NEW YORK STATE | Department of Environmental Conservation

KATHY HOCHUL
Governor

AMANDA LEFTON
Commissioner

May 27, 2026

Matthew Walsh
Manager, Health & Safety
GTE Operations Support Incorporated
1 Verizon Way, VC33E039
Basking Ridge, New Jersey 07920-1097

Re: 100% Remedial Design Report
G.T.E. Products Corporation Site
Site No.: 850003
Town of Seneca Falls, Seneca (C)

Dear Mr. Walsh:

The New York State Department of Environmental Conservation (NYSDEC) in conjunction with the New York State Department of Health (NYSDOH) has completed a review of the October 2025 100% Remedial Design Report (Report) for the G.T.E. Products Corporation site (Site) located at 50 Johnston Street in the Town of Seneca Falls, Seneca County. Based on the information presented in the Report, the Report is conditionally approved with the clarifications and modifications presented below.

1. NYSDEC understands that there may be skilled trades on the Site conducting activities in areas of the Site with the potential to encounter contamination. The Site's PE of record, a NYS licensed and registered PE, or an individual who is a direct report/under the direct supervision of the PE of record will be on-site to ensure those skilled trades are not exposed to Site contamination.

2. Soil/fill material (including sand) imported to the Site must meet the lowest of the restricted use or the protection of groundwater SCO in the current 6 NYCRR Part 375-6.8(b) unless the protection of ecological SCOs is applicable. All non-soil/fill material (e.g., crusher run, pea stone) and all soil/fill material will require a request to import form submittal with all supporting documentation (e.g., summarized laboratory analytical data, sieve analysis). The material proposed for importation to the Site can only be imported to the Site once the NYSDEC project manager has approved the material for import.

3. Within the Report there is a reference that trichloroethene (TCE) was used "anecdotally" at the Site. Given that the Site has TCE dense non-aqueous phase liquid (DNAPL) in subsurface soils and groundwater concentrations (e.g., 230,000 ug/L) significantly above groundwater standard (5ug/L), Site data collected to date clearly shows that the TCE was used at the Site.

4. Section 1; Introduction; Page 1: The current SCOs as presented in 6 NYCRR Part 375-6.8(b) are applicable to the Site unless a Site-specific SCO was established in the Statement of Basis for the Site. Note – The current 6 NYCRR Part 375 (2025) replaces all references to the Part 375 (2006) in the Report.

5. Section 1.3; Areas of Concern; Page 3: The sediments in the canal and potentially Van Cleef Lake will be identified as AOC 6 which is tracked under OU-2.

6. Section 2.1.2; Volatile Organic Compounds Monitoring; Page 4: The NYSDEC understands that Community Air Monitoring Plan (CAMP) VOC monitoring will not be occurring during the remedial activities for OU-2. Please note that if subsequent analytical data indicates that VOCs are a contaminant of concern for OU-2, CAMP VOC monitoring will be implemented as detailed in Appendix E.

7. Section 2.1.3; Particulate Monitoring; Page 4-5: The NYSDEC understands that no visible dust will be seen on-site or leaving the Site. NYSDEC understands that CAMP particulate monitoring will be conducted for the implementation of all remedial actions completed in OU-1 and OU-2.

8. Section 2.2; Selected Remedy Description; Item b for OU-2; Page 5: The SOB doesn't differentiate between saturated and unsaturated soils within the historical outfalls to be excavated. The SOB states that soils within AOC 5 that exceeds the commercial SCOs (on-site) and restricted residential SCOs (off-site) will be excavated. The NYSDEC understands that all soils that exceed the commercial SCOs within AOC 5 will be excavated unless it is detailed in the Reportto be capped with a concrete mattress. NYSDEC also understands that the floodplain and bank restoration will target the removed vegetation and establish stable banks.

9. Section 2.3; Remedial Design Elements; Page 6: Bullet #2 regarding saturated and unsaturated soils see the NYSDEC's comment above regarding this issue.

10. Section 3.3; Permitting; Pages 9-11: All permits and authorizations obtained after the approval of the Report will be submitted to the NYSDEC project manager for the project file prior to the start of field work activities.

11. Section 4.1.3; Site Preparation Activities; Pages 13-14: NYSDEC understands that well abandonment will be conducted in accordance with the NYSDEC's CP-43 guidance and will be documented in the Site's Final Engineering Report (FER).

12. Section 4.1.8; Operations; Pages 18-19: NYSDEC understands that the timeframes provided in this section are estimations and the actual timeframes for the operation of the ISTR will be based on the operational data collected such as temperature, pressure, and analytical data of the soil samples.

13. Section 4.1.10; Basis for Initiating Confirmation Sampling; Pages 20-21: Soil sampling results will be provided to the NYSDEC, and concurrence obtained, prior to transitioning to shutdown and initial cooling phase or continuing with the maintenance phase of the ISTR.

14. Section 4.1.11; Confirmation Soil Sampling Program; Page 21: A minimum of 2 soil samples will be collected per boring. Additional soil samples for laboratory analysis may be collected based on field screening impacts.

15. Section 4.1.13; Vapor Intrusion Mitigation and Monitoring; Pages 22-26: NYSDEC understands the approach as presented in the March 19, 2026 email (see attached) will be applied to the Site during the ISTR remedial implementation. This understanding/agreement is based solely on the Site-specific details associated with the G.T.E Site. NYSDEC understands that the majority of buildings are currently vacant and are currently used as large warehouse spaces. If, however, conditions at the Site change pre-, during, and post-ISTR remedy implementation then the action levels will need to be adjusted accordingly, and the NYSDEC and NYSDOH project managers will need to be notified for approval of correction actions.

NYSDEC understands that the SSD systems installed at the Site are not expected to be impacted/damaged during the ISTR remedy implementation. If the SSD systems are impacted/damaged, then a work plan presenting the corrective actions to address the damage/impacts to the SSD systems will be submitted to the NYSDEC and NYSDOH project managers for review and approval.

16. Section 4.1.13.2; Monitoring; Page24-25: An outdoor air sample will be collected for AOC 1, and the location will be outside to the area of the thermal influence zone. For AOC 3, the outdoor air sample will be moved to outside the thermal influence zone. NYSDEC understands that Building 13 is occupied and indoor air sampling/monitoring will be completed in the building.

17. Section 4.2; Unsaturated Soil Excavation; Page 26: The approach to resample the unsaturated soil excavation area after the completion of the ISTR is acceptable as the ISTR heating of the subsurface could reduce the volume of TCE impacted material within the proposed excavation area. The limited unsaturated soil excavation activities proposed at the Site are from the 0-3 foot interval. The new TCE commercial SCO (54 ppm vs 200 ppm) will be applied to the soil excavation area. The comment above regarding 6 NYCRR Part 375 is applicable to the backfill material to be placed in the completed excavation area.

18. Section 5; Operable Unit 2 Remedial Design: On April 30, 2026, NYSDEC issued a letter regarding the interpretation of the limits of the Operable Unit #2 remedial efforts and the issue of saturated vs. unsaturated soil within the floodplain. In addition, NYSDEC requested a supplemental work plan that addresses the 100-year floodplain to the navigational channel. The letter is attached. Accordingly, the conditional approval of the Report for Operable Unit #2 is only for the work proposed within the historical outfalls ditch remediation as detailed in October 2025 Report.

    All soils within the outfall ditches, saturated and/or unsaturated, with elevated cadmium exceedances above the commercial SCO (on-site) and residential SCO (off-site) will be excavated, containerized, characterized, and disposed off-site at a permitted landfill facility in accordance with all applicable local, State, and Federal regulations unless detailed in the Report as being capped in place. Note, a contained-in determination may be needed in order to dispose the material off-site at a permitted facility as non-hazardous waste.

19. Section 5.2; Site Preparation and Controls; Page 28-30: All material imported to the Site for road construction/stabilized entrances/staging areas/etc. must obtain NYSDEC project manager approval prior to import. All stockpiled excavated material will be covered to prevent wind and precipitation erosion. Decontamination pads will have a sump to collect any liquids generated during the decon process. No visible dust during all remedial activities and hauling of Site materials.

20. Section 5.3; Survey Control; Page 30: The surveys will be used for as-builts documenting the excavations, sampling and restoration of the ditch areas. As-builts drawings will be stamped as per DER-10 by a NYS licensed and registered PE of record for the Site.

21. Section 5.4.1; Historical Outfall 2 Ditch; Page 31-32: After a review of the Report and the PDI data as presented in Table 1 of the PDI Report dated March 2022, NYSDEC understands the following:
    - The excavation area will be dewatered. The water within and encountered will be managed – containerized, characterized, and disposed off-site at a permitted facility in accordance with all applicable local, State, and Federal regulations.

- Excavation in Historical Outfall 2 (HO2) Sample Location #1 will be completed to at least 4 feet or to refusal. PDI data shows exceedances of Site SCO at 3 feet. A documentation sample will be collected for laboratory analysis.
- Excavation in HO2 Sample Location #2 will be completed to at least 5 feet or to refusal. PDI data shows exceedances of Site SCO. A documentation sample will be collected for laboratory analysis.
- Excavation in HO2 Sample Location #3 will be completed to at least 3 feet or to refusal. PDI data shows exceedances of Site SCO. A documentation sample will be collected for laboratory analysis.
- Excavation in HO2 Sample Location #4 will be completed to at least 3 feet or to refusal. PDI data shows exceedances of Site SCO. A documentation sample will be collected for laboratory analysis.
- Excavation in HO2 Sample Location #5 will be completed to at least 3 feet. PDI data shows compliance with Site's SCOs at 3 feet.
- Excavation in HO2 Sample Location #6 will be completed to at least 4 feet or to refusal. PDI data shows exceedances of Site SCO. A documentation sample will be collected for laboratory analysis.

22. Section 5.4.3; Historical Outfall 4 Ditch; Page 32: After a review of the Report and the PDI data as presented in Table 1 of the PDI Report dated March 2022, NYSDEC understands the following:
    - The excavation area will be dewatered. The water within and encountered will be managed – containerized, characterized, and disposed off-site at a permitted facility in accordance with all applicable local, State, and Federal regulations.
    - Excavation in Historical Outfall 4 (HO4) Sample Location #1 will be completed to at least 3.5 feet. PDI data shows compliance with Site's SCOs at 3.5 feet.
    - Excavation in HO4 Sample Location #2 will be completed to at least 6.5 feet or to refusal. PDI data shows exceedances of Site SCO. A documentation sample will be collected for laboratory analysis.
    - Excavation in HO4 Sample Location #3 will be completed to at least 3.5 feet or to refusal. PDI data shows exceedances of Site SCO. A documentation sample will be collected for laboratory analysis.
    - Excavation in HO4 Sample Location #4 will be completed to at least 5.5 feet or to refusal. PDI data shows exceedances of Site SCO. A documentation sample will be collected for laboratory analysis.
    - Excavation in HO4 Sample Location #5 will be completed to at least 4 feet. PDI data shows compliance with Site's SCOs at 4 feet.
    - Excavation in HO4 Sample Location #6 will be completed to at least 5 feet or to refusal. PDI data shows exceedances of Site SCO. A documentation sample will be collected for laboratory analysis.

23. Section 5.4.4; Historical Outfall 5 Ditch; Page 33: After a review of the Report and the PDI data as presented in Table 1 of the PDI Report dated March 2022, NYSDEC understands the following:
    - The excavation area will be dewatered. The water within and encountered will be managed – containerized, characterized, and disposed off-site at a permitted facility in accordance with all applicable local, State, and Federal regulations.
    - Excavation in Historical Outfall 5 (HO5) Sample Location #1 will be completed to at least 5.5 feet. PDI data shows compliance with Site's SCOs at 5.5 feet.
    - Excavation in HO5 Sample Location #2 will be completed to at least 6.0 feet or to refusal. PDI data shows exceedances of Site SCO. A documentation sample will be collected for laboratory analysis.

- Excavation in HO5 Sample Location #3 will be completed to at least 4.0 feet. PDI data shows compliance with Site's SCOs at 4.0 feet.
- Excavation in HO5 Sample Location #4 will be completed to at least 4.5 feet or to refusal. PDI data shows exceedances of Site SCO. A documentation sample will be collected for laboratory analysis.
- Excavation in HO5 Sample Location #5 will be completed to at least 3.5 feet or to refusal. PDI data shows exceedances of Site SCO. A documentation sample will be collected for laboratory analysis.

24. Section 5.4.5; Historical Outfall 6, 7, and 6/7 Ditch; Page 33: After a review of the Report and the PDI data as presented in Table 1 of the PDI Report dated March 2022, NYSDEC understands the following:
    - The excavation area will be dewatered. The water within and encountered will be managed – containerized, characterized, and disposed off-site at a permitted facility in accordance with all applicable local, State, and Federal regulations.
    - Excavation in Historical Outfall 6 (HO6) Sample Location #1 will be completed at least 1 foot. PDI data shows compliance with Site's SCOs at 1 foot.
    - Excavation in HO6 Sample Location #2 will be completed at least 1 foot. PDI data shows compliance with Site's SCOs at 1 foot.
    - Excavation in HO6 Sample Location #3 will be completed at least 1 foot. PDI data shows compliance with Site's SCOs at 1 foot.
    - Excavation in HO6 Sample Location #4 will be completed at least 1 foot. PDI data shows compliance with Site's SCOs at 1 foot.

    - Excavation in Historical Outfall 7 (HO7) Sample Location #1 will be completed at least 1 foot. PDI data shows compliance with Site's SCOs at 1 foot.
    - Excavation in HO7 Sample Location #2 will be completed at least 1 foot. PDI data shows compliance with Site's SCOs at 1 foot.
    - Excavation in HO7 Sample Location #3 will be completed at least 1 foot. PDI data shows compliance with Site's SCOs at 1 foot.
    - Excavation in HO7 Sample Location #4 will be completed to at least 1.5 feet. PDI data shows compliance with Site's SCOs at 1.5 feet.

    - Excavation in Historical Outfall 6/7 (HO6/7) Sample Location #1 will be completed at least 1 foot. PDI data shows compliance with Site's SCOs at 1 foot.
    - Excavation in HO6/7 Sample Location #3 will be completed at least 1 foot. PDI data shows compliance with Site's SCOs at 1 foot.
    - Excavation in HO6/7 Sample Location #4 will be completed to at least 1.5 feet. PDI data shows compliance with Site's SCOs at 1.5 feet.

25. Section 5.6; Water Management; Page 34: Any fluids generated during the remedial activities will be containerized, characterized, and disposed in accordance with Section 6 of the Report.

26. Section 5.7; Backfilling and Restoration; Pages 34-35: Aggregate material used for the construction of the remediation support areas may be used on the Site if there was absolutely no contact with Site soils (direct or indirect contact). If the material was used in the construction entrances to the public highways, that material would be able to be reused on the Site assuming that all equipment and trucks leaving the Site underwent decontamination prior to exiting the Site.

27. Section 6; Waste Management; Table 2; Page 36-37: NYSDEC understands that the reuse of existing Site soils on-site (AOC soils detailed on Page 38) as backfill material is contingent upon field screening results. The soil/fill material will be field screened visually (e.g., staining), for odors, and with a PID with a screening level of 25 ppm. If the soil/fill material exhibits impacts that material must be containerized, characterized, and disposed off-site at a permitted landfill facility in accordance with all applicable local, State, and Federal regulations. For the material to be disposed off-site as non-hazardous a contained-in determination must be obtained from the NYSDEC before disposal can occur. This includes the cadmium impacted excavated material from the historical outfall ditches.

    Concrete and asphalt material removed as part of the trenching and excavation activities must also be field screened as detailed above. If the material exhibits impacts that material must be managed in accordance with the details provided in the above comment.

    Piping and hoses and down well components may only be reused off-site if those components undergo decontamination at the Site.

    NYSDEC understands that the granular activated carbon reuse off-site refers to returning the carbon units to the vendor for regeneration.

    All discharges to the canal will be completed in accordance with the NYSDEC issued permit.

28. Section 6.1.1.1; Soils; 1st Bullet; Page 39: NYSDEC understands that the reuse of soil/fill material on-site will be above the water table and below the Site cover system. If the material is not placed in one of the AOCs as detailed on Page 38 then NYSDEC project manager approval must be obtained prior to placement. The placement of the Site soils in the AOCs as detailed on Page 38 will be documented and detailed in the Site's Final Engineering Report in text and on as-built drawings that are signed and stamped by the PE of record for the Site.

    2nd Paragraph; Page 39: Screening of soils/fill material will be in accordance with the comment above as well as the detail presented in this paragraph. Field screening will be conducted on each bucket of material removed from the excavation area. All liquids collected from excavated saturated soils will be containerized, characterized, and disposed off-site at a permitted facility in accordance with all local, State, and Federal regulations.

29. Section 6.1.1.2; Concrete and Asphalt; Pages 39-40: Concrete and asphalt material removed as part of the trenching and excavation activities must also be field screened as detailed above. If the material exhibits impacts that material must be managed in accordance with the details provided in the above comment. The concrete vapor cap can be managed as detailed in this section.

30. Section 6.1.1.5; Granular Activated Carbon; Page 41: NYSDEC understands that the activated carbon used at the Site will either be disposed off-site at a permitted landfill facility or will be returned to the vendor for regeneration. Landfill disposal will be in accordance with all applicable local, State, and Federal regulations and will require a contained-in determination for disposal as non-hazardous waste obtained from the NYSDEC prior to disposal.

31. Section 6.2; Operable Unit 2; Page 41-41: All soils/fill material excavated from the historic outfall ditches will be managed as either hazardous waste or non-hazardous waste if a contained-in determination has been obtained from the NYSDEC. NYSDEC understands that construction and

demolition debris removed to facilitate historic outfall excavations will be managed as a hazardous waste.

Materials excavated during the access road enhancement will be staged on-site and sampled in accordance with DER-10 Table 5.4(e)10 for the full suite of analytical parameters.

32. Section 6.3; Contained-In Request; Page 42: A contained-in determination will need to be obtained from the NYSDEC for the off-site disposal of any solids (e.g., soil, debris, bricks) or liquids that are to be disposed as non-hazardous waste. Otherwise, NYSDEC understands that all materials generated as part of the remedial activities will be disposed off-site as hazardous waste at a permitted facility in accordance with all applicable local, State, and Federal regulations. Note all documentation associated with off-site disposal of all materials will be provided in the Site's Final Engineering Report. The Final Engineering Report will also provide documentation of all materials/components that are to be reused off-site.

33. Section 6.4; Discharge to Surface Water; Page 42-43: The discharges to the canal will be conducted under a NYSDEC issued permit in accordance with the permit conditions. The fluids treatment system for OU-2 and all other liquids collected, not including OU-1, will be designed to treat the contaminants of concern at the Site and meet the issued permit discharge requirements. The water samples will be analyzed at a laboratory with a current ELAP certification for the analytical methods to be conducted. The NYSDEC project manager and the Division of Water project manager will be notified at least 24 hours in advance of any discharges to the canal.

34. Section 7.1; Final Engineering Report; Page 44: The Final Engineering Report (FER) will be prepared using the current FER template as provided on NYSDEC's public website. The FER will include all certification language as presented in the template and DER-10. NYSDEC understands that the term record drawings includes as-built drawings, whichwill be stamped and signed by the PE of Record for the Site who is licensed and registered in NYS. The FER will also include documentation of imported material to the Site. With respect to the placement of Site material in the AOCs an as-built drawing will be included for each AOC and will document the vertical and horizontal extent of the Site material placed in the AOC. The FER will include an appendix with a copy of all field logbooks/field notes. The FER will include summary tables for analytical data generated during remedy implementation.

35. Section 7.2; Site Management Plan; Page 44-45: The Site Management Plan will be prepared using the SMP template as provided on the NYSDEC's public website. The Site's SMP will be a living document that will run in perpetuity with the Site. Note – to date an interim SMP has not be submitted or approved by the NYSDEC and NYSDOH. The NYSDEC does not require the SMP to be included in the FER.

36. Section 7.3; Institutional Controls; Page 45: The environmental easement will be executed by the NYSDEC and will be recorded by the Seneca County Clerk.

37. Section 7.4; Long Term Monitoring; Page 45: All Site related long term monitoring and site inspections will be detailed in the SMP. NYSDEC agrees that the current SVI and groundwater sampling frequency will be maintained until the Site's SMP is approved by the NYSDEC and NYSDOH.

38. Section 8; Schedule; Page 46: All permits and approvals will be obtained and provided to the NYSDEC project manager prior to the start of any fieldwork activities associated with the permits and approvals.

Appendix B – Stormwater Pollution Prevention Plan (SWPPP)

39. NYSDEC understands that all references to Engineer in this section is the NYS licensed and registered professional engineer (PE) of record for the Site. Either the PE of record or a qualified individual who is a direct report and under the direct supervision of the PE of record will be on-site for all remedial activities.

40. Section 2.3; Page 3: The NYSDEC understands that the cadmium contamination is also within the 100-year floodplain and the sediments within the canal up to the navigational channel.

41. Section 3.1.7; General Site Restoration; Page 9: The perennial selected for restoration of the disturbed areas will be submitted to NYSDEC for review and approval prior to the start of restoration.

42. Section 3.2; Non-Stormwater Discharges; Page 9: All groundwater collected, and Site construction dewatering fluids will be containerized, characterized, and disposed off-site at a permitted facility in accordance with all applicable local, State, and Federal regulations. Note a contained-in determination may need to be obtained for off-site disposal as non-hazardous waste.

43. Section 4.1; Design Components; Page 10: NYSDEC understands that Arcadis will have a qualified environmental professional (QEP) that is a direct report to the PE of record for the Site to oversee the installation, inspection, and maintenance of the erosion and sediment controls installed for the remedial action.

44. Section 4.2.2; Temporary Construction Entrance; Page 10: NYSDEC project manager approval prior will be obtained prior to import to the Site of all material for the construction of the temporary entrance(s). . A request to import material will be submitted to the NYSDEC project manager. Absolutely no Site related material is to be tracked onto public rights-of-ways/streets/roads. All entrances and egresses will be inspected daily at the beginning of the workday and at the end of the workday by the QEP as defined above.

45. Section 4.3.2; Periodic Site Inspections; Page 12: NYSDEC understands that the qualified inspector is the QEP as defined above.

46. Section 5.1.1; Soil; Page 13: A contained-in determination will be obtained from NYSDEC prior to disposal of any soil material/sludge/sediment at a permitted landfill facility. A minimum of 12-mil poly sheeting/liners will be used for the stockpiling of soil material as well as covering stockpiles during working and non-working hours. A decontamination pad will be installed and all vehicles exiting the Site as well as equipment leaving the Site will be decontaminated. All decontamination material generated (liquids, solids, sediment, sludges) will be containerized, characterized, and disposed off-site at a permitted facility in accordance with all applicable local, State, and Federal regulations. Note off-site disposal as non-hazardous waste requires a contained-in determination to be obtained from NYSDEC prior to disposal.

47. Section 5.1.2; Construction-Related Water; Page 13-14: All construction related water/fluids generated during the remedial action will be containerized, characterized, and disposed off-site at a permitted facility or will be completed under a local, State, or Federal issued permit. Note off-site disposal as non-hazardous waste requires a contained-in determination to be obtained from NYSDEC prior to disposal.

48. Section 5.2; Spill Prevention, Control, and Response; Page 14: NYSDEC understands that all workers will be familiar with the Contractor's Health and Safety Plan (HASP) and tailgate meetings will be held at the beginning of each workday.

49. Section 5.3; Dust Controls; Page 15: No visible dust is permitted on-site or leaving the Site. Work will be halted and dust control measures will be implemented in the event visible dust is observed. A minimum 12-mil poly sheeting/liner will be used for stockpiling purposes as detailed above.

Appendix E – Community Air Monitoring Plan (CAMP)

50. NYSDEC understands that all references to Engineer in this section is the NYS licensed and registered professional engineer (PE) of record for the Site. NYSDEC understands that either the PE of record or a qualified individual who is a direct report and under the direct supervision of the PE of record will be on-site for all remedial activities.

51. Section 1.4; Air Emission Control Measures; Page 3: In addition to the actions listed in this section, the CAMP will be implemented for all ground intrusive activities.

52. Section 2.1.1; Monitoring Location Selection and Deployment; Page 4: At a minimum, 1 downwind location will be established. Additional downwind monitoring locations may need to be deployed contingent upon the location of the remedial activities and wind direction.

53. Section 2.3; Reporting; Page 8-9: Daily reports will be submitted to the NYSDEC and NYSDOH project managers via email by noon the next day and will, at a minimum, detail the CAMP activities completed, include a figure indicating the wind direction, weather information, CAMP data/locations, air intakes/exposed individuals, and the excavation areas/ground intrusive locations as well as details for any corrective actions undertaken for CAMP exceedances. The daily report will also include any odor issues encountered and odor control corrective measures implemented. Note – Julia Kenney's telephone number is 518-402-7873 and her email address is Julia.kenney@health.ny.gov

Appendix F – In-situ Thermal Remediation System Design Report

54. NYDEC understands that all references to the storm water sewer is the on-site storm water management system which discharges to the canal via the ITO. All discharges to the canal will be regulated under a NYSDEC issued permit.

55. Section 3.5.5; Injection System; Pages 17-18: USEPA Region 2 approval for the injection of potassium chloride or equivalent electrolyte solution will be obtained prior to the ISTR system start-up, and a copy of the approval will be provided to the NYSDEC project manager.

56. Section 3.7; Sampling and Analysis; Pages 19-21: NYSDEC understands that the term "bi-weekly" is defined as once every two weeks. NYSDEC understands that either a sampling port will be installed for the daily PID sampling/monitoring or vapor samples will be collected into a Tedlar bag and screened with the PID.

57. Section 4; Construction Activities; Page 22: NYSDEC understands that the wet testing of the treatment system will use potable water provided by the Town of Seneca Falls.

58. Section 4.4; System Shutdown and Site Restoration; Page 32: The extraction system will continue to operate for a minimum of 5 days with the potential for longer operation based on the TTZ generation water steam. The treatment system will operate until all extracted vapor and water have been properly treated.

Appendix G – Waste Management Plan for ISTR Preparation Activities

59. All local permits and authorizations for the closure of public utilities will be obtained prior to the field work activities.

60. Section 3.1.2.1; Water Main Relocation; Bullet #2; Page 4: NYSDEC understands that 2 segments of pipe located 10 feet and 15 feet outside the thermal influence zone as presented on Figure 8 of Appendix G.

61. Section 3.1.2.1; Water Main Relocation; Bullet #3; Page 4: NYSDEC understands that the areas of removal will be backfilled with the excavated soil/fill material. If the excavated soil/fill material is grossly contaminated or has field screening impacts (PID screening – 25 ppm, visual impacts, odors), then the material will be containerized, characterized and disposed off-site at a permitted facility in accordance with all applicable local, State, and Federal regulations. The soil/fill material may be disposed off-site at a permitted facility as non-hazardous waste if a contained-in determination has been provided by the NYSDEC for that material. A request to import fill material must be submitted and approved by the NYSDEC project manager prior to the import of the fill material to the Site (Detailed in Section 3.1.3).

62. Section 3.1.2.2; Stormwater System Modifications; Page 4: NYSDEC understands that the flowable fill material will not impede the heating of the subsurface.

63. Section 3.1.2.2; Stormwater System Modifications; Bullet #1; Page 5: The imported sand material specifications will be submitted to the NYSDEC project manager in a request to import fill material for review and approval prior to importation to the Site. Catch basin CB-1A will be cleaned prior to filling with flowable fill material. The material and liquids generated from the cleaning of the catch basin will be containerized, characterized, and disposed off-site at a permitted facility in accordance with all applicable local, State, and Federal regulations.

64. Section 3.1.2.3; Other Pipe Filling/Plugging Activities; Page 5: The below grade piping referenced in this section will be cleaned prior to filling and plugging activities. The material and liquids generated from the cleaning of the below grade piping will be containerized, characterized, and disposed off-site at a permitted facility in accordance with all applicable local, State, and Federal regulations.

65. Section 3.1.3; Excavation and Backfill; Page 6: 7-days advance notification will be provided prior to the start of excavation activities so that appropriate Department oversight can be provided.

66. Section 4.1; Soil; Page 8: The excavated soil/fill material will have field screening completed. Field screening includes PID screening with a 25-ppm level, odors, and visual impacts such as staining. The evaluation regarding the reuse of soil/fill material sampling will include 2 samples collected – 1 VOC grab sample and 1 composite sample. The samples collected will be analyzed as per Section 5.7 of the Report and will be analyzed at an ELAP laboratory certified for the analytical method.

67. Section 5; Schedule and Reporting; Page 10: As-built drawings will be included in the Final Engineering Report documenting the locations and volume of material reused as backfill material at the Site. This also includes the AOC locations.

68. Figure 3: NYSDEC understands that the above grade SSDS piping will not be impacted during the ISTR heating activities.

69. All figures with concrete removal and soil/fill material excavation indicated - the comment above regarding field screening of concrete during the relocation and abandonment activities at the Site is applicable.

70. All figures with concrete and asphalt removal and soil/fill material excavation indicated – the removed/excavated material will be staged on 30 mil HDPE liners and covered and anchored with a minimum of 12 mil poly sheeting to prevent any wind and precipitation erosion.

Appendix H – Operable Unit 2 Design Drawings and Specifications

71. The following clarifications/modifications are applicable to Operable Unit #2:
    - No visible dust will be generated during the remedial actions
    - No soil/fill material will enter the canal.
    - CAMP monitoring for dust will occur for all ground intrusive activities in Operable Unit #2 unless data indicates that VOCs is an issue.
    - Dust mitigation equipment will always be on-site.
    - All soil/fill material excavated/removed from Operable Unit #2 will need a contained-in determination to be disposed off-site at a permitted landfill facility as non-hazardous waste.
    - Erosion control measures will be implemented during the remedial actions in Operable Unit #2.
    - Strawbales will be used. Haybales are prohibited.
    - All backfill material (including check dam material) to restore grades in Operable Unit #2 will be approved by the NYSDEC project manager prior to importation to the Site. A request to import must be submitted with all supporting documentation for review and approval. If backfill material is to be stored at the Site, the backfill material must be staged and covered with a minimum of 12 mil poly sheeting.
    - All imported material to improve the access road must be approved by the NYSDEC project manager prior to importation to the Site. A request to import must be submitted with all supporting documentation for review and approval.
    - All liquids collected as part of the remedial actions (including stormwater) and the dewatering process will be containerized, characterized, and disposed off-site at a permitted facility or under a NYSDEC issued permit.
    - All material imported for the construction of the dewatering sump, collection sump, the containment area, construction entrance, and the decontamination area(s) will be approved by the NYSDEC project manager prior to importation the Site. A request to import must be submitted with all supporting documentation for review and approval.

Within 15 days of the date of this letter, the remedial party shall elect in writing:

a) Option A - Accept the NYSDEC modified report; or
b) Option B - Invoke dispute resolution as set forth in Section 375-1.5(b)(2).

If the remedial party chooses to accept Option A, then this letter becomes part of the approved 100% Remedial Design Report dated October 2025. Also, if Option A is chosen, then a copy of the approved 100% Remedial Design Report along with this letter attached must be placed in the document repository within 1 week of accepting Option A and prior to any fieldwork activities. Please provide notification to the Department that the 100% Remedial Design Report and a copy of this letter have been placed in the document repository (electronic notification is acceptable).

NYSDEC seeks to resolve outstanding differences in a mutually agreeable manner which addresses the requirements of the RCRA Corrective Action Order on Consent, Part 375, and all applicable laws, regulations, and guidance. If you or your technical team have any questions or concerns regarding this modification letter, please contact me via email at charlotte.theobald@dec.ny.gov or at 585-226-5354. If your legal team have any questions or concerns regarding this letter, please feel free to contact Michael Murphy via e-mail at Michael.Murphy1@dec.ny.gov or at 518-402-8564.

Sincerely,



Charlotte B. Theobald
Assistant Engineer

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NEW YORK STATE | Department of Environmental Conservation

KATHY HOCHUL
Governor

AMANDA LEFTON
Commissioner

April 30, 2026

Matthew Walsh
Manager, Health & Safety
GTE Operations Support Incorporated
1 Verizon Way, VC33E039
Basking Ridge, New Jersey 07920-1097

Re: Sediment and Statement of Basis
G.T.E. Products Corporation Site
Site No.: 850003
Town of Seneca Falls, Seneca (C)

Dear Mr. Walsh:

The New York State Department of Environmental Conservation (Department) inquired via e-mail on March 3, 2026 regarding a decision for the remediation of cadmium impacts associated with Operable Unit (OU) #2 Item #2 sediments within the canal as detailed in the Site's executed Statement of Basis (SOB). On April 2, 2026 the Department received GTE's response to the Department's March 3, 2026 inquiry.

BACKGROUND:
The G.T.E. Products Corporation site (Site) is located at 50 Johnston Street, Town of Seneca Falls, Seneca County. The 64.2-acre Site includes an approximately 13-acre complex of interconnected buildings constructed between 1914 and the 1970s. The remaining 51 acres are primarily asphalt parking lots and roadways, grassy areas, and woods. Residential and undeveloped properties surround the Site to the west, north, and east. Railroad tracks line the northeastern property boundary. The Cayuga-Seneca Canal (canal), which includes Van Cleef Lake and portions of the Seneca River and is part of the New York State Barge Canal, is adjacent to and south of the Site. The canal and the land between the canal and the Site are owned by the New York State Canal Corporation.

The Site is undergoing RCRA Corrective Action under an Order on Consent that was executed on October 19, 2019. The Site's selected remedy is presented in the Statement of Basis that was executed on March 31, 2018. A Corrective Action Work Plan (CAWP) was contingently approved by the Department on April 13, 2020. A Pre-Design Investigation (PDI) Report was submitted March 2022 and the Department provided comments on July 28, 2022 that were to be addressed in the Remedial Design Work Plan (RDWP). The Department has reviewed and provided comments on the 95% RDWP and is currently reviewing the 100% RDWP.

CURRENT ISSUE:
Cadmium impacts in the sediments associated with the Cayuga Seneca Canal, Van Cleef Lake, and the Cayuga Lake Outlet came to the forefront due to sediment sampling completed in September 2025 by the New York State Power Authority. The Department has conducted a review of the sediment sampling history associated with these bodies of water as well as a review of the SOB for the Site. The Site's SOB for OU #2 addresses cadmium impacts on-site and off-site including sediment material located in the canal.

On March 3, 2026, the Department requested documentation to support GTE's position that Item #2 of the SOB did not need to be addressed. G.T.E. provided a response on April 2, 2026 with no supporting written documentation from the previous project managers. The Department does not agree with the statements and conclusions provided in G.T.E.'s April 2, 2026 response as explained below.

G.T.E. Statement:

- During our earlier conversation we did not mean to suggest that no action was needed with respect to Statement of Basis (SOB) Operable Unit (OU) 2 Item #2. To clarify, previous discussions between GTEOSI and NYSDEC established that the sediment referenced in OU2 Item #2 is alluvium located along the historical outfall ditch alignments that cross the floodplain next to the canal.

Department Response:

- The SOB states that cadmium impacted material that exceeds the sediment criteria from the limit of the 100-year flood plain to the navigational channel will be removed.
- A navigational channel is commonly defined as the designated, often the dredged, route within a waterway with sufficient depth for vessel passage. Based New York State Canals navigation information with water depths, the navigational channel width adjacent to the Site is approximately 45 feet in width and approximately 9 feet deep.

G.T.E. Statement:

- Following NYSDEC's issuance of the draft SOB in February 2018, the NYSDEC project manager at the time, Chris Magee, and I discussed the intended scope of OU2 Item #2 regarding sediment sampling and removal.
- The discussion clarified that the phrase "edge of the navigation canal" in the draft SOB was intended to define the boundary of the adjacent land that could become submerged. This boundary, in turn, would establish the limits for sediment removal.
- Specifically, the sediment referred to in OU2 Item #2 is the material situated between the canal's edge—where historical outfall ditches entered the canal—and the "edge of the navigation canal." Mr. Magee also noted that he considered earth within the floodplain to be sediment, hence the specific wording in OU2 Item #2.

Department Response:

- No written documentation has been provided documenting the definition of the "edge of the navigational canal" as described by the G.T.E. The Department agrees that the lands that could be submerged during a 100-year flood are considered sediment and will have the sediment numbers applied to this area which is detailed in the SOB. The Department understands that the sediments are from the upland edge of the 100-year floodplain to the nearest edge of the navigation channel within the Cayuga Seneca Canal.

G.T.E. Statement:

- During this conversation, Mr. Magee indicated that NYSDEC would consider using the mapped 100-year floodplain boundary to define the "edge of the navigation canal" for this purpose. This clarification was subsequently incorporated into the final SOB, issued on March 31, 2018 (see Comment 12 in the Responsiveness Summary, Appendix A).

Department Response:

- Provided below is the referenced comment and the Department's response as documented in the Responsiveness Summary, Appendix A of the executed SOB dated March 2018.

  - **Comment 12:** The subsection on OU 2, part 2, states that "*Sediments in the canal at the point where the outfall ravines enter the canal will be sampled and all sediments exceeding sediment criteria for the contaminants of concern will be removed up to the edge of the navigation canal.*" This section should be clarified to define the edge of the navigation canal as the 100-year floodplain boundary.

  - **Response 12:** Text was added to clarify that 6 NYCRR Part 373 Hazardous Waste Management Permits include requirements for corrective action. Owners of RCRA facilities must investigate and, when appropriate, remediate releases of hazardous wastes and/or constituents to the environment. G.T.E. Products Corporation does not operate site #850003 under a RCRA permit. Corrective action activities will be performed under the authority of an order that the Department hopes they can negotiate upon the finalization and signing of this Statement of Basis.

    Text was also added to identify the 100-year flood plain as the limit for the application of sediment criteria.

- No written documentation has been submitted to the Department that clearly states that the mapped 100-year floodplain boundary is the "edge of the navigation canal". The Site's SOB clearly states that the 100-year floodplain boundary is the boundary where soils are to be considered sediment and will have sediment criteria applied.

- The 2020 CAWP submitted and approved by the Department clearly states the definition of the floodplain as interpreted by G.T.E. in Section 3.4.2, Page 20-21:
  The floodplain area is defined as the land between the edge of the canal and the edge of the 100-year floodplain. The edge of the 100-year floodplain will be marked by a New York State-licensed Land Surveyor. The elevation of the 100-year floodplain downgradient of the dam at Van Cleef Lake is the topographic line at 386 feet above mean sea level (amsl), according to the Federal Emergency Management Agency Flood Insurance Rate Map for Seneca Falls, which is dated August 3, 1981.

G.T.E. Statement:
This confirmed understanding guided the preparation of the NYSDEC-approved Corrective Action Work Plan (May 2020), specifically Section 3.4. That section provided the rationale and scope for the pre-design investigation (PDI) within the historical outfall ditches and the floodplain adjacent to the canal. The PDI results were then used to define the excavation and restoration limits within the floodplain, as required by OU2 Item #2. These limits were incorporated into the ensuing Remedial Design Reports (95% RDR March 2023, 100% RDR May 2024, and Revised 100% RDR October 2025).

Department Response:
The Department reserves the right to modify the scope of work to be completed under an executed agreement. The issue surrounding the navigational channel and the associated definition must be addressed now as the 100% RDWP details the implementation of the selected remedy for the Site.

It has been stated by G.T.E. in documents submitted that the unsaturated soil (i.e., sediments) will be excavated as per the SOB. For example, in the 2020 CAWP Section 3.4.2: *The Statement of Basis calls*

for the excavation of unsaturated soil in the floodplain adjacent to the canal with concentrations of metals greater than residential SCOs.

The 2018 SOB does not differentiate between saturated or unsaturated soils in the remedial element for OU#2:

> *1. Limited Soil Excavation*
> *Excavating soil in AOC 5, the historic outfall ditches, with concentrations greater than commercial SCOs. AOC 5 soils that exist in drainage ditches beyond the limits of the former plant property will be remediated to residential clean-up objectives. A floodplain and bank restoration plan shall be included with the remedial design plan and will target restoration of removed vegetation and establishment of stable banks. Clean fill meeting the requirements of 6 NYCRR Part 375-6.7(d) (Protection of Ecological Resources) will be brought in to replace the excavated soil and establish the designed grades at the site*
>
> *2. Sediments in the canal at the point where the outfall ravines enter the canal (up to the limits of the 100 year flood plain adjacent to the former plant) will be sampled and all sediments exceeding sediment criteria for the contaminants of concern will be removed up to the edge of the navigation channel. Restoration of the excavation will be completed if the removal will leave unstable sediments or canal bank.*

Department's Conclusions and Determination:
The corrective action at the Site must address the sediments, unsaturated and saturated, located from the upland edge of the 100-year floodplain area to the edge of the navigational channel located within the Cayuga Seneca Canal in accordance with executed March 2018 Statement of Basis. The corrective action at the Site must also be protective of human health and the environment. The current October 2025 100% Remedial Design Work Plan does not address the saturated and unsaturated sediments on-site and off-site. As per the Site's Order on Consent, the Department is requiring a supplemental work plan that addresses the on-site and off-site saturated and unsaturated sediments to be submitted to the Department for review and approval. The supplemental work plan will be protective of human health and the environment. The supplemental work will detail the sampling and remediation of the unsaturated and saturated sediments from the upland edge of the 100-floodplain to the edge of the navigational channel and must be submitted within 90 days of the date of this letter. Failure to submit the supplemental work plan within 90 days of this letter will be considered a violation of the Order on Consent and subject to additional legal action.

The current 100% Remedial Design Work Plan will proceed forward in the review process for OU#1 In-situ thermal remediation and OU#2 for the historical outfall ditch remediation.

NYSDEC seeks to resolve outstanding differences in a mutually agreeable manner which addresses the requirements of the RCRA Corrective Action Order on Consent, Part 375, and all applicable laws, regulations, and guidance. If you or your technical team have any questions or concerns regarding this request, please contact me via email at charlotte.theobald@dec.ny.gov or at 585-226-5354. If your legal team have any questions or concerns regarding this request, please feel free to contact Michael Murphy via e-mail at Michael.Murphy1@dec.ny.gov or at 518-402-8564.

Sincerely,

Charlotte B. Theobald

Charlotte B. Theobald
Assistant Engineer

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GTE Operations Support Incorporated

100% Remedial Design Report

Former Philips Display Components Facility
Seneca Falls, New York
USEPA ID No. NYD002246015
NYSDEC Site No. 850003 – G.T.E. Products Corporation

October 2, 2025

100% Remedial Design Report

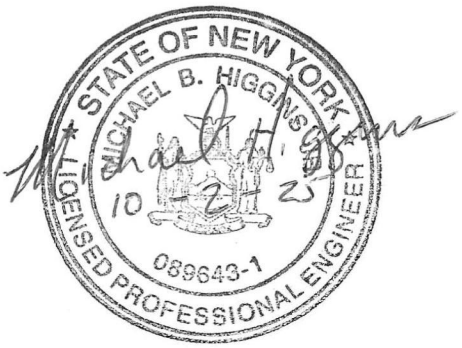
Former Philips Display Components Facility
Seneca Falls, New York
USEPA ID No. NYD002246015
NYSDEC Site No. 850003 – G.T.E. Products Corporation

October 2, 2025

Prepared By:
Arcadis of New York, Inc.
646 Plank Road, Suite 100
Clifton Park
New York 12065
Phone: 518 250 7300

Prepared For:
GTE Operations Support Incorporated

Our Ref:
30176334



Michael Higgins, P.E.
Principal Environmental Engineer

I, Michael Higgins, certify that I am currently a NYS registered professional engineer and that this 100% Remedial Design Report was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10) and that all activities were performed in full accordance with the DER-approved work plan and any DER-approved modifications.

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Contents

Acronyms and Abbreviations iv
1 Introduction 1
1.1 Site Description 1
1.2 Site Operational History 2
1.3 Areas of Concern 3
2 Remedial Program Overview 4
2.1 Remedial Action Objectives 4
2.2 Selected Remedy Description 5
2.3 Remedial Design Elements 5
3 Pre-Remediation Activities 7
3.1 Pre-Design Investigation 7
3.2 In Situ Waste Characterization for Operable Unit 2 7
3.2.1 Historical Outfall Ditches 2, 4, and 5 7
3.2.2 Historical Outfall Ditches 6, 7, and 6/7 8
3.3 Permitting 9
3.4 Health and Safety 11
4 Operable Unit 1 Remedial Design 12
4.1 In Situ Thermal Remediation 12
4.1.1 Remedial Objective 12
4.1.2 Treatment Areas 13
4.1.3 Site Preparation Activities 13
4.1.4 Subsurface Installation 14
4.1.5 Aboveground Installation 16
4.1.6 Aboveground Treatment System Installation 17
4.1.7 Electrical Installation 18
4.1.8 Operations 18
4.1.9 Maintenance and Performance Monitoring 19
4.1.10 Basis for Initiating Confirmation Sampling 20
4.1.11 Confirmation Soil Sampling Program 21
4.1.12 Demobilization and Restoration 21
4.1.13 Vapor Intrusion Mitigation and Monitoring 22

4.1.13.1 Mitigation Measures 22
4.1.13.2 Monitoring 24
4.1.13.3 Additional Mitigation Measures 25
4.1.13.4 Reopening of Exclusion Zones 25
4.2 Unsaturated Soil Excavation 26
5 Operable Unit 2 Remedial Design 27
5.1 Pre-Mobilization Activities 27
5.2 Site Preparation and Controls 28
5.3 Survey Control 30
5.4 Excavation Depths and Extents 30
5.4.1 Historical Outfall 2 Ditch 31
5.4.2 Historical Outfall 3 Ditch 32
5.4.3 Historical Outfall 4 Ditch 32
5.4.4 Historical Outfall 5 Ditch 33
5.4.5 Historical Outfalls 6, 7, and 6/7 Ditches 33
5.5 Historical Outfall 3 Ditch Capping 33
5.6 Water Management 34
5.7 Backfilling and Restoration 34
6 Waste Management 36
6.1 Operable Unit 1 37
6.1.1 In Situ Thermal Remediation 37
6.1.1.1 Soils 37
6.1.1.2 Concrete and Asphalt 39
6.1.1.3 Water 40
6.1.1.4 DNAPL, Sludge, and ISTR System Components 40
6.1.1.5 Granular Activated Carbon 41
6.1.2 Unsaturated Soil Excavation 41
6.2 Operable Unit 2 41
6.3 Contained-In Request 42
6.4 Discharge to Surface Water 42
7 Post-Remediation Activities 44
7.1 Final Engineering Report 44
7.2 Site Management Plan 44

7.3 Institutional Controls 45
7.4 Long Term Monitoring 45
8 Schedule 46
9 References 47

Tables (In Text)

Table 1 – Remedial Action Objectives 4
Table 2 – Anticipated Waste Streams and Management 36
Table 3 – Preliminary Project Schedule 46

Figures

Figure 1 Site Location
Figure 2 Remedial Action Areas
Figure 3 Site Utilities (Operable Unit 1)
Figure 4 Estimated Extent of DNAPL and Proposed Confirmation Sampling Locations (AOC 1)
Figure 5 Estimated Extent of DNAPL and Proposed Confirmation Sampling Locations (AOC 3)
Figure 6 Vapor Intrusion Mitigation During ISTR (AOC 1)
Figure 7 Vapor Intrusion Mitigation During ISTR (AOC 3)
Figure 8 New Sub-Slab Depressurization Point Details
Figure 9 Unsaturated Soil Excavation for Operable Unit 1 (AOC 1)
Figure 10 Areas of Contamination for Operable Unit 1

Appendices

Appendix A In Situ Waste Characterization Sample Locations and Analytical Data
Appendix B Stormwater Pollution Prevention Plan
Appendix C Air Emissions Evaluation Memorandum
Appendix D Site-Specific Health and Safety Plan
Appendix E Community Air Monitoring Plan
Appendix F In Situ Thermal Remediation System Design Report
Appendix G Waste Management Plan for ISTR Preparation Activities
Appendix H Operable Unit 2 Design Drawings and Specifications

Acronyms and Abbreviations

ºC	degrees Celsius
ºF	degrees Fahrenheit
AOC	Area of Concern
APE	Area of Potential Effect
Arcadis	Arcadis of New York, Inc.
bgs	below ground surface
canal	Cayuga-Seneca Canal
CAMP	Community Air Monitoring Plan
CAWP	Corrective Action Work Plan
COPC	constituent of potential concern
CY	cubic yards
DER-10	NYSDEC Division of Environmental Remediation Technical Guidance for Site Investigation and Remediation
digiTAM™	digital temperature acquisition module
DER	Division of Environmental Remediation
DNAPL	dense non-aqueous phase liquid
ERH	electrical resistance heating
ET-DSP™	Electro-Thermal Dynamic Stripping Process
FER	Final Engineering Report
GTEOSI	GTE Operations Support Incorporated
HASP	Health and Safety Plan
HO	historical outfall
ISTR	in situ thermal remediation
ITO	interceptor trench outfall
JPA	Joint Permit Application
Mc2	McMillan-McGee Corp.
mg/kg	milligrams per kilogram
MPE	multiphase extraction
NYCRR	New York Codes, Rules, and Regulations
NYSDEC	New York State Department of Environmental Conservation

NYSDOH	New York State Department of Health
NYSEG	New York State Electric & Gas
NYS OPRHP	New York State Office of Parks, Recreation, and Historic Preservation
OU	Operable Unit
pcf	pounds per cubic foot
PDI	Pre-Design Investigation
PEX	crosslinked polyethylene
PFAS	per- and polyfluoroalkyl substances
PID	photoionization detector
POP	Project Operations Plan
RAO	Remedial Action Objective
RCRA	Resource Conservation Recovery Act
RD	Remedial Design
SCO	Soil Cleanup Objective
Site	former Philips Display Components Facility, NYSDEC Site No. 850003 – G.T.E. Products Corporation
SPDES	State Pollutant Discharge Elimination System
SMD	sub-membrane depressurization
SMP	Site Management Plan
SSD	sub-slab depressurization
SSHASP	Site-Specific Health and Safety Plan
SVOC	semi-volatile organic compound
SWPPP	Stormwater Pollution Prevention Plan
TCE	trichloroethene
TCLP	Toxicity Characteristic Leachate Procedure
$\mu g/m^3$	micrograms per cubic meter
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound
WWTP	wastewater treatment plant

1 Introduction

Arcadis of New York, Inc. (Arcadis) has prepared this 100% Remedial Design Report for the former Philips Display Components Facility (NYSDEC Site No. 850003 – G.T.E. Products Corporation) at 50 Johnston Street, Seneca Falls, New York (the "Site") on behalf of GTE Operations Support Incorporated (GTEOSI). This report has been developed in support of remedial actions to be implemented at the Site (Figure 1). The selected remedy is outlined in the Statement of Basis dated March 2018 that was issued by the New York State Department of Environmental Conservation (NYSDEC) (NYSDEC 2018).

This report has been prepared in accordance with the following documents:

- Statement of Basis (NYSDEC 2018);
- NYSDEC Title 6 of the New York Codes Rules, and Regulations (NYCRR), Part 375 Environmental Remediation Programs (NYSDEC 2006);
- NYSDEC Division of Environmental Remediation Technical Guidance for Site Investigation and Remediation (DER-10) (NYSDEC 2010);
- NYSDEC-approved Corrective Action Work Plan (CAWP) (Arcadis 2020); and
- Pre-Design Investigation (PDI) Report (Arcadis 2022).

The CAWP was conditionally approved by NYSDEC in a letter dated April 13, 2020. NYSDEC provided comments to the PDI Report in a letter dated July 28, 2022. Additionally, NYSDEC provided comments on the 95% Remedial Design Report, which forms the basis of this report, in a letter dated October 23, 2023. GTEOSI responded to NYSDEC's comments to the 95% Remedial Design Report in a letter to NYSDEC dated January 19, 2024. NYSDEC comments to the 95% Remedial Design Report, and the associated response to comments prepared by GTEOSI, have been incorporated into this 100% Remedial Design Report, as appropriate.

The purpose of this 100% Remedial Design Report is to present the Remedial Design (RD) and approach for implementing the major elements of the selected remedy for the Site, which include excavation, capping, and in situ thermal remediation (ISTR). On behalf of GTEOSI, Arcadis will serve as the Engineer of Record during implementation of the remedy for the Site. Arcadis will be responsible for ensuring the remedial construction activities are performed in accordance with the RD, will prepare and certify the Final Engineering Report (FER), and will prepare and stamp record drawings.

1.1 Site Description

The 64.2-acre Site includes an approximately 13-acre complex of interconnected buildings (Figure 2) constructed between 1914 and the 1970s. The remaining 51 acres are primarily asphalt parking lots and roadways, grassy areas, and woods. An electrical substation owned by New York State Electric & Gas (NYSEG) is located on a separate tax parcel in the southwest corner of the Site.

Residential and undeveloped properties surround the Site to the west, north, and east. Railroad tracks line the northeastern property boundary. The Cayuga-Seneca Canal (canal), which includes Van Cleef Lake and portions of the Seneca River and is part of the New York State Barge Canal, is adjacent to and south of the Site. The canal and the land between the canal and the Site are owned by the New York State Canal Corporation. The first canal in the area opened in 1821. In the early 1900s, the mill area of Seneca Falls was submerged under what is now Van Cleef Lake after construction of the hydroelectric dam south of the Site.

1.2 Site Operational History

The following bullets summarizes the Site history:

- Prior to 1914 – The Site was undeveloped.
- 1914 through the 1930s – Water pumps were manufactured in Site Buildings 1A through 5. Roof drainage, stormwater, and wastewater were managed in a combined system of floor drains that discharged to Van Cleef Lake via historical outfall (HO) 1 and HO 2.
- 1930s through the early 1950s – Black-and-white television components were manufactured at the Site. Buildings 6 through 10 were added to expand the complex of interconnected buildings. Terra cotta pipe underdrains were laid beneath Buildings 7 and 9 during construction. As manufacturing processes expanded, floor drains were cut into the concrete floors and connected to the underdrains. Roof drainage, stormwater, and wastewater from Buildings 7, 8, and 9 were combined into HO 3 and discharged to a ditch that ran to the canal.
- Mid-1950s through the early 1970s – Manufacturing was converted to color television components in the early 1950s. Buildings 10A, 11, 11A, 12, 13, and 13A were added to the building complex. Similar to the drainage structures in Buildings 7 and 9, reinforced concrete pipe underdrains were constructed beneath Buildings 10, 10A, 11, 11A, 13, and 13A. Floor drains were connected to these underdrains, and combined roof drainage, stormwater, and process wastewater discharged via HOs 4 through 7 with overland flow to the canal. Building 12 housed laboratories and corporate offices; no floor drains or underdrains have been identified at Building 12.
- 1970s to 1986 – Waste handling practices changed when an interceptor sewer and wastewater treatment plant (WWTP) were constructed in the early 1970s. The pipes for HOs 2 through 5 were rerouted to the interceptor sewer, and wastewater flow was conveyed to the WWTP for treatment. HOs 1, 6, and 7 were modified to convey stormwater only. A network of aboveground interior piping in the ceiling rafters was also installed to carry process wastes to the WWTP.
- 1986 to 1989 – Manufacturing operations ceased in 1986. With the cessation of manufacturing, the WWTP was decommissioned and the interceptor sewer was rerouted to convey roof drainage and stormwater directly to the canal at an interceptor trench outfall (ITO). In 1989, the Seneca County Industrial Development Agency acquired the Site.
- 1989 to 2018 – H.P. Neun Company, Inc. and later Viva Foam Products, Inc. leased the building complex from the Seneca County Industrial Development Agency for warehousing. Only roof drains and stormwater discharge to the ITO. Between 1993 and 1994, roof drain lines inside the buildings were identified and rerouted along the roof trusses and down the inside walls of the buildings. New roof drain lines were diverted just above the floor to the outside of the buildings and connected to newly constructed outside storm sewer lines. The original down spouts that drained to the former process sewers under the facility building floors were removed, and the associated process sewer piping and floor drains were sealed with concrete to floor surface. After rerouting of the roof drain lines, the pipes for HOs 1, 6, and 7 no longer conveyed stormwater. The abandoned discharge piping for HOs 2 through 5 were located, identified to be free of debris, and filled with concrete (Chester Environmental 1995).
- 2018 to present – Seneca Fall Specialties and Logistics Company, Inc. purchased the property in 2018 and continues to perform warehouse operations in the buildings complex.

1.3 Areas of Concern

Previous environmental investigations conducted at the Site are summarized in the CAWP (Arcadis 2020). Based on the findings of these investigations, the following Areas of Concern (AOCs) and associated constituents of potential concern (COPCs) were identified and presented in the Corrective Measures Study Report (Arcadis 2013):

- AOC 1 (Building 2 area) – Volatile organic compounds (VOCs) in soil and groundwater south of Buildings 2 and 5;
- AOC 2 (Building 7 area) – VOCs in soil and groundwater south of Buildings 7 and 9;
- AOC 3 (Building 11 area) – VOCs in soil and groundwater at and south of Building 11A;
- AOC 4 (soil vapor intrusion pathways) – VOCs in sub-slab soil vapor beneath Buildings 1, 2, 3, 4, 6, 7, 8, 9, 10, 10A, 11, 11A, 13, and 13A; and
- AOC 5 (HOs) – Metals, primarily cadmium, in HO ditches both on-Site and off-Site.

For organization of the remedial program, the Site has been divided into two Operable Units (OU). OU 1 consists of AOCs 1 through 4, and OU 2 consists of AOC 5 and canal sediments.

2 Remedial Program Overview

This section provides a summary of the Remedial Action Objectives (RAOs) and the selected remedy for the Site, consistent with the Statement of Basis (NYSDEC 2018). Those portions of the remedy addressed in detail by the RD are also identified in this section.

2.1 Remedial Action Objectives

RAOs established for the Site in the Statement of Basis (NYSDEC 2018) are presented in Table 1 below.

Table 1 – Remedial Action Objectives

	Receptor	Remedial Action Objective
Operable Unit 1		
Groundwater	Public Health Protection	• Prevent contact with, or inhalation of, volatiles from contaminated groundwater. • Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards.
	Environmental Protection	• Restore groundwater aquifer to pre-disposal/pre-release conditions, to the extent practicable. • Prevent the discharge of contaminants to surface water. • Remove the source of groundwater or surface water contamination.
Soil	Public Health Protection	• Prevent ingestion/direct contact with contaminated soil. • Prevent inhalation of or exposure from contaminants volatilizing from contaminants in soil.
	Environmental Protection	• Prevent migration of contaminants that would result in groundwater or surface water contamination. • Prevent impacts to biota from ingestion/direct contact with soil causing toxicity or impacts from bioaccumulation through the terrestrial food chain.
Soil Vapor	Public Health Protection	• Mitigate impacts to public health resulting from existing, or the potential for, soil vapor intrusion into buildings at a site.
Operable Unit 2		
Soil	Public Health Protection	• Prevent ingestion/direct contact with contaminated soil.
	Environmental Protection	• Prevent impacts to biota from ingestion/direct contact with soil causing toxicity or impacts from bioaccumulation through the terrestrial food chain.
Sediment	Public Health Protection	• Prevent ingestion/direct contact with contaminated sediments. • Prevent surface water contamination which may result in fish advisories.
	Environmental Protection	• Prevent releases of contaminant(s) from sediments that would result in surface water levels in excess of ambient water quality criteria. • Prevent impacts to biota from ingestion/direct contact with sediments causing toxicity or impacts from bioaccumulation through the marine or aquatic food chain.

2.2 Selected Remedy Description

The NYSDEC-selected remedy outlined in the Statement of Basis (NYSDEC 2018) is summarized below.

- For OU 1, the remedy includes the following elements:
  a) The RD program will consider green remediation and sustainability principles and techniques including: (1) using renewable energy sources; (2) reducing greenhouse gas emissions; (3) encouraging low-carbon technologies; and (4) recycling and reusing clean materials.
  b) Soil cover will be maintained during Site redevelopment. Where a soil cover is required, it will be at least 1 foot of soil, meeting Soil Cleanup Objectives (SCOs) for cover material in 6 NYCRR Part 375-6.7(d) (NYSDEC 2006) for commercial use. The soil cover will be placed over a demarcation layer, with the upper 6 inches of soil of sufficient quality to maintain a vegetation layer.
  c) ISTR will be implemented to remove, destroy or volatilize dense non-aqueous phase liquid (DNAPL) within AOCs 1 and 3.
  d) Unsaturated soils within AOCs 1, 2, and 3 with concentrations that exceed commercial SCOs will be excavated and transported off-Site for disposal.[1]
  e) VOCs in groundwater that remain after active remediation will be addressed by monitoring the attenuation of COPCs (i.e., select VOCs) in groundwater in AOCs 1, 2, and 3.
  f) Sub-slab depressurization (SSD) systems or other acceptable measures will be used to mitigate the vapor intrusion pathway (AOC 4) at on-Site buildings, except at Buildings 12, 13, and 13A where the vapor intrusion pathway is not present or does not require mitigation.
- For OU 2, the remedy includes the following elements:
  a) Soils within the on-Site and off-Site HO ditches with COPC concentrations that exceed commercial and residential SCOs, respectively, will be excavated and transported off-Site for disposal.
  b) Unsaturated soil within the historical outfall ditches within the 100-year floodplain where discharge from the HO ditches historically entered the canal will be sampled and soil with COPC concentrations exceeding residential SCOs will be removed and transported off-Site for disposal. Restoration of the soil removal areas will be completed if the removal will leave the soil or canal bank unstable.
  c) Monitoring the extent and integrity of the existing clean sediment cover in Van Cleef Lake.
- For both OU 1 and OU 2, institutional controls will be implemented in the form of an environmental easement, a Site Management Plan (SMP), and an Operation and Maintenance Plan to protect public health and the environment.

2.3 Remedial Design Elements

This RD Report addresses those elements of the remedy listed in Section 2.2 that involve specific active remedial actions to be undertaken at the Site. As such, the following major elements of the remedy are addressed by this RD:

- For OU 1, ISTR will be implemented to remove, destroy or volatilize DNAPL within AOCs 1 and 3.
- For OU 1, unsaturated soils within AOC 1 with COPC concentrations that exceed commercial SCOs will be excavated and transported off-Site for disposal. As discussed in Section 4.2, excavation of targeted

[1] There are no exceedances of commercial SCOs in unsaturated soil in AOCs 2 and 3.

unsaturated soils within AOC 1 may be phased to occur after ISTR is completed and post-ISTR soil concentrations have been evaluated. As documented in the Corrective Measures Study Report (Arcadis 2013), AOCs 2 and 3 do not contain unsaturated soils with COPC concentrations that exceed commercial SCOs.

- For OU 2, soils within HO ditches 2, 4, 5, 6, and 7 with COPC concentrations that exceed the applicable SCO for cadmium will be excavated and transported off-Site for disposal. As described in Section 1.3, the primary COPC in both on-Site and off-Site HO ditch soil is cadmium. The commercial SCO for cadmium (9.3 milligrams per kilogram [mg/kg]) applies for on-Site soils and the residential SCO (2.5 mg/kg) applies for off-Site soils. As discussed in Section 5.4.2, soil within HO ditch 3 with COPC concentrations that exceed applicable SCOs will be capped in lieu of excavation. As described in the CAWP (Arcadis 2020), HO 1 discharged directly to Van Cleef Lake with no overland flow and as such, no active remedial action is required for HO 1 soil.
- For OU 2, unsaturated soils within the 100-year floodplain, where discharge from the HO ditches historically entered the canal, that contain cadmium at a concentration that exceeds the residential SCO (2.5 mg/kg) will be excavated and transported off-Site for disposal. These impacted soils are limited to the areas downgradient of HOs 4 and 5.

Soil vapor intrusion pathways (AOC 4) are currently addressed via Interim Corrective Measures implemented as detailed in the Sub-Slab Depressurization System Conceptual Design Report (Arcadis 2016). Operation and maintenance of the AOC 4 Interim Corrective Measures (e.g., SSD systems) will be detailed in an Interim SMP, to be prepared in 2024, and a final SMP to be prepared following completion of the active remediation activities described in this RD. The SMPs will also address other elements of the remedy, such as long-term groundwater monitoring and institutional controls, as discussed in Section 7.2.

3 Pre-Remediation Activities

Pre-remediation activities conducted (or to be conducted) in support of the active remedial actions described by this RD include the PDI, in situ waste characterization for OU 2, permitting, and development of certain plans in accordance with DER-10 (NYSDEC 2010).

3.1 Pre-Design Investigation

The following PDI activities were conducted by Arcadis in 2020 and 2021 to support development of this RD:

- For AOC 1 (OU 1), soil sampling was conducted to further delineate the vertical and horizontal extents of unsaturated zone soil with trichloroethene (TCE) concentrations exceeding the commercial SCO to develop the limits of excavation in this AOC.
- For AOCs 1 and 3 (OU 1), soil borings were advanced to identify DNAPL presence to delineate the vertical and horizontal extents of soils to be treated by ISTR in these AOCs.
- For AOC 5 (OU 2), soil sampling was conducted within the HO ditches to delineate the vertical and horizontal extents of soils with cadmium concentrations exceeding the applicable SCO to develop the limits of excavation or capping.

The results of the PDI and preliminary basis of design based on those results were summarized in the PDI Report (Arcadis 2022). Those preliminary bases of design and are incorporated into this RD.

3.2 In Situ Waste Characterization for Operable Unit 2

In 2022, Arcadis performed in situ soil sampling within the excavation areas identified during the PDI to pre-characterize soil within proposed excavation areas for off-Site disposal to facilitate potential direct-loading of soils during OU 2 remediation activities. Waste characterization activities consisted of collecting vertical composite samples at discrete horizontal locations representative of the horizontal and vertical limits of the proposed excavation areas. The vertical cores were placed into a clean container and mixed to generate a representative composite sample. All soil samples were placed in laboratory-provided bottleware and shipped under chain-of-custody procedures to Eurofins Buffalo for analysis.

3.2.1 Historical Outfall Ditches 2, 4, and 5

Based on cadmium concentration results for soil samples collected during the 2020 PDI, it was anticipated that soils excavated from the HO 2, 4, and 5 ditches, including those within the 100-year floodplain, would be managed as characteristic hazardous waste (Waste Code D006 for cadmium). As a result, the in situ waste characterization soil sampling conducted in 2022 at the HO 2, 4, and 5 ditches was performed to further profile the soil for disposal at a permitted hazardous waste facility. Sampling was performed as follows:

- The horizontal location for each soil sample was chosen based on locations identified during the PDI as having high metals concentrations. One sample location was identified within each of the HO 2, 4, and 5 ditches, and one sample location was identified within the 100-year floodplain downgradient of the HO 4 and 5 ditches.
- At each identified location one vertical composite soil sample was collected from ground surface to the proposed excavation depth determined based on the PDI soil sampling results.

Soil samples were collected from the following locations from ground surface to the depth shown in parentheses. Sample locations are shown on Figures A-2 and A-3 in Appendix A.

- HO2-DITCH-02 (0 to 4 feet below ground surface [bgs]);
- HO4-DITCH-05 (0 to 3.5 feet bgs);
- HO4-DITCH-06 (0 to 4 feet bgs) (located within the 100-year floodplain);
- HO5-DITCH-01 (0 to 2 feet bgs); and
- HO5-DITCH-04 (0 to 3 feet bgs) (located within the 100-year floodplain).

Each soil sample was analyzed for the following parameters:

- Toxicity Characteristic Leachate Procedure (TCLP) Metals by United States Environmental Protection Agency (USEPA) Methods 1311, 6010, and 7470;
- VOCs by USEPA Method 8260;
- Semi-volatile organic compounds (SVOCs) by USEPA Method 8270;
- Pesticides by USEPA Method 8081; and
- Herbicides by USEPA Method 8151.

In situ waste characterization data for the HO 2, HO 4, and HO 5 excavation areas are summarized in Table A-1 in Appendix A. Based on the analytical results, soil concentrations from the proposed excavation areas in the HO 2, 4, and 5 ditches exceed the Resource Conservation and Recovery Act (RCRA) toxicity limit for cadmium. Additional details regarding the management of these soils are presented in Section 6.

3.2.2 Historical Outfall Ditches 6, 7, and 6/7

Based on cadmium concentration results for soil samples collected during the 2020 PDI, it was anticipated that soils from the HO 6, HO 7, and HO 6/7 ditches would be managed as non-hazardous waste. As a result, soil sampling in these areas in 2022 was performed to further profile the soil in support of obtaining approval from a non-hazardous waste disposal facility as follows:

- The collective HO 6, HO 7, and HO 6/7 ditch area proposed for excavation was divided into seven waste characterization areas that ranged in size from an estimated 75 cubic yards (CY) to 125 CY and one smaller excavation area approximately 25 CY in size located east of the Site perimeter access road. Waste characterization areas for HO ditches 6, 7, and 6/7 are shown on Figures A-4 and A-5 in Appendix A.
- Soil samples were collected from multiple discrete horizontal locations within each waste characterization area (between three and nine soil samples per area). At each discrete horizontal location, a vertical composite was collected from ground surface to the proposed excavation depth determined based on the PDI soil sampling results.

Soil composites from the cores within each waste characterization area were then field-composited into a single composite soil sample representative of that area.

Waste characterization areas and discrete horizontal sample locations for the proposed excavation areas in HO 6, HO 7, and HO 6/7 are provided on Figures A-4 and A-5 in Appendix A.

The composite soil samples from each of the seven waste characterization areas were analyzed for the following parameters:

- TCLP Metals by USEPA Methods 1311, 6010, and 7470;
- TCLP VOCs by USEPA Methods 1311 and 8260;
- TCLP SVOCs by USEPA Methods 1311 and 8270;
- TCLP Pesticides/Herbicides by USEPA Methods 1311, 8081, and 8151; and
- Polychlorinated biphenyls by USEPA Method 8280.

In situ waste characterization data for the proposed excavation areas in the HO 6, 7, and 6/7 ditches are summarized in Table A-2 in Appendix A. Analytical results were all below RCRA toxicity limits.

Additionally, one vertical composite sample from each waste characterization area was analyzed for the constituents corresponding (as per 40 Code of Federal Regulations Part 268) to listed hazardous waste Codes F001 and F002. TCE is anecdotally known to have been historically used in the manufacturing activities at the Site and, based on a waste manifest from 1986, one drum of TCE is known to have been transported off-Site for disposal as an F-listed hazardous waste. TCE is not known to have historically been released in the HO ditch 6, 7, and 6/7 area; analyses of F001/F002 constituents was performed to further support this determination. Each vertical composite sample was analyzed by USEPA Methods 1311, 8260, and 8270. TCE was not reported to be present at or above laboratory reporting limits in any of the samples. Additionally, except for a single low-concentration detection of methylene chloride (14 mg/kg at sample location HO67-EX4-01), no other F001/F002 constituents were reported to be present in these samples. Methylene chloride is a common laboratory contaminant and has not been previously in reported in Site soil. Additional details regarding the management of these soils are presented in Section 6.

3.3 Permitting

Remediation activities in this RD will require permits or the satisfaction of other requirements. Permitting-related activities include:

- **Endangered and Threatened Species** – Following NYSDEC's Endangered and Threatened Species Regulations (6 NYCRR Part 182), Arcadis submitted a Natural Heritage Database Request to NYSDEC on August 15, 2022. This request was submitted to assess whether endangered and threatened species exist at the Site that could potentially be impacted by the planned remedial actions. A response from NYSDEC was received on October 5, 2022, stating that no records of rare or State-listed animals or plants or significant natural communities exist for the Site. However, a documented non-winter location of the Indiana bat (*Myotis sodalis*), a Federal and State endangered bat, exists within 2.25 miles of the Site. The response further stated that the Indiana bat may forage up to 2.5 miles or more from documented locations. The response concluded that, depending upon the nature of the project and conditions at the Site, further information from on-Site surveys or other resources may be required to fully assess impacts on biological resources. Further consultation with NYSDEC and the United States Fish and Wildlife Service is anticipated, through the Joint Permit Application approval process, to ensure compliance with the Federal Endangered Species Act and Section 11 of New York's Environmental Conservation Law.
- **Cultural Resources** – Following Section 106 of the National Historic Preservation Act and Section 14.09 of the State Historic Preservation Act, Arcadis, on behalf of GTEOSI, initiated consultation with the New York

State Office of Parks, Recreation, and Historic Preservation (NYS OPRHP) to assess whether cultural resources exist at the Site that could potentially be impacted by the planned remedial actions. This consultation was initiated through the online Cultural Resource Information System. On August 19, 2022, NYS OPRHP requested a Phase IA/IB Archaeological Survey for the Site. Arcadis is in the process of completing the Phase IA/IB Study and will continue to consult with the United States Army Corps of Engineers (USACE) and NYS OPRHP to comply with Section 106 of the National Historic Preservation Act and Section 14.09 of the State Historic Preservation Act. A Phase IA research and sensitivity assessment for the project's Area of Potential Effect (APE) was completed between October and early November 2022. The APE is the area where direct and indirect adverse impacts caused by remediation activities may occur. Phase IB field work was subsequently conducted in archaeologically sensitive locations at the Site in November 2022. Results of the Phase IB field investigation indicate that no potentially significant resources are present in the APE. A Phase I Archaeological Investigation report was uploaded to NYS OPRHP through CRIS for review on April 17, 2024. Arcadis will also verify that USACE intends to consult directly, as they typically do, with interested Tribal Nations. In a letter dated May 13, 2024, NYS OPRHP concurred with the conclusion of the Phase I Archaeological investigation report that cultural resources will not be adversely impacted by remedial actions and issued a Determination of No Effect for the project.

- **Wetlands and Streams** – Delineation activities conducted at the Site by Arcadis on August 3 and 4, 2022, identified one wetland (shown on Figure 2) and one stream (the HO 6/7 ditch) at the Site. Due to the proximity of planned remedial excavations to the identified wetland and stream, as well as the canal, a Joint Permit Application (JPA) was submitted to the USACE and NYSDEC to address impacts to these areas. It is anticipated that the remediation activities will be covered under Nationwide Permit 38, Cleanup of Hazardous and Toxic Waste, to comply with the Clean Water Act. The JPA was submitted to USACE and NYSDEC on April 16, 2024. The JPA was approved on August 12, 2024.
- **Stormwater Pollution Prevention** – A Stormwater Pollution Prevention Plan (SWPPP) has been prepared and is included as Appendix B. A Notice of Intent for the New York State Pollutant Discharge Elimination System General Permit for Stormwater Discharges from Construction Activity will be submitted for notification purposes only. Permit coverage is not required.
- **Discharge to Surface Water** – Wastewater will be generated as part of the ISTR and OU 2 excavation activities. Following Section 1.10 of DER-10, GTEOSI requests an exemption from a State Pollutant Discharge Elimination System (SPDES) permit for the discharge of treated water to the canal at the ITO as discussed in Section 6. A SPDES permit equivalent application will be submitted to NYSDEC for approval prior to discharging water to the canal (discussed further in Section 6.4).
- **Underground Injection** – An Underground Injection Control Permit application will be submitted to USEPA Region 2 to allow for potable water or treated groundwater to be reinjected into the subsurface through electrodes as part of the ISTR system.
- **Air Emissions** – As per 6 NYCRR Part 201-3.3, operation of the ISTR system fits the definition of a trivial activity and is therefore exempt from air permitting requirements. Additionally, an emissions evaluation has been performed to demonstrate that GTEOSI emission sources at the Site do not qualify as a major Hazardous Air Pollutant source as per 6 NYCRR Part 201-2.1. A memorandum summarizing this evaluation is included as Appendix C.
- **Floodplain** – A floodplain development permit, or equivalent, will be obtained from Seneca County prior to the start of field work within the floodplain.

NYSDEC will be updated as to changes in status of the above activities via monthly progress reports submitted by GTEOSI. Access agreements (i.e., permit from the New York State Canal Corporation to perform remediation on its property) and building permit(s) (e.g., electrical) will be obtained as needed before the start of remedial activities.

3.4 Health and Safety

A Site-Specific Health and Safety Plan (SSHASP) to cover remedial activities conducted by Arcadis staff (Appendix D) has been developed following Occupational Safety and Health Administration requirements. The SSHASP lays out potential hazards and the health and safety procedures to be followed by Arcadis staff during implementation of remedial activities at the Site. Contractor and subcontractor health and safety plans will supplement the SSHASP to cover the activities of contractor and subcontractor employees. If there is conflict between SSHASPs, the most stringent requirements will apply.

A Community Air Monitoring Plan (CAMP) has been developed for implementation during intrusive or soil handling activities conducted as part of remedial activities at the Site (Appendix E). The CAMP includes air monitoring requirements, locations, action levels, and associated controls to minimize community exposure to Site-related VOCs or particulates as a result of remedial construction activities. Special requirements for work conducted within 20 feet of potentially exposed individuals or structures are also included in the CAMP. Air monitoring data will be logged and provided to NYSDEC and New York State Department of Health (NYSDOH) as stated in the CAMP. Exceedance of a CAMP action level and the associated corrective actions implemented will be reported to the NYSDEC and NYSDOH project managers within 12 hours of occurrence. Any changes to the CAMP will require NYSDEC and NYSDOH approval.

4 Operable Unit 1 Remedial Design

The RD for OU 1 is described in this section. Elements include ISTR in AOCs 1 and 3 and unsaturated soil excavation in AOC 1. Vapor intrusion mitigation measures that will be implemented in connection with the OU 1 remedy are also described in this section. Waste management activities associated with the OU 1 remedy are discussed in Section 6. OU 1 construction activities will be conducted following the procedures in the SWPPP (Appendix B), SSHASP (Appendix D), and CAMP (Appendix E).

4.1 In Situ Thermal Remediation

ISTR will be implemented to remove DNAPL and reduce COPC concentrations in subsurface soils in AOCs 1 and 3. ISTR involves the delivery of heat to the subsurface to volatilize DNAPL and COPCs and using vapor extraction or multiphase extraction wells to remove the volatilized constituents. ISTR systems typically consist of heater or electrode wells, extraction wells, subsurface temperature and pressure monitoring points, an aboveground control system, and aboveground extraction and treatment system components. Thermally-insulating vapor covers are typically installed at the ground surface in ISTR treatment areas to prevent rainfall infiltration, limit heat loss, and facilitate effective recovery of volatilized COPCs.

After soliciting technical and cost proposals from multiple ISTR firms for the AOC 1 and 3 treatment areas, Arcadis/GTEOSI selected the electrical resistance heating (ERH) approach proposed by McMillan-McGee Corp. (Mc2). ERH, which is also known by the trade name “Electro-Thermal Dynamic Stripping Process” (ET-DSP™), directs three-phase electrical power through subsurface electrodes to drive resistive heat dissipation (i.e., Joule heating) throughout soil in the subsurface. ERH relies on soil moisture to conduct electric current through the subsurface, so water is often injected or dripped into the electrodes to replace water that is volatilized near the wellbore. ERH can raise subsurface temperatures up to the boiling point of water (i.e., approximately 212 degrees Fahrenheit [ºF] or 100 degrees Celsius [ºC]), which is sufficient to vaporize a wide range of VOCs, including the COPCs at the Site. Further descriptions and common design approaches for this technology are available in publications by the U.S. Army Corps of Engineers (2009) and Horst et al. (2021).

Mc2 has prepared an ISTR Design Report, included as Appendix F, that presents the Site-specific design and implementation details for ISTR in AOCs 1 and 3. Major aspects of this design are summarized in the following subsections.

4.1.1 Remedial Objective

Per the Statement of Basis (NYSDEC 2018), the primary objective for the ISTR program is to remove residual TCE mass that is present in the form of DNAPL in AOCs 1 and 3 (Figure 2). This goal does not include areas that extend underneath the Site buildings. To optimize recovery and reduction of DNAPL mass, the ISTR system will be used to heat the subsurface to achieve a minimum target temperature that is equal to or higher than the co-boiling (i.e., steam distillation) temperature of water and TCE DNAPL, which ranges between approximately 73°C and 90°C, depending on hydrostatic pressure.

As indicated in the NYSDEC-approved CAWP (Arcadis 2020), the soil concentration threshold at which TCE DNAPL is anticipated to be present at the Site is the Site-specific soil saturation limit of 492 mg/kg. The areas in which concentrations of TCE in soil exceeded this threshold were defined as part of investigations completed during the PDI in 2020 and 2021. ISTR will be used to reduce TCE concentrations within the DNAPL source

areas to less than half of the Site-specific soil saturation limit, or to a rounded down concentration of 200 mg/kg[2], which coincidentally corresponds to the commercial use SCO for TCE. This concentration of 200 mg/kg is less than the threshold concentration at which DNAPL is anticipated to be present and, therefore, more conservative than the ISTR remediation objective specified in the Statement of Basis.

4.1.2 Treatment Areas

As described in the PDI Report (Arcadis 2022), DNAPL delineation activities were performed during the PDI to determine the treatment areas for ISTR. The resulting horizontal extents for the ISTR treatment areas are shown on Figure 2 and represent areas of approximately 3,800 square feet in AOC 1 and 2,700 square feet in AOC 3. The vertical extent of ISTR treatment in each area will be between ground surface and the maximum depth at which DNAPL was delineated during the PDI (see Table 7 of the PDI Report). This depth ranges between around 28 and 34 feet bgs in AOCs 1 and 3.

As shown in drawing WFL-02 and WFL-03 of the In-Situ Thermal Remediation System Design Report (Appendix F), the ERH system will be comprised electrodes installed in a triangular grid pattern with a spacing of around 18 feet. The electrode grid pattern overlaps the boundary of the ISTR treatment area; thus, the anticipated areas of thermal influence around the perimeter electrodes extends outside the treatment areas delineated during the PDI. These areas of thermal influence are approximately 5,500 square feet in AOC 1 and 3,700 square feet in AOC 3. The design of the ERH system considers the actual areas of thermal influence when determining energy budgets, the sizing of the treatment system, and other design parameters.

4.1.3 Site Preparation Activities

In addition to obtaining permits and access agreements, as necessary, to implement the RD activities (discussed in Section 3.3), the following preparation activities will be performed before commencing ISTR system operations:

- **Well Abandonment** – Existing monitoring wells known in the vicinity of the ISTR treatment areas have the potential to be damaged when exposed to elevated temperatures. Therefore, these wells will be abandoned in place using a neat cement grout (i.e., neat Portland Type 1/2 cement mixed with water at a rate of one 94-pound bag of cement and up to 6 gallons of water) before initiating ISTR construction. In general, bentonite will not be added to the grout mixture as it can desiccate when exposed to steam. Currently, two existing vapor monitoring wells, MP-1 and MP-2, located near the west side of the AOC 3 ISTR area, have been identified for abandonment (approximately 5 feet west of electrode location E2-B03 in drawing EQL-03 in Appendix F).
- **Abandonment and Protection of Subsurface Utilities** – Utilities that may be damaged during ISTR operations will be abandoned or re-routed before ISTR well installation activities. Several subsurface utilities have been identified within and near the ISTR treatment areas, as shown on drawing WFL-02 and WFL-03 in Appendix F and on Figure 3. Of these, (i) the main water line traversing AOCs 1 and 3 will be rerouted outside of the thermal influence area, (ii) stormwater lines from the roof drains traversing AOCs 1 and 3 will be grouted in place and alternate means for drainage will be established during ISTR operations, and (iii) accessible former subsurface process waste lines located in AOCs 1 and 3 will be grouted in place. Additional

[2] During the PDI, soil samples with TCE concentrations less than 246 mg/kg, or 50% of the site-specific soil saturation limit of 492 mg/kg, did not contain DNAPL (based on the multiple lines of evidence approach described in the CAWP [Arcadis 2020] and PDI Report [Arcadis 2022]).

details regarding the relocation and abandonment of utilities before ISTR implementation are provided in the Waste Management Plan for ISTR Preparation Activities (Appendix G).

- **Utility Connections** – Temporary utility connections necessary for ISTR operations will be established in parallel with subsurface and aboveground installation activities. A new power drop from NYSEG will provide electrical service for ISTR operations. Additional details regarding the power drop are provided in the Waste Management Plan for ISTR Preparation Activities (Appendix G). A potable water connection for cooling tower operations and electrode injection will be established from a nearby facility-owned fire hydrant and fitted with a backflow preventer and meter. Treated water from the ISTR system will be handled and disposed of as discussed in Section 6.
- **Pre-Construction Survey –** A land surveyor licensed in the State of New York will mark the planned ISTR well locations (e.g., electrodes, extraction wells, and monitoring points) before installation using marking paint, stakes, survey nails, whiskers, or similar devices. The planned ISTR well locations are presented in drawings WFL-02 and WFL-03 in Appendix F.
- **Temporary Facilities** – Temporary facilities will be established, including an office trailer, sanitary facilities, garbage removal and recycling services, and tool containers. Staging areas will be established to receive and store equipment. An internet connection via landline or cellular mobile router will also be installed to allow the ISTR system to be remotely monitored and operated and to manage data collected during operations.
- **Fencing, Signage, and Site Security –** The Site will be secured to deter unauthorized access with the placement of privacy fencing, high voltage signage, and no trespassing/authorized personnel signage around the ISTR treatment and equipment laydown areas, in accordance with the ISTR design presented in Appendix F. Perimeter fencing will be installed around each of the ISTR treatment areas and around the aboveground treatment equipment compound to restrict access to these areas. Anticipated fencing limits and access gates are shown in drawings WFL-02 and WFL-03 in Appendix F. Access to the ISTR areas will be limited to designated project staff during construction and operations. Emergency shutdown device buttons will be placed at each of the power delivery system units (which control power to the electrodes) and the entrance to the aboveground treatment system compound to allow operators to shut off the heating, extraction, and/or ex situ treatment equipment in case of emergency. Furthermore, hazard-specific signage (e.g., high voltage, hot surface, machine hazard, and/or lockout-tagout signage) will be posted at the entry points to the ISTR areas and on specific equipment following applicable codes and regulations (e.g., National Electric Code and the Occupational Safety and Health Administration). Beacon lights will also be installed on certain electrical components of the ISTR system to indicate whether they are energized.

4.1.4 Subsurface Installation

The following subsurface components will be installed as part of ISTR system construction. The component locations are shown on drawings WFL-02 and WFL-03 in Appendix F:

- **Electrodes** – Two 8-inch diameter electrodes will be stacked in each electrode boring to deliver energy into the subsurface with depth-discrete control. The ET-DSP™ electrodes are shop-fabricated and comprised of thin-walled steel, fiberglass tubing, baffle plates, #1/0 copper lead wires, and ¼-inch water injection hoses. A ¼-inch pressure relief hose is also outfitted at each boring to return steam and condensate back to the treatment system. After installing the electrode assemblies in each boring, the well bore will be backfilled with 10/20 silica sand to about 0.5 feet above the upper electrode, followed by about 1.0 foot of 40/60 silica sand,

and then neat cement grout to ground surface. Double stacked electrode well details are presented in drawing WCD-01 in Appendix F.

- **Multiphase Extraction (MPE) Wells** – Vertical MPE wells will be used to extract fluids (i.e., air, COPCs, steam, entrained liquids) from the subsurface during ISTR operations. MPE wells will be constructed using 4-inch diameter 304L stainless steel (SS) well screens with a 0.006-inch slot size. Annular space along the well screen will be backfilled with 40/60 silica sand to about 1.5 feet below grade, followed by neat cement grout to ground surface. MPE well details are presented in drawing WCD-01 in Appendix F.
- **Horizontal Soil Vapor Extraction (SVE) Wells –** Horizontal SVE wells will be used to sweep non-condensable vapors (i.e., air) through the vadose zone, entraining condensable vapors (i.e., steam, COPCs) rising up from the deeper saturated zones and pulling them into the extraction system. Horizontal SVE wells will be constructed using 2-inch diameter fiberglass well screens with a 0.020-inch slot size, and connected to vertical riser pipes extending above grade. Horizontal SVE wells will be installed in shallow trenches within an approximate 1.0-foot layer of 10/20 silica sand, atop which trench spoils would be backfilled to ground surface and compacted. Horizontal SVE well details are presented in drawing WCD-02 in Appendix F.
- **Temperature Sensor Wells** – Temperature sensor strings installed downhole within receptacle tubes will be used to evaluate subsurface temperatures as ISTR operations progress. The receptacles will be constructed with 1.5-inch diameter carbon steel tubing surrounded by neat cement grout extending to ground surface. Digital temperature acquisition module (digiTAM™) strings with sensors installed on a 3-foot vertical spacing will be installed within the receptacles. Further details are presented in drawing WCD-01 in Appendix F.
- **Shallow SVE Wells** – Shallow SVE wells will be installed in a portion of Building 11A to remove vapors that could accumulate under the building slab due to fringe heating effects from AOC 3. The shallow SVE wells will be constructed using 2-inch diameter 304L SS well screens with a 0.010-inch slot size. Annular space will be backfilled with 20/40 silica sand to about 2.0 feet below grade, followed by 0.5 feet of bentonite and neat cement grout to the surface. The shallow SVE wells will be connected to the ISTR system and, if required based on the sampling protocols and action levels discussed in Section 4.1.13, will be brought online. Further details are presented in drawing WCD-01 in Appendix F.
- **Vacuum Monitoring Wells** – Perimeter vacuum monitoring wells will be installed both inside and outside of the heated areas as a means to assess pneumatic control during ISTR operations. The vacuum monitoring wells will be constructed using SS vapor implants installed within 20/40 silica sand and ¼-inch diameter Teflon® tubing extending above ground surface. The well construction details are presented in drawing WCD-01 in Appendix F.
- **Johnston Street Installation** – ISTR components within Johnston Street in AOC 1 will be completed below ground surface in vaults, and connection lines will be trenched back to the north of the perimeter fence line before transitioning above grade. Specific configurations are detailed in drawings WCD-03 and WCD-04 in Appendix F.
- **Pre-Cast Utility Corridor** – To allow unobstructed access to the loading docks at Buildings 7 and 9 by delivery trucks and other vehicles, a pre-cast concrete subsurface process corridor will be installed to convey well field piping, power cables, and water supply lines beneath a portion of the driveway between AOC 1 and the aboveground treatment equipment compound. Further details are presented in drawings PIL-01 and TD-01 in Appendix F.

Sonic and/or auger drilling techniques will be used to install vertical ISTR system wells. An excavator will be used for trenching activities. Soil cuttings and groundwater collected during the subsurface installation program will be containerized into drums, roll-off bins, and/or frac tanks and managed following the procedures presented in

Section 6. Estimated quantities of wastes derived from subsurface installation activities are provided in Table 5 in Appendix F. For silica sand delivered to the Site in bulk, a Request to Import form for such silica sand, including the necessary support documentation, will be submitted to the NYSDEC project manager for approval before delivery to the Site. For silica sand delivered to the Site in commercially-available bags, a Request to Import form will not be submitted but receipts documenting the purchase of such material will be provided in the Final Engineering Report.

4.1.5 Aboveground Installation

The following aboveground components will be installed as part of ISTR system construction. The component locations are shown on drawings EQL-01, EQL-02, EQL-03, EQL-04, PIL-01, PIL-02, and PIL-03 in Appendix F:

- **Vapor Cap –** After the subsurface installation is complete, a cellular concrete vapor cap will be installed atop the ISTR areas at ground surface. The purpose of the vapor cap is to minimize short-circuiting of air flow to the extraction wells, limit infiltration of surface water, mitigate fugitive emissions, and reduce heat losses to the surface to minimize the potential for COPCs to recondense in shallow soils. The vapor cap will be constructed using a Tyvek® liner, a 7-inch layer of 25 pound-per-cubic-foot (pcf) cellular concrete (i.e., Class II cellular concrete), and a 1.5-inch layer of 140 pcf concrete to act as a weathering surface. The vapor cap will extend approximately 5 feet outside the predicted areas of thermal influence in AOCs 1 and 3. If necessary, some minor regrading of the surface may be performed to facilitate the vapor cap installation. Although designed primarily to allow for foot traffic, plywood sheets can be placed on top of the cellular concrete to facilitate access for mechanized equipment during system construction and operation (e.g., telehandlers for lifting piping into place, or drill rigs for performance sampling). Vapor cap details are presented in drawing VCD-01 in Appendix F.
- **Johnston Street Road Repairs –** Road improvements consisting of 10 inches of concrete installed over a subbase material will be completed within the portions of the AOC 1 treatment area that extend into Johnston Street to replace cracked asphalt and mitigate the potential for fugitive emissions. A Request to Import form for subbase material, including the necessary support documentation, will be submitted to the NYSDEC project manager for approval before delivery to the Site. Details of this installation are provided in drawing VCD-02 in Appendix F.
- **Wellheads** – Extraction wellheads outfitted with temperature gauges, vacuum indicators, and sample ports will be installed at each MPE well. Vapor extraction lines will be connected to the well field piping using 1-inch diameter crosslinked polyethylene (PEX) tubing with cam-and-groove fittings. Downhole air-assisted liquid recovery tubes (i.e., slurper tubes) will be installed within the MPE wells. Temperature sensor wells will be completed with cord grips to hold the sensor strings at the desired depths. Because the installation will be temporary in nature, the wellheads will be constructed with aboveground completions. Further details are presented in drawings WHD-01 and WHD-02 in Appendix F.
- **Well Field Header Piping – C**arbon steel well field piping will be used to convey both vapors and liquids from the extraction wells to the ex situ treatment system. This piping will be sloped slightly toward the ex situ treatment system to allow for condensate collection in case there is a loss of vacuum. Because the installation will be temporary in nature, the well field conveyance piping will be run above ground surface on pipe stands, except for portions extending underground in the pre-cast concrete subsurface process corridor and beneath Johnston Street. The use of aboveground piping reduces the need for intrusive work and allows for regular inspections and maintenance to be performed during ISTR operations. A 1-inch diameter compressed air line

will also be run to each of the slurper tubes installed at the MPE wells. Further details are presented in drawings PIL-01, PIL-02, PIL-03, and WHD-01 in Appendix F.

- **Lift Station** – Because the well field piping will contain both vapor and liquids, a liquid lift station is necessary where the well field piping daylights after traversing the subsurface pre-cast concrete utility corridor along the driveway. The lift station will include a liquid/vapor separator, a centrifugal pump, level sensors, and a discharge hose to lift liquids into the well field piping located at the higher elevation downstream. Further details on the lift station are presented in Appendix F, Section 4.3.2.

4.1.6 Aboveground Treatment System Installation

The following ex situ treatment system components will be installed as part of ISTR system construction. The aboveground treatment equipment compound will be in a centralized location south of Building 12 and between AOCs 1 and 3, as shown in drawing EQL-04 in Appendix F. A process flow diagram is presented in drawing PFD-01 and process and instrumentation drawings are presented in drawings P&ID-01 through P&ID-05 in Appendix F.

- **Vapor Phase Treatment System** – Extracted vapors conveyed to the ex situ treatment system will consist of both condensable vapors (e.g., steam, VOCs) and non-condensable vapors (e.g., air, dissolved gases). At the treatment equipment compound, these vapors will first pass through a knockout tank to remove liquids that may have condensed in the well field piping. Vapors will then pass through a series of heat exchanging and moisture separation steps, rejecting heat to a cooling tower recirculation loop to further reduce moisture levels in the vapor stream, before and after passing through the main process vacuum blower(s). Lastly, the conditioned vapors will pass through a series of vapor phase granular activated carbon vessels to remove VOCs before discharging to atmosphere through a stack via booster blower.
- **Liquid Phase Treatment System** – Liquid and condensate recovered from the well field and vapor treatment process knockout tanks will be combined and treated before reinjection to the electrodes or managed following the procedures in Section 6. Liquids will first be collected in a knockout tank that will also serve as a silt separator, separating solids from the liquid process stream through a sludge dewatering system. Process liquids will be cooled through a heat exchanger, which will convey heat to a cooling tower recirculation loop, and then pass through a phase separator, an air stripper, bag filters, and liquid granular activated carbon vessels before discharging into a treated water storage tank. Cooling tower blowdown will be routed directly to the on-Site stormwater system that eventually discharges to the canal via the ITO following procedures described in Section 6.4. Process equipment that may contain untreated liquids will be placed in secondary containment areas (constructed of plastic pop-up bracket berms and sized with a liquid capacity of at least 110% of the liquid capacity of the largest single process component within each respective containment area) outfitted with level sensors to automatically shut off the system if a leak is detected. DNAPL collected from the phase separator will be decanted into DNAPL storage tanks (e.g., stainless steel drums or equivalent) for off-Site disposal following the procedures in Section 6.

The majority of the equipment will be skid-mounted or installed inside heated and insulated containers, such that it can be staged using a crane or telehandler. Interconnecting piping will be fitted on-Site using materials with appropriate temperature and corrosion resistance ratings for the COPCs. Flexible hose connections with pinned cam-and-groove fittings will be used between components that may require reconfiguration during operations.

4.1.7 Electrical Installation

A new electrical service will be installed for the ISTR system. A new power drop will be installed by NYSEG near the NYSEG electrical substation (drawing EQL-01 in Appendix F). The new power drop will provide 12.5 kilovolt service that will be supplied to the aboveground treatment equipment area. The supply line will feed a temporary transformer with a capacity of at least 1,800 kilovolt-amperes and a delta-wye configuration with a 480/277 Volt secondary, which will be rented for the duration of ISTR operations. Downstream of this temporary transformer, a power distribution panel will be installed to function as the main switchgear for the ISTR system, which in turn, will feed a plurality of power delivery system units that will control power to individual electrodes through #1/0 copper cables. Junction boxes will be installed at each electrode for connections between aboveground and downhole cables. A single line diagram is presented in drawing ESL-01 in Appendix F.

New York licensed electrical subcontractors will perform the installation of the primary electrical equipment. Electrical cables will be installed in an orderly fashion to minimize potential tripping hazards, and labeled at both ends near their termination points so that each connection is clearly identifiable. Because the ISTR installation will be temporary, heavy-duty outdoor-rated power cables will be used and interconnections between equipment downstream of the main switchgear will not be run in conduit or cable tray. To protect the cables from damage, they will be placed within areas restricted from vehicle traffic, adjacent to pipe stands, or within the subsurface process corridor. Wiring and grounding will be performed in accordance with the National Electrical Code.

4.1.8 Operations

ISTR operations will begin in AOCs 1 and 3 concurrently. ISTR implementation will consist of the following phases of operation:

- **Startup Phase** – Operation of the extraction system will be initiated to establish pneumatic and hydraulic control within the ISTR treatment areas and to confirm that all extraction and treatment system components are working correctly. This phase is anticipated to last for less than 1 week.
- **Heating Phase** – After completing the startup phase, the ISTR heating system will be operated at peak power input to raise subsurface temperatures to the target of > 90°C throughout the ISTR treatment areas. Peak TCE mass removal rates are anticipated to be observed during this phase of operation after subsurface temperatures reach the TCE-water co-boiling point (>73°C to 90°C). The heating phase of operations is anticipated to last for approximately 120 days.
- **Maintenance Phase** – The ISTR heating system will be operated with the goal of maintaining 90% of the temperature sensors above the 90°C target to facilitate complete removal of TCE DNAPL from the treatment areas and to optimize COPC recovery rates. Based on experience at other sites, the maintenance phase will be sustained for at least 30 days or until such time that the COPC mass recovery rate nears an asymptotic condition. Section 4.1.10 provides additional discussion on the duration of the maintenance phase.
- **Confirmation Sampling Phase** – After the maintenance phase is completed, heating will be temporarily suspended to allow for confirmation soil sampling to be completed. The vapor recovery system will remain active while sampling is on-going and heating will be resumed while samples are being analyzed by the laboratory. Results will be used to assess progress towards achieving the remedial objective of removing DNAPL, as described in Section 4.1.1, and the ability to move to the system shutdown/initial cooling phase. The basis for timing of the confirmation soil sampling event is described in Section 4.1.10. Further details of the confirmation soil sampling approach are described in Section 4.1.11.

- **System Shutdown and Initial Cooling Phase** – The ISTR heating systems will be turned off after confirmation soil sampling results indicate the attainment of the remedial objective of removing DNAPL, as described in Section 4.1.1; however, at the end of heating operations, active extraction and treatment will continue to operate for up to 5 days while in situ temperatures cool to levels below water boiling temperatures so steam/pressure is not built up in the subsurface. NYSDEC and NYSDOH will be notified prior to shutdown of the extraction and treatment system components.
- **Passive Cooling Phase** – The subsurface will passively cool down for a period of months to years before the subsurface returns to background temperatures. No ISTR operations will occur during the passive cooling phase other than demobilization.

4.1.9 Maintenance and Performance Monitoring

A summary of the performance monitoring that will be performed during ISTR operations is provided in Table 4 of Appendix F, and will generally consist of the following items:

- Power, current, and voltage at individual electrodes, using the ISTR equipment (automatic, averaged daily);
- Water injection to individual electrodes, using the ISTR equipment (automatic, averaged daily);
- Subsurface temperatures, using the digiTAM™ strings (automatic, averaged daily);
- Temperature and vacuum at the extraction wells, using manual gauges (weekly);
- Vacuum monitoring at vacuum monitoring points, using manual gauges (weekly);
- Vapor extraction rates at the extraction wells, using pitot tubes or rotameters (monthly);
- Screening of vapor VOCs at the extraction wells, using a photoionization detector (PID) (monthly);
- Vapor extraction and discharge rates at the treatment system, using pitot tubes or rotameters (daily);
- Liquid extraction, discharge, and/or reinjection rates at the treatment system, using flow totalizers (daily);
- Screening of vapor VOCs at the influent, midpoint, and discharge of the treatment system, using a PID (daily);
- Grab sampling of vapor VOCs at the influent, midpoint, and effluent of the treatment system, submitted to an accredited laboratory for analysis by USEPA Method TO-15 (every two weeks); and
- Grab sampling of liquid VOCs at the influent, midpoint, and discharge of the treatment system, submitted to an accredited laboratory for analysis by USEPA Method 8260 (every two weeks).

The results of system effluent vapor sampling will be used to verify that the air emissions evaluation (Appendix C) conclusion remains valid. Additional monitoring to be conducted during ISTR operations related to indoor air quality and treated water discharge is discussed in Section 4.1.13. and Section 6.4, respectively.

Extraction rates and VOC concentrations in each of the recovered fluid phases will be combined to estimate the total mass of VOCs and TCE removed from the subsurface as ISTR operations progress. Concentration data used for estimating VOC and TCE mass removal during ISTR system operation will be collected downstream of initial condensation and cooling processes to avoid damage to the monitoring equipment from elevated temperature and humidity in the vapor stream, thus improving data quality and consistency. The mass of condensed constituents will be accounted for through sampling and analysis of liquids on the water treatment side of the system, as part of a comprehensive mass balance across the treatment system. Specific locations that will be used to calculate mass removal include: (i) vapor concentrations at sample port SP-240 (drawing P&ID-03 in Appendix F) combined with pilot tube readings at flow element FE-240 (drawing P&ID-03 in Appendix F) to

determine the mass of vapor phase VOCs; (ii) liquid concentrations at sample port SP-480 (drawing P&ID-02 in Appendix F) combined with totalizer readings at flow element FQIT-501 (drawing P&ID-04 in Appendix F) to determine the mass of dissolved phase VOCs; and (iii) dipping of product storage tanks T-461 and T-462 (drawing P&ID-01 in Appendix F) combined with a laboratory measurement of NAPL density to determine the mass of non-aqueous VOCs. Daily data collection that is not automated will be collected on days when the system operator is onsite (generally on weekdays, excluding holidays).

Maintenance activities will be performed periodically during ISTR operations to ensure the extraction and treatment systems are functioning effectively. A preliminary equipment maintenance checklist describing the frequency at which visual inspections, sensor cleaning, media changeouts, and other maintenance activities will be performed for the major process equipment is provided in Appendix F. This checklist may be updated during the acceptance testing and commissioning of the system.

4.1.10 Basis for Initiating Confirmation Sampling

As discussed in the Statement of Basis (NYSDEC 2018), the primary objective of ISTR operations is to remove DNAPL within AOCs 1 and 3. Attainment of this goal will be evaluated via a confirmation soil sampling program that will be used to verify that TCE concentrations within the treatment area have been reduced below the site-specific goal of 200 mg/kg, as described above in Section 4.1.1. The confirmation sampling event will be conducted before final shutdown of the ISTR system; therefore, the following information will be used to guide decision making regarding the appropriate time to conduct confirmation sampling:

- In situ temperatures will be monitored at multiple depths throughout the ISTR treatment areas using temperature sensors during the maintenance phase (as shown in Drawings WFL-02 and WFL-03 of Appendix F). Achieving temperatures greater than the co-boiling point of TCE DNAPL and water within the saturated portions of the treatment volume (i.e., between around 73°C and 90°C), and the pure compound boiling point within the unsaturated zones (around 88°C), will result in the conversion of all TCE DNAPL into a vapor phase. Therefore, a target temperature of 90°C has been established as a conservative temperature goal. To provide confidence that the vaporized TCE NAPL is removed from the subsurface through the network of MPE and horizontal vapor extraction wells, the ISTR system will continue to operate for at least 30 days after the 90°C temperature goal is achieved (i.e., maintenance phase operations) before conducting confirmation sampling. The anticipated 30 days of maintenance phase operations is based on experience on other ISTR projects and will allow for the extraction of approximately three hundred pore-volume equivalents of vapor from the vadose zone of the treatment areas, based on the anticipated vapor extraction flow rates provided in Appendix F.
- TCE mass removal rates from each ISTR treatment area will be monitored throughout the heating and maintenance phases. After achieving the target temperature of 90°C and maintaining this temperature for at least 30 days, maintenance phase operations will continue, if necessary, until asymptotic conditions in the rate of TCE mass removal are achieved (e.g., TCE mass removal rates fall below 10% of the peak recovery rate for 10 consecutive days) prior to conducting sampling. Low-level asymptotic recovery rates provide a good indication that bulk source mass (i.e., NAPL) has been completely removed from within an ISTR treatment area.
- In the event that asymptotic TCE mass removal rates are not achieved after 60 days of maintenance phase operations (e.g., due to lower levels of mass flux from outside the thermal treatment volume), termination of the maintenance phase and performance of confirmation soil sampling will be initiated based on other lines of evidence (e.g., rates of energy input, decreasing concentrations at extraction wells).

The details of the confirmation soil sampling program are discussed in section 4.1.11. ISTR operations will continue after the confirmation soil sampling program while the samples are being analyzed by the laboratory. Once received, if the analytical results confirm that soil concentrations are below 200 mg/kg at all sample locations, ISTR operations will transition to the system shutdown and initial cooling phase of operations. If the sampling results indicate concentrations are still higher than 200 mg/kg in select areas, GTEOSI may elect to focus continued operations only in portions of the treatment areas where the remedial objective of removing DNAPL has not been met.

It is noted that GTEOSI and Mc2 have established a contractual goal of eliminating DNAPL in soil within the ISTR treatment areas (i.e., the remedial objective from the Statement of Basis [NYSDEC 2018]). Performance objectives for ISTR operations are listed in Section 1.3.2 of the ISTR Design Report (Appendix F). GTEOSI may elect to allow Mc2 to deviate from certain temperature- or time-based performance objectives in Section 1.3.2 of Appendix F, so long as DNAPL removal within the AOC 1 and 3 treatment areas is achieved.

4.1.11 Confirmation Soil Sampling Program

The TCE concentration in confirmation soil samples will be the primary performance metric used to verify that the remedial objective of removing DNAPL from AOCs 1 and 3 has been achieved. Confirmation soil borings will be advanced in up to eight total locations in AOCs 1 and 3 where the presence of DNAPL was previously identified during the PDI (see Figures 4 and 5). Sampling locations are proposed near AOC-1 investigation borings D-47/47A, D-39, D-38, D-74, D-62, and D-04, and near AOC-3 investigation borings D-71 and D-63. The boring locations may be adjusted (if appropriate) based on observations of soil cuttings during system installation, and as needed to avoid ISTR system wells and other infrastructure. Continuous soil cores will be collected at each sample location between 1 ft bgs and the top of bedrock (i.e., the bottom of the target treatment volume) using direct-push or sonic drilling techniques and hot soil sampling procedures (as presented in Appendix F), which will involve cooling the sample cores in an ice bath immediately upon extraction. Once sufficiently cooled (e.g., soil core temperatures below 25°C), the soil cores will be visually inspected for NAPL, and field screened with a PID at 1 ft depth intervals. At least two discrete soil samples will be collected for laboratory analysis at each of the 8 borings, with the sampled intervals biased towards depths displaying the highest PID field screening results, visual indication of potential impacts, and/or depths at which the presence of DNAPL was documented during previous investigations. If the TCE concentration in a confirmation soil sample exceeds 200 mg/kg (i.e., an ISTR performance objective discussed in Section 4.1.1), ISTR heating will continue in that portion of the ISTR treatment area for approximately two weeks followed by resampling at the same location(s) to verify that the remedial objective has been met (i.e., absence of DNAPL). Soils and decontamination fluids generated during confirmation soil sampling will be managed as detailed in Section 6. Confirmation soil borings will be abandoned by using neat cement grout.

4.1.12 Demobilization and Restoration

After ISTR operations are completed (including the initial cooling phase), demobilization of the ISTR system will begin by cleaning the extraction wellheads, well field piping, process equipment, transfer hoses, and other materials that may have been exposed to COPCs using a steam pressure washer. In general, well field components farthest from the treatment system will be cleaned first, while maintaining a vacuum on the piping using the process blowers. The ex situ treatment system components will be cleaned in a similar manner. Material and equipment cleaning will be performed within the secondary containment area(s) for liquid process equipment.

Any rinsate or other decontamination liquids will be managed for off-Site disposal as discussed in Section 6. Spent filtration media will be placed into drums, totes, and/or flexible intermediate bulk container bags and removed for off-Site regeneration and/or disposal. Any sludge or DNAPL will be drummed or transferred into intermediate containers and sent to a permitted treatment or disposal facility off-Site as an F-listed hazardous waste. Waste management activities are further detailed in Section 6.

Once power is no longer needed, the ISTR equipment will be de-energized and locked out. A New York licensed electrician will disconnect the temporary transformer. It is anticipated the primary electrical conduits feeding the ERH equipment and step-down transformer pad(s) will remain in place. Overhead wires will remain in place. Downstream electrical equipment, power cables, and temperature sensors will then be spooled and packaged for reuse. The ISTR and ex situ treatment equipment will then be demobilized from the Site. The temporary potable water/hydrant connection established for thermal treatment will also be removed.

The thermally-insulating vapor cap will be removed using a bulldozer and a backhoe and managed for off-Site disposal as described in Section 6. Following its removal, subsurface infrastructure associated with the ERH system (e.g., remediation wells, vaults) will be abandoned in place using neat cement grout. Riser pipes will be cut flush to ground surface and finished with a cement patch. Electrode water injection hoses will be plugged at ground surface. General debris that has not come into contact with COPCs (e.g., pipe stands, water supply hoses, etc.) will be disposed of as construction debris. Finally, temporary facilities including office, sanitary services, and any ISTR-specific security measures will be removed from the Site.

Utilities that were re-routed prior to implementation of ISTR will be reinstalled, as necessary, following demobilization of ISTR equipment (e.g., water line, stormwater lines).

4.1.13 Vapor Intrusion Mitigation and Monitoring

The ISTR treatment areas are adjacent to Site Buildings 2 and 3 in AOC 1 and Buildings 11 and 11A in AOC 3. ISTR operation in AOCs 1 and 3 could contribute to the migration of VOC-impacted vapors into the indoor air of these buildings. Therefore, mitigation measures and a monitoring program will be implemented in portions of these buildings during ISTR.

4.1.13.1 Mitigation Measures

Preemptive mitigation measures that will be implemented during ISTR are described below.

- **Exclusion Zones** – Exclusion zones will be established and maintained in Buildings 2 and 3 (AOC 1) and Buildings 11 and 11A (AOC 3) during ISTR operations (Figures 6 and 7, respectively). Vertical sheeting (10-mil polyethylene) will be hung as necessary to separate the exclusion zone indoor air from adjoining indoor air spaces. Access to the exclusion zones will be restricted to designated project staff, and to designated facility personnel for performing required facility maintenance (e.g., fire suppression system inspections or repairs). The purpose of the exclusion zones is to establish areas in which measures may be taken to mitigate vapor intrusion or improve indoor air quality (e.g., supplemental fresh air ventilation or sealing of potential vapor intrusion pathways). The exclusion zone areas may be adjusted based on future changes in building conditions and ISTR performance monitoring data.
- **Indoor Air Ventilation** – Within the exclusion zones during subsurface heating, exterior doors will be opened, to the extent possible and feasible (i.e., not during cold or stormy conditions), while ISTR operators are on

Site to increase the natural ventilation of the exclusion zone indoor space. The increased air ventilation will help to mitigate vapor intrusion within the exclusion zones, if any, during ISTR operations.

- **Vapor Intrusion Pathway Sealing** – The sealing of potential vapor intrusion pathways through the floor slab (e.g., floor cracks) will be conducted within each exclusion zone. Crack sealing will be performed before the ISTR startup phase using polyurethane caulk.
- **Sub-Slab Depressurization** – SSD will be implemented and/or verified in the portions of the exclusion zones that are closest to the ISTR treatment areas in AOCs 1 and 3, identified as ISTR SSD zones in Figures 6 and 7, respectively.

  For the AOC 3 exclusion zone, the SSD system that is currently active in Buildings 11 and 11A as a component of the AOC 4 remedy will continue to operate during ISTR operations. Four existing SSD extraction points (B11-EP-01R, B11-EP-02, B11-EP-03, and B11-EP-06) are located within the AOC 3 exclusion zone (Figure 7). To confirm that sub-slab vacuum influence is being induced throughout the ISTR SSD zone in AOC 3, up to three additional sub-slab vacuum monitoring points will be installed to supplement the existing sub-slab vacuum monitoring point network. Up to two additional SSD extraction points may be installed within the ISTR SSD zone in AOC 3 and connected to either the existing SSD system or to a new SSD system (e.g., exterior-mounted inline fan(s)) if sub-slab differential pressure measurements indicate the need to expand the depressurization area.

  SSD systems do not currently exist in the AOC 1 exclusion zone. Up to four new SSD extraction points will be installed to target sub-slab vacuum influence throughout the ISTR SSD zone for AOC 1. New SSD extraction points in AOC 1 will be connected to a new SSD system (e.g., exterior-mounted inline fan(s)). Up to six sub-slab vacuum monitoring points will be installed in the ISTR SSD zone and used to confirm that sub-slab vacuum influence is being induced throughout the ISTR SSD zone in AOC 1, and to allow monitoring of sub-slab vacuum influence during ISTR.

  Construction details for SSD extraction points and sub-slab vacuum monitoring points are included on Figure 8.
- **Sub-Membrane Depressurization** – As an additional preemptive vapor intrusion mitigation measure, sub-membrane depressurization (SMD) will be implemented in the portions of each exclusion zone nearest to the ISTR treatment areas in AOCs 1 and 3, identified as ISTR SMD zones in Figures 6 and 7, respectively. The extents of the ISTR SMD zones in AOCs 1 and 3 match the corresponding ISTR SSD zones. The extents of the ISTR SMD zones may be adjusted before or during ISTR based on future changes in floor conditions or building use, ISTR performance monitoring data, and other field observations. A membrane (30-mil high-density polyethylene) will be installed over the existing concrete floor slab to capture vapors that could potentially migrate through the floor from the sub-slab environment to indoor air. The space beneath the membrane in each ISTR SMD area will be connected to a dedicated, exterior-mounted inline fan to depressurize the space between the membrane and the existing concrete floor slab (relative to indoor air). Four sub-membrane vacuum monitoring points will be installed within each ISTR SMD area (Figures 6 and 7) to allow for sub-membrane differential pressure measurements. A pedestrian walkway constructed of elevated plywood will be installed as necessary to facilitate foot traffic across the ISTR SMD area for AOC 1 (i.e., Buildings 2 and 3). SMD will begin operation before ISTR operations start and continue through at least 60 days after the end of the initial cooling phase, as discussed below in Section 4.1.13.4.

4.1.13.2 Monitoring

Vapor intrusion mitigation monitoring activities to be conducted during ISTR are described below.

- **Indoor Air Sampling** – Indoor air sampling will be the primary metric by which the efficacy of the mitigation measures implemented during ISTR is evaluated. Indoor air sampling will be conducted within, and outside the perimeter of, the exclusion zones for AOCs 1 and 3. For AOC 1, indoor air sampling will be conducted inside the exclusion zone at locations IA-ISTR-B2-01 and IA-ISTR-B3-01 and just outside the exclusion zone at locations IA ISTR-B2-02 and IA-ISTR-B3-02 (Figure 6). For AOC 3, indoor air sampling will be conducted inside the exclusion zone at locations IA-ISTR-B11-01 and IA-ISTR-B11-02 and just outside the exclusion zone at locations IA-ISTR-B11-03 and IA-ISTR-B11-04 (Figure 7). Each indoor air sample will be collected over an 8-hour period using an individually-certified 6-liter SUMMA® canister and analyzed for the Site-specific list of VOCs via USEPA Method TO-15 with a targeted turnaround time of 5 days.

  A baseline indoor air sampling event will be performed to document pre-ISTR conditions and for comparison to subsequent data. The baseline indoor air sampling will occur before the ISTR startup phase and after the preemptive mitigation measures discussed in Section 4.1.13.1 have been implemented. Indoor air sampling will be performed again approximately one week after starting the ISTR heating phase, and then at least monthly thereafter at indoor air sampling locations within the exclusion zone and coinciding with quarterly indoor air sampling events at locations outside the perimeter of the exclusion zone until the corresponding exclusion zone is removed (discussed in Section 4.1.13.4).

  a) If the TCE concentration in an exclusion zone indoor air sample exceeds half the NYSDOH recommended immediate action level for TCE of 20 micrograms per cubic meter (µg/m^3), additional measures, described below in Section 4.1.13.3, will be implemented to mitigate vapor intrusion or improve indoor air quality for the corresponding exclusion zone. Additionally, the frequency of indoor air sampling within and outside the perimeter of that exclusion zone will change to weekly until sampling results demonstrate that indoor air TCE concentrations within the exclusion zone are below 10 µg/m^3.

     Potential additional measures are discussed in Section 4.1.13.3. For AOC 3, additional measures will at a minimum include beginning extraction from the shallow SVE wells, which are described above in Section 4.1.4.

  b) If the indoor air TCE concentration inside the exclusion zone exceeds the NYSDOH recommended immediate action level for TCE of 20 µg/m^3, ISTR heating operations for the corresponding AOC will be temporarily stopped or adjusted while additional measures (discussed Section 4.1.13.3) to mitigate vapor intrusion or improve indoor air quality are implemented. ISTR heating for that AOC may resume after indoor air sampling demonstrates TCE concentrations are less than 10 µg/m^3 inside of the exclusion zone.

- **Indoor Air PID Screening** – Immediately preceding the ISTR system startup phase and then until the end of the initial cooling phase, indoor air PID screening of the breathing zone within and just outside of each exclusion zone will be conducted at least weekly in Buildings 2, 3, 11, and 11A. Background PID screening will be performed in adjacent buildings at the facility concurrent with weekly PID screening.

  If indoor air PID readings within the exclusion zone are greater than 5 parts per million above background at any of the indoor air screening locations, indoor air sampling (by USEPA Method TO-15) will immediately be scheduled and conducted at the indoor air sampling locations associated with that exclusion zone (i.e., both inside and outside the perimeter of the exclusion zone). Samples will be analyzed with a 3-day turnaround time. Indoor air sampling results will be evaluated as described above for the monthly indoor air sampling.

- **Differential Pressure Measurements** – Sub-slab and sub-membrane differential pressures will be measured in the ISTR SMD/SSD zones before ISTR startup, weekly for the first month following ISTR system startup, and then monthly until the end of the initial cooling phase. Differential pressure measurements will be used as an indicator as to the performance of the SSD and SMD systems and may be used to guide the selection of additional mitigation measures (Section 4.1.13.3) as appropriate.
- **SMD/SSD System Vapor Sampling** – Vapor samples will be collected from the influent of each SMD system and at each ISTR SSD extraction point. Vapor samples will be collected over a 5-minute period using individually-certified 1-liter SUMMA® canisters and analyzed for Site-specific VOCs via USEPA Method TO-15. Baseline vapor samples will be collected after mitigation measures are in place but before ISTR operations begin. Vapor samples will then be collected one week after ISTR heating operations begin and monthly thereafter. The analytical results for the vapor samples will be used to evaluate changes in sub-slab VOC concentrations during ISTR operations, and as an indicator of VOC mass removal by the ISTR SMD/SSD systems.

4.1.13.3 Additional Mitigation Measures

Additional mitigation measures may be warranted depending on the results of the monitoring (primarily indoor air sampling) conducted during ISTR operations, as discussed above in Section 4.1.13.2. The following additional measures may be implemented in portions of Buildings 2 and 3 (AOC 1), and Buildings 11 and 11A (AOC 3) during ISTR:

- **Shallow SVE Well Operation** – In AOC 3, shallow SVE wells (described above in Section 4.1.4) can be connected to the ISTR extraction system. Once activated, the shallow SVE wells would continue operating through at least the end of the initial cooling phase.
- **Reevaluation of the Effectiveness of SSD and SMD** – In ACOs 1 and 3, SSD or SMD areas may be expanded or vacuum equipment can be upsized if it appears that vapor intrusion is occurring outside the ISTR SMD/SSD zones, or if the sub-membrane or sub-slab within the ISTR SSD/SMD zones is not sufficiently depressurized.
- **Increased Ventilation via Mechanical Means** – In ACOs 1 and 3, ventilation fans may be placed near building or exclusion zone openings as necessary to increase indoor air ventilation and reduce indoor air concentrations.
- **Preventing Indoor Air Flow to Other Buildings** – In AOC 1, the doors and doorways connecting Buildings 2 and 3 to adjacent buildings may be sealed with polyethylene sheeting to prevent indoor air in Buildings 2 and 3 from migrating to other buildings at the Site.
- **Restricting Access** – in AOC 1, access to Buildings 2 and 3 can be blocked off from other buildings and access can be restricted.

4.1.13.4 Reopening of Exclusion Zones

Exclusion zones will be reopened after SMD systems are decommissioned and based on sub-slab vacuum influence and indoor air sampling results. The SMD systems in AOCs 1 and 3 will begin operating before the ISTR startup phase in each AOC and will continue operating through at least the end of the initial cooling phase in each AOC (i.e., after the ISTR heating system shuts down). After the initial cooling phase concludes, each SMD system will be assessed and decommissioned using the following procedure:

- Two months after completing the initial cooling phase, the SMD system will be temporarily turned off and passively vented to indoor air by opening sub-membrane vacuum monitoring points. The SSD extraction points in the ISTR SMD/SSD zone will remain operating, and sub-slab differential pressures within the ISTR SMD/SSD zone will be measured. If sub-slab vacuum influence is demonstrated throughout the ISTR SSD/SMD zone, the SMD system will be decommissioned and the membrane removed.

  If the shallow SVE wells in AOC 3 are online, they will be turned off at least one week before sub-slab differential pressures are measured in order to replicate SSD operating conditions before ISTR system operation.
- One week following the decommissioning of the SMD system, indoor air samples will be collected from both inside and outside the exclusion zone. The exclusion zone will remain in place while indoor air samples are being analyzed.
  a) If the indoor air TCE concentrations within the exclusion zone are greater than both the NYSDOH ambient air guideline for TCE (2 µg/m^3) and the indoor air TCE concentration outside the exclusion zone, the exclusion zone will remain in place and air sampling will be repeated after one month. Before repeating the air sampling, additional vapor intrusion mitigation measures may be implemented if warranted (e.g., SSD expansion).
  b) If the indoor air TCE concentrations within the exclusion zone are less than either the NYSDOH ambient air guideline for TCE (2 µg/m^3) or the indoor air TCE concentration outside the exclusion zone, the exclusion zone and associated sheeting will be removed.

4.2 Unsaturated Soil Excavation

The remedy for OU 1 includes excavation of unsaturated soil in AOC 1 with COPC concentrations exceeding commercial SCOs. Proposed unsaturated soil excavation extents were developed during the PDI and are presented on Figure 9. However, because ISTR operations may reduce TCE concentrations in unsaturated soils in the proposed unsaturated soil excavation area, any potential excavation activities may be deferred until after ISTR is completed. If the unsaturated soil excavation is deferred until after ISTR is completed, TCE concentrations in unsaturated soil in the proposed excavation extents will be re-evaluated by collecting and analyzing soil samples from the same locations and depths where TCE concentrations in PDI soil samples exceeded the commercial SCO (see Table 3 of the PDI Report [Arcadis 2022]). Soil samples would be collected using the same methods used during the PDI. Based on the results of this sampling, the scope and details of these unsaturated soil excavations for AOC 1, including the extents (Figure 9) will be revised (if necessary) and presented to NYSDEC for approval. The management of unsaturated soils excavated as part of the OU 1 remedy is discussed further in Section 6.

5 Operable Unit 2 Remedial Design

The RD for OU 2 is described in this section. Elements include soil excavation and off-Site disposal and capping as follows:

- Unsaturated soils within the on-Site HO ditches (HO ditches 2, 4, 5, 6, 7 and 6/7) with cadmium concentrations that exceed the commercial SCO will be targeted for excavation and transported off-Site for disposal.
- Unsaturated soils within the HO 3 ditch with cadmium concentrations that exceed the applicable SCO will be capped in lieu of excavation.
- Unsaturated soils within the 100-year floodplain where discharge from the HO drainage ditches entered the canal with cadmium concentrations that exceed the residential SCO will be targeted for excavation and transported off-Site for disposal. These soils are limited to the areas downgradient from HO 4 and HO 5.

Design Drawings and Specifications for these elements have been prepared by Arcadis and are included in Appendix H. OU 2 construction activities will be conducted following the procedures in the SWPPP (Appendix B), SSHASP (Appendix D), and CAMP (Appendix E). Locations and depths of implementation for these RD elements are indicated in the Design Drawings and described in Section 5.4.

It is anticipated that, on behalf of GTEOSI, Arcadis will subcontract with a qualified remediation contractor for implementation of the OU 2 RD. The Design Drawings and Specifications, which are referenced throughout this section, will guide the performance of the work and serve as the basis of the contractual agreement with the remediation contractor. Waste management activities associated with the OU 2 remedy are discussed in Section 6.

5.1 Pre-Mobilization Activities

In addition to obtaining permits and access agreements to implement the RD activities (discussed in Section 3.3), submittals will be prepared by the remediation contractor for review by Arcadis and GTEOSI prior to the remediation contractor mobilizing to the Site. Pre-mobilization submittals will include, but not be limited to, the following:

- Project Operations Plan (POP) – The remediation contractor will prepare and submit a POP that provides its comprehensive approach for implementing the work, including organizational structure, work schedule and sequence, construction equipment, proposed locations of decontamination and material staging areas, and detailed procedures for excavation, material handling, backfilling, and Site restoration. The POP will be prepared following the procedures in Appendix H specification Section 01 15 00 – Contractor's Project Operations Plan.
- Health and Safety Plan (HASP) – The remediation contractor will prepare and submit a HASP to provide a mechanism for establishing safe working conditions for its on-Site personnel. The remediation contractor will engage with a Certified Industrial Hygienist for preparation and/or approval of its HASP. The HASP will include, but not be limited to, a hazard analysis and hazard controls for each task to be performed, training requirements and associated documentation, an emergency response plan, an exposure monitoring program, and identification of a safety representative to be present at the Site when work is being performed. The remediation contractor will assume sole responsibility for the accuracy and content of its HASP. The HASP

will be prepared following the procedures in Appendix H specification Section 01 35 29 – Contractor's Health and Safety Plan.

- Traffic Maintenance and Protection Plan – The remediation contractor will prepare and submit a Traffic Maintenance and Protection Plan that establishes procedures for maintaining and protecting traffic at the Site, including Site entrances and exits. The plan will lay out construction vehicle routes and locations of traffic controls (e.g., signage) and identify the personnel responsible for implementing the plan. Construction vehicles leaving the Site will follow Lamb Road and proceed east on US Route 20 (i.e., right turn from Lamb Road, away from downtown Seneca Falls). The Traffic Maintenance and Protection Plan will be prepared following the procedures in Appendix H specifications in Section 01 55 26 – Maintenance and Protection of Traffic and Section 02 60 05 – Contaminated Material Management and Disposal.

  As shown on Design Drawing 3, construction vehicles (e.g., waste-hauling trucks, material/equipment deliveries, etc.) will enter and exit the Site via Lamb Road in the northern end of the Site to reduce disturbance to nearby residential properties.
- Preliminary Project Schedule – The remediation contractor will prepare a preliminary schedule that identifies major work items and work sequences. Requirements for the preliminary project schedule and schedule updates are included in Appendix H specification Section 01 32 16 – Construction Project Schedule.

Arcadis has prepared the SWPPP to outline the procedures to be implemented to prevent stormwater pollution due to construction activities. The SWPPP will be implemented in conjunction with Appendix H specification Section 01 41 26 – Stormwater Pollution Prevention Plan and Permit.

The pre-mobilization submittals listed above will also be provided to NYSDEC and NYSDOH for review prior to the remediation contractor mobilizing to the Site.

5.2 Site Preparation and Controls

Following mobilization to the Site by the remediation contractor, Site preparation activities will be performed and controls will be established. Site preparation and controls will include, but not be limited to, the following:

- Underground and aboveground utilities in the vicinity of the work areas (see Design Drawing 3 in Appendix H) will be located and identified. A minimum of three lines of evidence will be used for location of underground utilities, including at a minimum contacting UDig NY (formerly Dig Safely New York) and the use of a private utility locator. All utilities will be protected and maintained for the duration of remedial construction activities unless otherwise agreed upon with the utility and/or affected property owner(s). Clearance distances from energized overhead electric lines will be maintained in accordance with Occupation Safety and Health Administration requirements (29 Code of Federal Regulations 1910.333(c)(3)(i)(A)). Requirements for the protection of utilities are described in Appendix H specification Section 01 71 33 – Protection of Work and Property.
- Temporary erosion and sedimentation controls will be installed following the procedures in the Design Drawings and Specifications, and the SWPPP. Silt fencing will be installed on the downgradient side of each land disturbance area (e.g., excavation areas, access road improvement areas, staging and stockpile areas). Check dams will be installed as necessary in HO ditches actively conveying water (e.g., HO 6/7). Temporary erosion and sedimentation controls will be maintained and inspected throughout the remediation activities and will be removed after Site restoration activities, including establishment of vegetative areas, have been completed. Requirements for erosion and sedimentation controls are included in Appendix H specifications in

Section 01 57 05 – Temporary Controls and Section 01 41 26 – Stormwater Pollution Prevention Plan and Permit.

- Clearing and grubbing, including tree removal activities, will be performed as necessary to facilitate access to excavation and capping areas. A Tree Removal Plan will be prepared by the remediation contractor to determine whether measures (e.g., additional field surveys, limiting tree removal activities to outside of mating season for endangered or threatened species) to minimize tree disturbance and removal are required. Requirements for tree removal are included in the following Appendix H Specification:
  a) Section 02 60 05 – Contaminated Material Management and Disposal; and
  b) Section 31 11 00 – Clearing and Grubbing.
- Contractor support areas for temporary facilities, materials storage, and equipment storage will be constructed. Contractor support areas are shown on Design Drawing 3 and will be continuously fenced at the support area perimeters and accessed via swing gates adjacent to the access road.
- The existing dirt access road leading from the paved Site access road to and along the New York State Electric & Gas right-of-way adjacent to the canal will be enhanced as needed to facilitate the RD work. For those portions of the existing dirt access road that require enhancement, non-woven stabilization fabric will be placed on the existing grade and overlayed with crushed stone. The existing dirt access road is shown on Design Drawing 3 and access road enhancement details are shown on Design Drawing 17.
- If needed, a soil stockpile area will be installed for management of excavated soils. The soil stockpile area will be installed within a contractor support area and will be required if direct-loading of excavated soils is not performed. The soil stockpile area will consist of a geomembrane liner wrapped over a perimeter berm. Geotextile fabric will be installed on the top and bottom sides of the geomembrane liner to serve as a cushioning layer. A sump will be installed in the lowest corner of the soil stockpile area for collection of any accumulated water. The soil stockpile will be covered when not in use to prevent precipitation from contacting excavated soils. Additional details regarding the soil stockpile area are included on Design Drawing 15.
- Decontamination pads will be installed at each excavation area to prevent tracking of impacted materials by construction vehicles, equipment, or personnel. Decontamination pads will be constructed in a similar manner to the soil stockpile with the addition of wood planking (or similar) to support construction vehicle/equipment traffic. Details for decontamination pads are included on Design Drawing 15. Additional decontamination requirements are included in Appendix H specifications Section 02 51 00 – Decontamination and Section 02 60 05 – Contaminated Material Management and Disposal.
- Stabilized construction entrances will be installed for use by construction vehicles prior to returning to public roadways. Stabilized construction entrances will be a minimum of 50 feet long and consist of crushed stone (minimum 6 inches thick and 12 feet wide) placed on non-woven stabilization fabric.
- The presence of visible dust is not permitted during remedial activities. Dust migration will be visually assessed during all work activities. If visible dust is observed during work activities, reasonable dust suppression techniques will be used to mitigate the migration of fugitive dust, including maintaining soil stockpile covers, implementing good housekeeping procedures, and wetting haul routes as necessary. Community air monitoring for dust will be conducted following the procedures in Appendix 1A of DER-10 (NYSDEC 2010) and Appendix H specification Section 01 57 05 – Temporary Controls during intrusive activities and while material stockpiles are present at the Site.

A Request to Import form will be submitted to NYSDEC for approval before backfill materials, including those aggregate materials used to construct temporary support areas (e.g., temporary roads, containment areas, etc.), are imported to the Site. Additional details regarding imported material requirements are described in Section 5.7.

5.3 Survey Control

A land surveyor licensed in the State of New York will be engaged by the remediation contractor to conduct survey control during remedial activities, including the following:

- Pre-excavation surveying activities: marking the horizontal extents of each excavation cell and documenting the ground surface elevations within each excavation cell; staking the 100-year floodplain boundary.
- Post-excavation surveying activities: documenting the bottom elevations and horizontal extents of each excavation cell to support complete excavation of soils targeted for removal. The land surveyor will also document the location and depth of any documentation samples collected during remedy implementation.
- Mid-restoration surveying activities: conducted as appropriate to support restoration activities (e.g., vegetated topsoil depths).
- Post-restoration surveying: documenting final ground surface elevations and horizontal extents of each surface restoration type.

Surveying activities will also include photographic documentation of pre- and post-construction conditions. Additional surveying requirements are included in the Design Drawings and in Appendix H specifications Section 01 71 26 – Construction Surveying and Layout and Section 01 78 39 – Project Record Documents.

5.4 Excavation Depths and Extents

Proposed excavation depths are presented on Design Drawings 4, 5, and 6. As discussed previously, the proposed excavation depths and extents for OU 2 were developed based on soil sampling data obtained during the PDI. Each HO ditch was divided into multiple areas for the purpose of pre-delineating excavations, and then one pre-delineation soil boring was advanced per area. For each excavation area, the proposed excavation depth was selected as either:

- The deepest depth at which soils contained cadmium at a concentration greater than the applicable SCO;
- The depth at which the water table was encountered in that excavation area; or
- The depth at which refusal was encountered in that excavation area.

A more detailed description of the procedure used to develop the proposed excavation depths is included in the PDI Report (Arcadis 2022). Proposed excavation depths are the same throughout an excavation area, unless otherwise noted.

For those excavation areas where the proposed excavation depth is based on water table elevation, the following criteria will be applied during remediation activities:

- If the water table is encountered above the proposed excavation depth, water will be managed as necessary to allow for the proposed excavation depth to be achieved.
- If the proposed excavation depth is reached before the water table is encountered, the excavation will be advanced either 6 inches deeper or until the water table is encountered (whichever is shallower). If the water

table is not encountered during the additional excavation advancement, a documentation soil sample will be collected from the excavation bottom to document the cadmium concentration in the remaining soil in that excavation area.

Excavation areas in which the proposed excavation depth has been set based on the depth of refusal during the PDI will be excavated until the proposed excavation depth is achieved, and further advanced up to 6 inches deeper, if the material is unconsolidated, or until refusal is encountered (whichever is shallower). If refusal is not encountered during the additional excavation advancement, a documentation soil sample will be collected from the excavation bottom to document the cadmium concentration in the remaining soil in that excavation area.

If a documentation soil sample contains cadmium at a concentration greater than the applicable SCO, then the process of backfilling and restoration (described in Section 5.7) will constitute an engineering control (i.e., cover system) to prevent exposure to soils exceeding the applicable SCO. In these instances, except where an excavation meets the edge of Van Cleef Lake or the Canal, the excavation, backfilling, and restoration design provides at least 12 inches of vertical separation between the final surface and native soils remaining in place, includes the placement of a demarcation fabric, and is intended to minimize the potential for erosion (as described further in Section 5.7). Where an excavation meets the edge of Van Cleef Lake or the Canal, less than 12 inches of backfill will be placed due to constructability constraints in close proximity to the water (i.e., net fill elevations will not exceed pre-construction bank elevations). A cover system is an acceptable engineering control per the Statement of Basis (NYSDEC 2018), which states engineering controls include “the cover system, or other engineered systems to control exposure to contaminants remaining in OU-02 (the historic outfalls and Van Cleef Lake sediments)”. Such cover systems will contribute to achieving the remedial goals for the Site by “preventing exposure to contaminated historic outfall drainage ditch soils”, as stated in the Statement of Basis (NYSDEC 2018). As engineering controls, the backfilled and restored areas will be inspected and maintained during the site management phase of the project in accordance with a future Site Management Plan.

Post-excavation confirmation soil sampling will not be conducted as part of OU 2 remediation activities.

The horizontal extents of the proposed excavations were selected to extend each excavation horizontally in the direction perpendicular to the HO ditch flow direction to the top of the HO ditch bank, but to no more than 2 feet vertically above the ditch invert. The proposed horizontal excavation extents shown on the Design Drawings may be adjusted based on the pre-excavation surveying described in Section 5.3. Excavation work will be conducted following the procedures in Appendix H specifications Section 02 60 05 – Contaminated Material Management and Disposal and Section 31 23 00 – Excavation and Fill.

5.4.1 Historical Outfall 2 Ditch

The HO 2 ditch remedial activities consist of six excavation areas (HO 2 Excavation Areas 1 through 6) shown on Design Drawing 4. Proposed excavation depths range from 2.5 feet bgs in HO 2 Excavation Areas 3 and 4 to 4 feet bgs in HO 2 Excavation Area 2. The estimated volume of soil in the proposed HO 2 ditch excavation is 130 in-place CY (not including additional soils that may need to be removed to facilitate restoration).

The proposed depth of excavation for Excavation Area 5 is based on delineation of cadmium concentrations in soil to below the commercial SCO during the PDI. The proposed depth of excavation for the other five excavation areas are based on where the water table was encountered during the PDI. As such, the final excavation depths for those five areas will be determined in the field following the criteria described above.

The proposed excavation depth of 3 feet bgs for Excavation Area 6 is below the normal surface water elevation of Van Cleef Lake, which abuts Excavation Area 6. As such, for the portion of Excavation Area 6 closest to Van Cleef Lake, the bottom of the excavation will be sloped to minimize bank disturbance and limit hydraulic head pressures on the excavation sidewalls. The excavation will be sloped gradually from 3 feet bgs at the PDI soil boring location to the elevation of surface water in the lake at the time of the excavation. Measures will be taken (e.g., sandbags) to prevent lake water from entering the excavation. Erosion and sediment controls (e.g., silt fence) will also be used at the edge of the lake. Additional details regarding water management procedures and sediment control measures are included in the SWPPP (Appendix B). In addition, GTEOSI will inquire with the New York State Canal Corporation as to the practicability of coordinating a specific time period during which excavation(s) can be conducted while water levels in Van Cleef Lake or the Canal (as appropriate) are low.

5.4.2 Historical Outfall 3 Ditch

Based on PDI findings, a proposed excavation for the HO 3 ditch would consist of three excavation areas with proposed excavation depths ranging from 2 to 4.5 feet bgs, corresponding to an estimated soil volume of 40 in-place CY. However, due to the steep slope of this ditch, access constraints, and its proximity to low-hanging electrical transmission lines, remedial activities at the HO 3 ditch will not include excavation. Instead, RAOs will be achieved in this area by installing a concrete cap as described in Section 5.5.

5.4.3 Historical Outfall 4 Ditch

The HO 4 ditch remedial activities, including the portion within the 100-year floodplain, consist of six excavation areas (HO 4 Excavation Areas 1 through 6) shown on Design Drawing 5. Proposed excavation depths range from 2.5 feet bgs in HO 4 Excavation Area 3 to 6 feet bgs in HO 4 Excavation Area 2. The estimated volume of soil in the proposed HO 4 ditch excavation is 440 in-place CY (not including additional soils that may need to be removed to facilitate restoration).

The proposed depths of excavation for HO 4 Excavation Areas 1 through 5 are based on delineation of cadmium concentrations in soil to below the commercial SCO during the PDI or encountering refusal. For the excavation area within the 100-year floodplain (HO 4 Excavation Area 6), the proposed depth of excavation is based on the depth at which the water table was encountered during the PDI. As such, the final excavation depth for Excavation Area 6 will be determined in the field following the criteria described in the introduction Section 5.4. Additionally, the proposed excavation depth of 4 feet bgs for Excavation Area 6 is near the normal surface water elevation of the canal that abuts Excavation Area 6. As such, for the portion of Excavation Area 6 closest to the canal, the bottom of the excavation will be sloped to minimize bank disturbance and limit hydraulic head pressures on the excavation sidewalls. The bottom of the excavation will be sloped gradually from 4 feet bgs at the PDI soil boring location to the elevation of saturated soils or the surface water in the canal at the time of the excavation (whichever is shallow). Measures will be taken (e.g., sandbags) to prevent canal surface water from entering the excavation. Erosion and sediment controls (e.g., silt fence) will also be used at the edge of the canal. Additional details regarding water management procedures and sediment control measures are included in the SWPPP (Appendix B). In addition, GTEOSI will inquire with the New York State Canal Corporation as to the practicability of coordinating a specific time period during which excavation(s) can be conducted while water levels in Van Cleef Lake or the Canal (as appropriate) are low.

5.4.4 Historical Outfall 5 Ditch

The HO 5 ditch remedial activities, including that portion within the 100-year floodplain, consists of five excavation areas (HO 5 Excavation Areas 1 through 5) shown on Design Drawing 5. Proposed excavation depths range from 2 feet bgs at Excavation Areas 1 and 5 to 5.5 feet bgs at Excavation Area 2. The estimated volume of soil in the proposed HO 5 ditch excavation is 270 in-place CY (not including additional soils that may need to be removed to facilitate restoration).

Proposed depths of excavation for HO 5 Excavation Areas 1 through 3 are based on delineation of cadmium concentrations in soil to below the commercial SCO during the PDI or encountering refusal. For the excavation areas within the 100-year floodplain (HO 5 Excavation Areas 4 and 5), the proposed depths of excavation are based on the depth at which the water table was encountered during the PDI. As such, the final excavation depth for HO 5 Excavation Areas 4 and 5 will be determined following the criteria described in Section 5.4. Additionally, the proposed excavation depth shown on Design Drawing 5 (2 feet bgs) for HO 5 Excavation Area 5 is near the normal surface water elevation of the canal (which HO 5 Excavation Area 6 abuts). As such, for the portion of HO 5 Excavation Area 5 closest to the canal (between the edge of water and the PDI soil boring location), the bottom of the excavation will be sloped gradually from 2 feet bgs (at the PDI soil boring location) to the elevation of saturated soils or the canal's surface water at the time of excavation to minimize bank disturbance and limit hydraulic head pressures on the excavation sidewalls. Measures will be taken (e.g., sandbags) to prevent canal surface water from entering the excavation. Erosion and sediment controls (e.g., silt fence) will also be used to minimize turbidity at the edge of water. Additional details regarding water management procedures and sediment control measures are included in the SWPPP (Appendix B). In addition, GTEOSI will inquire with the New York State Canal Corporation as to the practicability of coordinating a specific time period during which excavation(s) can be conducted while water levels in Van Cleef Lake or the Canal (as appropriate) are low.

5.4.5 Historical Outfalls 6, 7, and 6/7 Ditches

The HO 6, HO 7, and HO 6/7 ditches consist of eleven excavation areas (HO 6 Excavation Areas 1 through 4, HO 7 Excavation Areas 1 through 5, and HO 6/7 Excavation Areas 1 and 2) with proposed excavation depths ranging from 0.5 feet bgs (all areas except HO 7 Excavation Area 4) to 1 feet bgs (HO 7 Excavation Area 4), as shown on Design Drawing 6. The estimated soil volume for the HO 6, HO 7, and HO 6/7 ditches excavation is 570 in-place CY (not including additional soils that may need to be removed to facilitate restoration). The proposed depth of excavation for all areas is based on cadmium being detected below the commercial SCO during the PDI.

5.5 Historical Outfall 3 Ditch Capping

A concrete cap will be installed to address HO 3 ditch soils in lieu of remedial excavation. As described in the PDI Report (Arcadis 2022), remedial excavation for the HO 3 ditch is not feasible because of its proximity to overhead electrical lines, utility poles, and fixed guy wires that cannot be relocated or adequately protected from mechanical excavation equipment. The steep slope of the ditch, challenges with accessing the ditch, and the target excavation depths (up to 4.5 feet bgs) identified for the HO 3 ditch also make manual excavation in this area infeasible. The concrete cap will cover, at a minimum, soils that exceed the applicable SCO for cadmium (i.e., those soils that would have been proposed for removal if remedial excavation was to be performed). The proposed extents of the concrete cap are shown on Design Drawing 8.

The concrete cap will be 6 inches thick and, due to the steep slope, will consist of a fabric form concrete mattress (Uniform Section US600-PET by Synthetex, LLC, or equivalent). The concrete mattress will be installed on non-woven geotextile fabric placed on existing grade. The concrete mattress will be anchored using corrosion-resistant duckbill anchors installed to a minimum depth of 42 inches below grade and spaced at least every 3 feet (in directions both parallel and perpendicular to the ditch bank slope). An erosion control mat will be placed under the upper 3 feet (minimum) of the concrete mattress on both sides of the ditch and extend at least 3 feet beyond the extents of the concrete mattress. Existing soils exceeding the commercial SCO for cadmium will not be disturbed during placement of the concrete mattress. If required, fill material will be placed in the invert of the ditch prior to placement of the mattress to meet the minimum bend radius requirement for the mattress. Following placement and anchoring of the fabric form concrete mattress, fine aggregate concrete will be pumped into the fabric forms. It is anticipated that the fabric form placement will generally begin at the bottom of the HO 3 ditch and proceed upgradient, although the actual procedure and sequencing will be determined in coordination with the selected remediation contractor. A capping detail for the HO 3 ditch is shown on Design Drawing 16. The fabric form concrete mattress installation will be conducted following the procedures in Appendix H specifications Section 03 37 00 – Fabric Formed Concrete.

5.6 Water Management

Groundwater or stormwater that needs to be removed from HO ditches to facilitate the work will be containerized and managed as described in Section 6. Water will be managed in accordance with the SWPPP (Appendix B) and Appendix H specifications Section 02 60 05 – Contaminated Material Management and Section 02 73 00 – Construction Water Management and Disposal.

To limit the volume of stormwater requiring management, stormwater that would otherwise accumulate in an HO ditch may be collected and diverted to downstream of the excavation area(s).

5.7 Backfilling and Restoration

After the vertical and horizontal extents of remedial excavations are achieved (as described in Section 5.4) and post-excavation surveying is conducted, backfilling and restoration activities will commence. Backfilling will begin as soon as possible to facilitate area stability, reduce the amount of stormwater or groundwater requiring management, and increase overall safety at the Site. An orange geotextile demarcation fabric will be placed across the bottom of each excavation where possible to provide a visual barrier between imported backfill materials and native soils remaining in place.

In accordance with DER-10 (NYSDEC 2010), Section 5.4(e), soil/fill material brought to the Site for use as backfill for OU 2 will meet the lower of the SCOs for the Protection of Ecological Resources and either SCOs for Commercial Use (OU 1 and on-Site portion of OU 2) or Residential Use (off-Site portion of OU 2) as per 6 NYCRR Part 375-6.8(b) (NYSDEC 2006). Proposed fill material will be sampled and analyzed prior to being delivered to the Site for VOCs, SVOCs, metals, polychlorinated biphenyls, pesticides, herbicides, total cyanide, total mercury, 1,4-dioxane (analyzed with a reporting limit of 0.1 ppm or less), and per- and polyfluoroalkyl substances (PFAS). For PFAS and 1,4-dioxane, sample results will be compared to respective guidance values as per the most recent applicable NYSDEC guidance document. Sampling will be performed at a frequency consistent with Table 5.4(e)10 in DER-10. A Request to Import/Reuse Fill or Soil form will be filled out and submitted to NYSDEC for approval, per DER-10, Section 5.4(e)(6), which states: remedial party must provide documentation of the source of fill to DER for approval of the source of the material before it is used on the Site.

Final restoration surface characteristics are designed to achieve long-term surface soil stability with respect to stormwater runoff erosion potential. Although the HO pipes have been decommissioned, surface water from impervious facility areas concentrates within HO ditches and was evaluated as part of the restoration design. Drainage areas to each outfall were evaluated using United States Department of Agriculture Technical Release 55 (TR-55) based software HydroCAD which predicted peak runoff rates for design storms up to and including the 50-year, 24-hour storm event. Resulting flow characteristics (i.e., shear stress, velocity, flow depth) were evaluated to select appropriate surface restoration measures (i.e., vegetated topsoil, erosion control mat, and/or riprap) described below.

As noted above, final restoration surface type will consist primarily of either vegetated topsoil or stone infill. For areas where vegetated topsoil is used, the excavation will be backfilled and compacted with imported general fill to an elevation of 6 inches below final grade, followed by placement and seeding of a 6-inch-thick layer of topsoil. General fill is defined as material that is free of rock and gravel larger than 3 inches in any dimension, debris, waste, frozen materials, organic material, and other deleterious matter, with a liquid limit not greater than 45 and plasticity index not greater than 25 inches, consistent with the specifications (Section 31 05 16 – Aggregates for Earthwork). For vegetated topsoil areas with relatively steep slopes, the topsoil will be overlayed by erosion control matting[3]. For areas where stone infill is used, which is anticipated for portions of the HO 4 and HO 5 ditch excavations, a 24-inch thick (minimum) layer of NYSDOT medium stone will be placed on the excavation bottom. Riprap will be placed to prevent erosion on the inlet and outlet side of the concrete culvert that conveys HO 6/7 ditch stormwater underneath the Site perimeter access road. The design restoration extents, surface types, and proposed final grades for the excavations are shown on Design Drawings 7 (HO 2 ditch), 9 (HO 4 and HO 5 ditches), and 10 (HO 6, HO 7, and HO 6/7 ditches). Cross-sectional details for restoration types are included on Design Drawing 16. Final restoration extents, surface types, and grades assume that excavations will be conducted using sloping and may be adjusted based on the actual limits and slopes of disturbance.

The wetland that overlaps the HO 6, HO 7, and HO 6/7 ditch excavation will be restored in accordance the JPA approved by NYSDEC on August 12, 2024, which includes the Wetland Restoration Plan (Arcadis 2024). n.

Prior to demobilization, contractor support areas will be removed from the Site and vegetated as necessary to match approximate pre-construction conditions, unless otherwise requested by the property owner. Erosion and sedimentation controls will be removed following the establishment of vegetated areas. Aggregate materials used during construction, but that have not contacted potentially impacted materials (e.g., materials used for stabilized construction entrances), will be either transported for off-Site disposal or moved to a location acceptable to the property owner.

Backfilling and restoration activities will be conducted in accordance with the following Appendix H Specifications:

- Section 31 05 16 – Aggregates for Earthwork;
- Section 31 05 19 – Geosynthetics for Earthwork;
- Section 31 23 00 – Excavation and Fill; and
- Section 32 21 00 – Site Restoration.

[3] Erosion control matting used to stabilize backfilled material within the HOs will be permanent, and erosion control matting used for temporary applications (stockpile stabilization, etc.) will be biodegradable, consistent with the products specified in specification Section 32 21 00 (Site Restoration).

6 Waste Management

Wastes anticipated to be generated during remediation activities include soil (trench spoils, drill cuttings, excavated materials, etc.), water (groundwater, decontamination fluids, condensate), concrete (vapor cap removal), and spent granular activated carbon. Potential management options for these wastes are summarized below in Table 2.

Table 2 – Anticipated Waste Streams and Management

Waste Stream	Reuse On-Site as Backfill	Non-Hazardous Waste – Contained-In Policy	Non-Hazardous – Not a Listed Waste	Hazardous Waste Disposal	Off-Site Reuse	Discharge to Canal
Operable Unit 1						
Soils removed from trenches for the installation of utilities related to ISTR system operations	X	X		X		
Soil cuttings from electrode wells, multiphase extraction wells, and temperature sensor wells		X		X		
Soil cuttings from vacuum monitoring wells and shallow vapor extraction wells		X		X		
Unsaturated soils generated from the AOC 1 excavation		X		X		
Confirmation soil borings soil		X		X		
Concrete and asphalt removed as part of trenching or excavation activities			X		X	
Concrete generated from removal of vapor cap			X		X	
Extraction well piping/hose and down-well components which have contacted groundwater			X	X	X	
DNAPL or sludge generated by the ISTR system				X		
Spent liquid-phase granular activated carbon		X		X	X	
Spent vapor-phase granular activated carbon		X		X	X	
Treated liquid waste generated from ISTR system operations		X		X		X
Cooling tower blowdown water						X
Groundwater generated from dewatering activities for utilities abandonment, rerouting, and reinstallation		X		X		
Decontamination fluids generated during cleaning of construction and drilling equipment				X		X

Waste Stream	Reuse On-Site as Backfill	Non-Hazardous Waste – Contained-In Policy	Non-Hazardous – Not a Listed Waste	Hazardous Waste Disposal	Off-Site Reuse	Discharge to Canal
Operable Unit 2						
Excavated historical outfall soil from HO 2, 4, and 5 ditches				X		
Excavated historical outfall soil from HO 6 and 7 ditches		X		X		
Groundwater generated from dewatering activities and stormwater that has contacted HO ditch soils designated for removal		X		X		X
Decontamination fluids generated during cleaning of construction equipment				X		

It is noted that Table 2 presents multiple waste management options (and in some cases, conflicting options) for several waste streams. The final waste management strategy for some waste streams will be determined pending additional communication with NYSDEC and collection of additional waste characterization data. The waste streams and associated potential waste management/disposal methods listed in Table 2 are described in more detail below.

6.1 Operable Unit 1

Waste management activities associated with ISTR for AOCs 1 and 3 and unsaturated soil excavation for AOC 1 are discussed below. Additional details regarding the management of soil, water, and concrete and asphalt debris generated during site preparation activities to be performed before ISTR implementation are provided in the Waste Management Plan for ISTR Preparation Activities (Appendix G).

6.1.1 In Situ Thermal Remediation

6.1.1.1 Soils

To the extent practicable, soils removed as part of ISTR activities (e.g., trench spoils) will be temporarily stockpiled and reused as backfill following USEPA's Area of Contamination Policy as described in USEPA's guidance document entitled Management of Remediation Waste Under RCRA (USEPA 1998). Six distinct areas in which soils will be managed under the Area of Contamination Policy are indicated on Figure 10 and include the following:

- **Area of Contamination No. 1** – Soils to be reused as practicable in this area are listed below.
  a) Trench spoils accumulated during the abandonment, rerouting, and subsequent reinstallation of the water line that traverses the AOC 1 thermal influence zone, which extends slightly beyond the ISTR treatment area, as described in Section 4.1.2.
  b) Trench spoils accumulated during the installation of horizontal SVE wells in the AOC 1 thermal influence zone.
  c) Trench spoils accumulated during installation of subsurface electrode and MPE well conveyance lines and horizontal SVE wells beneath Johnston Street in the southern end of the AOC 1 thermal influence zone.
  d) Soils removed to install the subsurface vapor cap within Johnston Street in the southern end of the AOC 1 thermal influence zone.
  e) Trench spoils accumulated during the rerouting of stormwater lines in the AOC 1 thermal influence zone.
  f) Trench spoils accumulated during the abandonment or exploration of former process waste lines near the AOC 1 thermal influence zone.
- **Area of Contamination No. 2** – Soils to be reused as practicable in this area are listed below.
  a) Trench spoils accumulated during the abandonment, rerouting, and subsequent reinstallation of the water line that traverses the AOC 3 thermal influence zone.
  b) Trench spoils accumulated during the installation of horizontal SVE wells in the AOC 3 thermal influence zone.
  c) Trench spoils accumulated during the rerouting of stormwater lines west of the AOC 3 thermal influence zone.
  d) Trench spoils accumulated during the abandonment or exploration of former process waste lines near the AOC 3 thermal influence zone.
- **Area of Contamination No. 3** – Soils to be reused as practicable in this area include trench spoils accumulated during the installation of the pre-cast concrete subsurface process corridor between AOC 1 and the aboveground treatment equipment compound, which will be located directly south of Building 12 and to the southwest of the water tower. Additionally, soils accumulated during the installation of one electrical pole next to Building 12 are included in this area.
- **Area of Contamination No. 4A** – Soils to be reused as practicable in this area include trench spoils and auger cuttings accumulated during installation of the below-grade electrical conduit and electrical pole, respectively, in the vicinity of the new power drop from NYSEG.
- **Area of Contamination No. 4B** – Soils to be reused as practicable in this area include auger cuttings accumulated during installation of electrical poles outside the southern corner of Building 12.
- **Area of Contamination No. 4C** – Soils to be reused as practicable in this area include auger cuttings accumulated during installation of electrical poles outside the northern corner of Building 12.

Soils accumulated from each Area of Contamination will be temporarily stockpiled within each respective Area of Contamination until backfilling commences. Soil used as backfill following the Area of Contamination policy will only be used in the same Area of Contamination from which the soil was excavated.

In some instances, certain soils may not be reused as backfill following the Area of Contamination Policy because of the physical characteristics of the soil (e.g., moisture content or presence of debris) or the size of the subsurface utility being installed. In these instances, the excess soil may be:

- Reused on-Site above the water table if soil concentrations are less than the respective protection of groundwater SCO (following the Statement of Basis [NYSDEC 2018]);
- Managed as an F-listed hazardous waste (Listed Waste Codes F001 and F002); or
- Managed as a non-hazardous waste in accordance with NYSDEC's contained-in policy outlined in Technical Administrative Guidance Memorandum 3028 (NYSDEC 1992) and non-hazardous waste disposal facility requirements.

Soils excavated from each Area of Contamination with PID readings greater than 25 ppm or meeting the definition of grossly contaminated media as defined in 6 NYCRR Part 375 will not be reused as backfill, and will be segregated from soil with no evidence of contamination. The segregated soil will either be managed for off-Site disposal as non-hazardous waste via NYSDEC's contained-in policy (with NYSDEC approval) or as an F-listed hazardous waste. PID screening of excavated soils will be performed at least once for each 10 cubic yards of excavated material (estimated based on excavator bucket quantities). If PID readings exceed 25 ppm or soils meet the definition of grossly contaminated media, the frequency of PID screening for that Area of Contamination will be increased to once per cubic yard. The PID screening frequency will return to once per 10 cubic yards after PID readings (based on screening once per cubic yard) are less than 25 ppm for at least 10 consecutive cubic yards of excavated soils. Unsaturated trenched soil will be stockpiled separately from saturated trenched soil. Unsaturated trenched soil and saturated trenched soil (after being dried as necessary) will be reusable as backfill at any depth within the Area of Contamination. Saturated soils excavated during ISTR activities will be processed in accordance with Section 02 60 05 – Contaminated Material Management and Disposal, Section 02 73 00 – Construction Water Management and Disposal, and in accordance with the SWPPP (Appendix B).

Soil cuttings from wells and from confirmation soil sample borings will either be managed as an F-listed hazardous waste (Listed Waste Codes F001 and F002) and transported off-Site for disposal at a RCRA Subtitle C disposal facility or, pending approval from NYSDEC, managed as non-hazardous waste in accordance with NYSDEC's contained-in policy and transported off-Site for disposal in accordance with RCRA Subtitle D disposal facility requirements. Site investigation data indicate that TCE is present at higher concentrations at greater depths, and the shallow soils may meet the criteria for obtaining a contained-in determination from NYSDEC for management as non-hazardous waste. Thus, segregating soil cuttings at shallow wells (vacuum monitoring wells and shallow vapor extraction wells) from soil cuttings at deep wells (electrode wells, MPE wells, and temperature sensor wells soils) will allow a contained-in approval to be pursued for shallow well soil cuttings, if GTEOSI chooses to do so.

6.1.1.2 Concrete and Asphalt

Concrete and asphalt will be generated from trenching and excavation activities for AOCs 1 and 3, from trenching for the pre-cast concrete subsurface process corridor between AOC 1 and the aboveground treatment equipment compound, and from SSD extraction point installation. Concrete and asphalt that is separated from Site soils by a subbase gravel layer and has not contacted Site soils, and that neither meets the definition of grossly contaminated media as defined in 6 NYCRR Part 375 nor exceeds a PID screening value of 25 ppm will be sent off-Site for recycling or managed as non-hazardous waste for off-Site disposal in accordance with RCRA Subtitle D disposal facility requirements. Concrete and asphalt that has contacted Site soils, or that either meets the

definition of grossly contaminated media or exceeds a PID screening value of 25 ppm, will be managed either as an F-listed hazardous waste (Listed Waste Codes F001 and F002) and transported off-Site for disposal at a RCRA Subtitle C disposal facility or, pending approval from NYSDEC, as a non-hazardous waste in accordance with NYSDEC's contained-in policy and transported off-Site for disposal in accordance with RCRA Subtitle D disposal facility requirements.

Concrete will also be generated from removal of the concrete vapor caps to be installed in AOCs 1 and 3. The concrete vapor caps in each AOC will be separated from subsurface soils by a Tyvek® liner, in addition to the underlying asphalt and subbase layers; thus, the vapor cap concrete is not an F-listed hazardous waste and will be sent off-Site for recycling or managed as non-hazardous waste for off-Site disposal in accordance with RCRA Subtitle D disposal facility requirements.

6.1.1.3 Water

Water that may be generated by ISTR activities includes the following:

- Groundwater generated from dewatering performed during trenching for the abandoning, rerouting, or reinstallation of existing subsurface utilities in AOCs 1 and 3;
- Condensate or extracted groundwater accumulated by the ISTR extraction and treatment system operation;
- Blowdown water resulting from non-contact cooling of vapors and groundwater extracted by the ISTR extraction and treatment system; and
- Decontamination water used during system demobilization.

Condensate or extracted groundwater generated by the ISTR system, as well as decontamination water generated during the cleaning of ISTR system equipment or during confirmation soil sampling, will be treated by an aboveground treatment system (discussed in Section 4.1.6) to the extent practical. Treated liquids will be either injected into the subsurface through electrodes as part of the ISTR system (discussed in Section 3.3), transported for off-Site disposal as non-hazardous waste with NYSDEC approval via NYSDEC's contained-in policy, or discharged to surface water (i.e., the canal) (discussed further in Section 6.4).

Cooling tower blowdown water resulting from the non-contact cooling of vapors and groundwater extracted by the ISTR system operation will be discharged to surface water (i.e., the canal) (discussed further in Section 6.4).

Liquids that are not treated on-Site, except for cooling tower blowdown water, will be either managed for off-Site disposal as an F-listed hazardous waste or, pending approval from NYSDEC, managed for off-Site disposal as non-hazardous waste in accordance with NYSDEC's contained-in policy and Subtitle D disposal facility requirements. Decontamination fluids that are not treated on-Site and discharged to surface water will be transported off-Site for disposal as an F-listed hazardous waste.

6.1.1.4 DNAPL, Sludge, and ISTR System Components

DNAPL or sludge generated by the ISTR system will be managed as an F-listed hazardous waste and transported for off-Site disposal.

ISTR system components that have potentially been exposed to COPCs will be managed as indicated below.

- Major ISTR system equipment (e.g., tanks, filter housings, etc.) will be cleaned and transported off-Site for reuse by the ISTR contractor.
- Other ISTR system components and materials, such as extraction wellheads, well field piping, and transfer hoses, will also be cleaned and transported off-Site for reuse by the ISTR contractor to the extent practicable.
- System components that will not be transported off-Site for reuse by the ISTR contractor will be either:
  a) Cleaned with a steam pressure washer, verified clean via visual inspection, and managed as non-hazardous waste for off-Site disposal; or
  b) Managed as an F-listed hazardous waste for off-Site disposal.

6.1.1.5 Granular Activated Carbon

Spent liquid-phase and vapor-phase granular activated carbon will be either managed as F-listed hazardous waste (plus characteristic hazardous codes as appropriate) or, with NYSDEC approval, managed as non-hazardous waste via the contained-in policy. Spent granular activated carbon will be transported off-Site for either disposal or recycling via reactivation.

Vapors treated by the vapor-phase granular activated carbon do not meet the definition of a solid waste (i.e., they are not “contained gas” per RCRA regulations) and, therefore, cannot be hazardous waste. As such, the vapor-phase granular activated carbon is neither mixed with, contains, nor is derived from the treatment of a listed hazardous waste; thus, spent vapor-phase granular activated carbon is not a listed hazardous waste. Spent vapor-phase granular activated carbon will be managed as non-hazardous waste and transported off-Site for disposal or recycling via reactivation.

6.1.2 Unsaturated Soil Excavation

If the unsaturated soil excavation is conducted in AOC 1 (as described in Section 4.2), soils will be either managed as an F-listed hazardous waste and transported off-Site for disposal at a RCRA Subtitle C disposal facility or, pending approval from NYSDEC, managed as non-hazardous waste in accordance with NYSDEC’s contained-in policy and Subtitle D disposal facility requirements. Decontamination fluids will be transported off-Site for disposal as an F-listed hazardous waste.

6.2 Operable Unit 2

Soils excavated from the HOs 2, 4, and 5 ditches, including soils within the 100-year floodplain, will be managed as hazardous waste (Waste Code D006 for cadmium) and transported off-Site for disposal at a RCRA Subtitle C Hazardous Waste Landfill. An F-listed hazardous waste code will also be applied to the ditch soils from HO 2, 4, and 5 because an F002 constituent (TCE) was reported in in situ waste characterization samples collected from these areas (Table A-1 in Appendix A). Existing construction and demolition debris (e.g., bricks and cinder blocks) may be removed to facilitate access to certain HO excavation areas (e.g., HO 4 and HO 5 ditches) and will be managed in the same manner as soils from HO 2, 4, and 5.

Materials excavated during access road enhancement (if any) will be either:

- Reused on-Site above the water table if soil concentrations are less than the Protection of Groundwater SCOs following the Statement of Basis (NYSDEC 2018);
- Managed as an F-listed hazardous waste for off-Site disposal; or
- Managed as a non-hazardous waste in accordance with NYSDEC's contained-in policy outlined in Technical Administrative Guidance Memorandum 3028 (NYSDEC 1992) and non-hazardous waste disposal facility requirements.

Soils excavated from the ditches at HOs 6, 7, and 6/7 will be either managed as hazardous waste and transported off-Site for disposal at a RCRA Subtitle C Hazardous Waste Landfill or, pending approval from NYSDEC, managed as non-hazardous waste in accordance with NYSDEC's contained-in policy. Based on in situ waste characterization sample data, soil in the HO 6, 7, and 6/7 ditches do not exceed RCRA toxicity limits and it is expected that this soil will be disposed of as a non-hazardous waste.

Liquids that may be generated during OU 2 remediation activities include groundwater generated from dewatering activities, stormwater that has contacted HO ditch soils designated for removal, and decontamination fluids. Groundwater and stormwater will be containerized, sampled, and analyzed by a laboratory for waste characterization purposes before off-Site disposal in accordance with local, State, and Federal regulations. Based on the results of waste characterization sampling, groundwater and stormwater will be either managed as hazardous waste (Waste Code D006 and/or Waste Code F002) or, pending contained-in approval from NYSDEC, managed as non-hazardous waste. Depending on the volume of liquids generated, a liquid-phase treatment system may be mobilized to the Site to treat and discharge groundwater and stormwater to the canal (via the ITO as shown on Figure 2) as discussed in Section 6.4. Decontamination fluids will be managed for off-Site disposal as hazardous waste (Waste Code F002 and Waste Code D006 as appropriate).

6.3 Contained-In Request

As indicated above, GTEOSI may request a contained-in determination from NYSDEC to manage certain listed hazardous wastes generated as part of remedial activities as non-hazardous waste. The decision to request a contained-in determination(s) will be made based on laboratory analytical data obtained during the remediation phase. Contained-in determination requests will be submitted during the remediation phase and in consultation with the NYSDEC Project Manager.

6.4 Discharge to Surface Water

Based on the anticipated volume of water to be generated by ISTR operations, GTEOSI plans to discharge non-contact cooling water (i.e., cooling tower blowdown water) and unused treated water (i.e., that which is not reinjected to the subsurface to facilitate ISTR in the treatment areas) to the on-Site stormwater system, which eventually discharges to the canal via the ITO. Similarly, the following liquid waste streams may potentially be treated on-Site and discharged to the canal:

- Water generated from OU 2 activities including groundwater generated from dewatering activities and stormwater that has contacted HO ditch soils designated for removal.

The ITO was permitted in the 1970s and 1980s to discharge treated wastewater from the on-Site WWTP to the canal. For at least the past 30 years, the ITO has only been used for stormwater discharge.

In accordance with Section 1.10 of DER-10, GTEOSI requests an exemption from requiring a SPDES permit for the discharge of treated water to the canal at the ITO. GTEOSI anticipates submitting a SPDES permit equivalent application to NYSDEC for approval prior to discharging water to the canal. The SPDES permit equivalent application will include the following information:

- Site information (e.g., address, remedial program, DER project manager, DER site number, remedial party, site figure with discharge point);
- Discharge rate and treatment system design capacity;
- Description and flow diagram of proposed treatment system;
- Description of receiving water body; and
- Proposed dates and duration of discharge.

Water treatment system design information for water generated by ISTR system operations is described in Section 4.1.16 and presented in Appendix F. A water treatment system mobilized to the Site to treat other liquids generated as part of remedial activities (e.g., dewatering water from OU 2 excavation activities) for discharge to the canal, if utilized, will at a minimum consist of two liquid-phase granular activated carbon vessels arranged in series.

Discharge monitoring will be conducted in accordance with SPDES permit equivalent requirements. Additionally, an initial batch of 10,000 gallons (minimum) of treated water will be stored in a holding tank for confirmation sampling to verify discharge limits are met. A representative confirmation sample of the initial 10,000 gallons (minimum) of treated water will be collected and sent to an accredited laboratory for analysis of monitoring parameters required under the SPDES permit equivalent. The treated water in the holding tank will be discharged to the canal after confirmation sampling results indicate the SPDES permit equivalent discharge limits are met. The NYSDEC project manager will be notified in advance of the discharge of the initial batch of treated water; subsequent notifications to the NYSDEC project manager and the Division of Water will be made in accordance with the SPDES permit equivalent requirements."

7 Post-Remediation Activities

Activities to be conducted following the completion of remedial activities at the Site include the following:

- Preparing a Final Engineering Report (FER);
- Preparing an SMP;
- Establishing institutional controls in the form of an environmental easement, and
- Performing inspections and long-term groundwater and indoor air monitoring following the procedures in the SMP.

A description of the FER, SMP, and institutional controls are presented below, along with an outline of the proposed long-term monitoring program. Depending on confirmation sampling results following remedial operations at the Site, the scope and details of these documents may be modified, where appropriate.

7.1 Final Engineering Report

The FER will be submitted to NYSDEC following the completion of remedial construction activities. The FER will be prepared In accordance with DER 10 Section 5.8 dated 2010, or the current version, and will present, at a minimum, the following information:

- Description of the remediation activities completed following the procedures in the approved 100% RD, including problems encountered and variations (if any) from the NYSDEC-approved 100% Remedial Design Report;
- Record drawings, tables, and figures detailing the remediation activities completed;
- Information and documentation regarding the final quantities of materials transported for off-Site disposal during implementation of the remediation activities, including executed manifests and/or bills of lading;
- Summaries of field observations, tests performed, laboratory samples collected, and monitoring results obtained during remediation activities (e.g., community air monitoring);
- Representative photographs taken during implementation of the remediation activities;
- Copies of the regulatory permit(s) and other key regulatory agency correspondence related to the permits and permit compliance; and
- Certification statement.

The FER will document the remediation activities performed for the project. The FER will be prepared in a format based on available templates on the NYSDEC website. A professional engineer licensed in New York State will sign and stamp the FER, including the record drawings and certification statement.

7.2 Site Management Plan

Following completion of the remedial actions and consistent with the requirements of DER 10 Chapter 6 dated 2010, or the current version, an SMP will be prepared that will detail the post-remedial action activities to be conducted for the project. In general, the SMP will provide the methods and protocols to be followed when conducting post-remediation monitoring (described in Section 7.4) and potential future intrusive activities at the Site.

The SMP will be prepared to include the following information:

- Description of the project area and identification of areas covered by the SMP;
- An Excavation Plan that provides the requirements for management of future excavations in areas of remaining contamination;
- Identification of any use restrictions on the project area;
- Descriptions of site inspection, maintenance, and notification and reporting requirements;
- Requirements for completing groundwater and indoor air monitoring;
- Evaluation of the potential for vapor intrusion for any future buildings developed on the project area, including provisions for mitigation of any impacts identified (as appropriate); and
- A plan to assess the performance and effectiveness of the remedy.

The format and content of the SMP document will be consistent with available templates on the NYSDEC website. The SMP will be incorporated as an attachment to the FER.

An interim SMP will be prepared and submitted in 2025 to summarize the current site management activities, in advance of the completion of the corrective measures described in this report.

7.3 Institutional Controls

As required by the Statement of Basis (NYSDEC 2018), institutional controls in the form of an environmental easement will be established for the Site in support of the following:

- Restricting the use of the Site to commercial or industrial uses, although land use is also subject to local zoning laws;
- Requiring management of the Site following the provisions of the NYSDEC-approved SMP (as described in Section 7.2);
- Restricting the use of groundwater at the Site; and
- Requiring GTEOSI (or the property owner) to complete and submit periodic certifications to NYSDEC that the institutional and engineering controls are still in place and remain effective.

GTEOSI will initiate the establishment of the environmental easement following the completion of the remediation activities. The environmental easement will be incorporated as an attachment to the SMP.

7.4 Long Term Monitoring

Following the completion of the remedial construction activities, site inspections will be performed to evaluate the cap for the HO 3 ditch, the sediment cover in Van Cleef Lake, other engineering controls, such as cover systems, and the SSD systems. Additionally, groundwater monitoring will be conducted periodically to document post-remediation groundwater conditions and indoor air samples will be collected to evaluate the effectiveness of the SSD systems. The scope, frequency, and duration requirements for post-remediation site inspection and air and groundwater monitoring will be provided in the SMP. Until the forthcoming interim SMP is approved by NYSDEC and implemented, the scope and frequency of air and groundwater sampling will continue under the current sampling programs.

8 Schedule

The proposed preliminary schedule is presented in Table 3.

Table 3 – Preliminary Project Schedule

Schedule Component	Date
Remedial Design	
Submittal of 95% Remedial Design Report to NYSDEC	March 17, 2023
ISTR Contractor Bidding and Contracting	2023Q1 to 2023Q3
ISTR Design Drawings and Specifications	2023Q4
NYSDEC comments on the 95% Remedial Design Report	October 31, 2023
Submit to NYSDEC the 100% Remedial Design Report	May 31, 2024
NYSDEC comments on the 100% Remedial Design Report	February 10, 2025
Submit to NYSDEC the revised 100% Remedial Design Report	October 2025
NYSDEC Approval of 100% Remedial Design Report	2026Q1
Preparation and submittal of SPDES permit equivalent application	2025Q4
NYSDEC Approval of SPDES permit equivalent application	2026Q1
OU 1 In Situ Thermal Remediation	
ISTR Contractor – Supplies Procurement and Mobilization	2026Q1 to 2026Q3
ISTR System Construction	2026Q3 to 2027Q1
ISTR System Operation	2027Q2 to 2027Q3
Post-ISTR Testing and Initial Subsurface Cooldown Period	2027Q4 to 2028Q1
Site Restoration and ISTR Contractor Demobilization	2028Q1 to 2028Q2
OU 2 Soil Excavation	
Soil Excavation Contractor Bidding	2026Q2
Soil Excavation Contractor Contracting	2026Q4
Soil Excavation Planning and Mobilization	2026Q4 to 2027Q1
Soil Excavation Construction	2027Q2 to 2027Q3

Initiation of construction is contingent on meeting the initial schedule components defined above and receipt of all required permits, access agreements, and approvals. Further details regarding the schedule for the remedial construction and operations will be submitted to the NYSDEC once the remediation contractors are selected and/or under contract. The above sequencing of the remedial activities may be modified in consultation with the NYSDEC based on weather and/or climatic conditions, any permit requirements (e.g., construction window), or other regulatory conditions.

9 References

Arcadis. 2013. *Corrective Measures Study Report*. Former Philips Display Components Facility, Seneca Falls, New York. June 2013.

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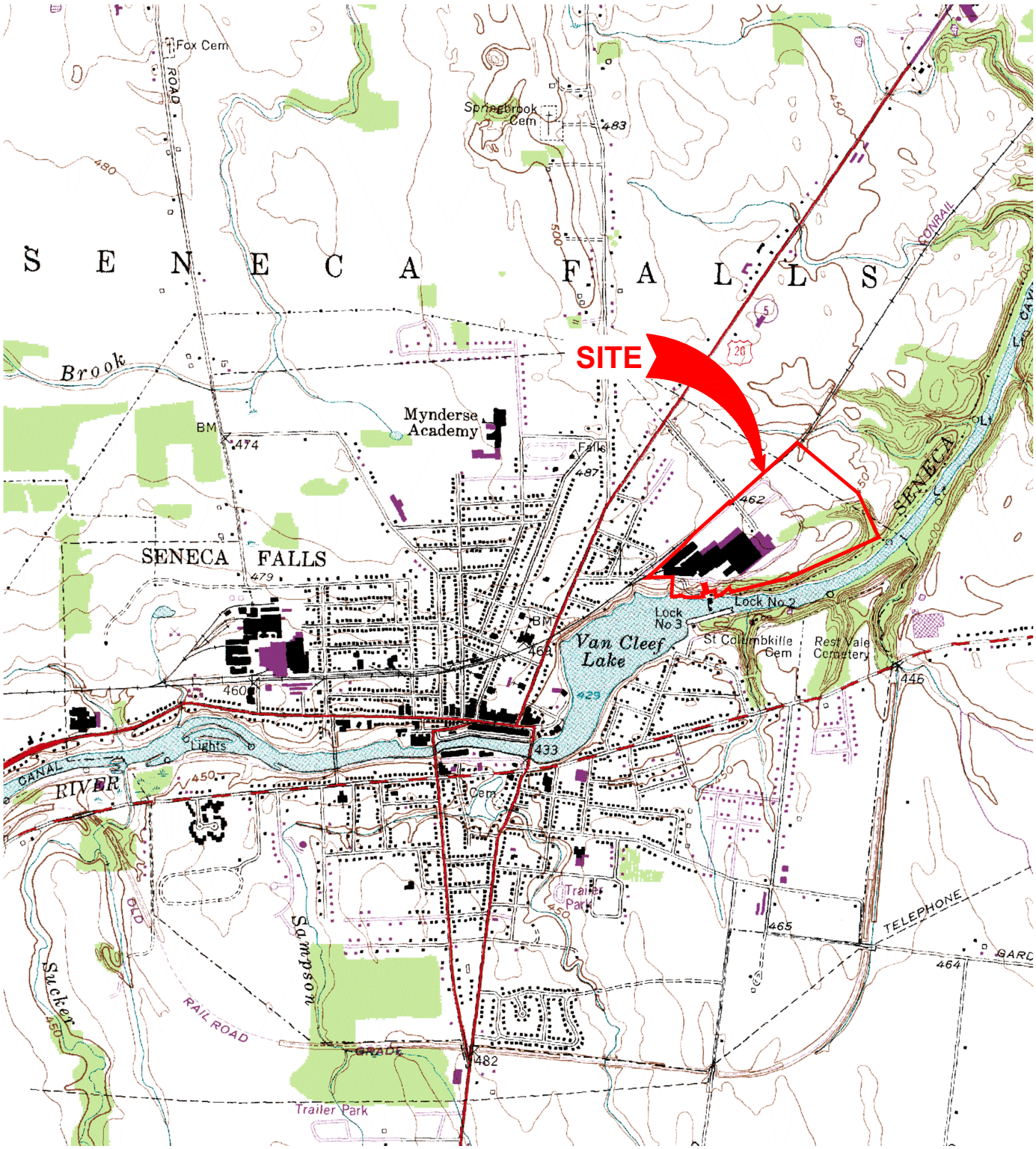
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Figures



REFERENCE: BASE MAP USGS 7.5 MINUTE QUADRANGLE., SENECA FALLS, NY., 1953, PHOTOREVISED 1978

0 1000' 2000'
GRAPHIC SCALE



NEW YORK

G.T.E. PRODUCTS CORPORATION, NYSDEC SITE NO. 850003
FORMER PHILIPS DISPLAY COMPONENTS FACILITY
SENECA FALLS, NEW YORK
REMEDIAL DESIGN REPORT

SITE LOCATION

ARCADIS

FIGURE
1

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HO 7
HO 6
AOC 2
AOC 3
AOC 1
HO 2
HO 3
HO 4
HO 5
HO 1
BUILDING #1
BUILDING #2
BUILDING #3
BUILDING #4
BUILDING #5
BUILDING #6
BUILDING #7
BUILDING #7B
BUILDING #8
BUILDING #9
BUILDING #9A
BUILDING #10
BUILDING #10A
BUILDING #11
BUILDING #12
BUILDING #13
BUILDING #13A
BUILDING #18
BUILDING #18B
BLDG. #7A
BLDG. #8B
BLDG. #9B
BLDG. #1A
BLDG. #2A
COURTYARD
COURTYARD
GUARD HOUSE
GUARD HOUSE
GUARD SHED
6" SANITARY SUMP
GAS BLDG
WATER TOWER
STEEL TOWER
ELECTRIC SUBSTATION
DEBRIS FIELD
ATOMIC VAPOR BLOCK BLDG
POLE BARN
FLOW HOUSE
BLDG
FLOW
UNPAVED ACCESS ROAD
THRUWAY AUTHORITY DIVISION OF CANALS
385.44' FLOOD ELEVATION CONTOUR
INTERCEPTOR TRENCH OUTFALL
NEW YORK STATE ELECTRIC AND GAS L. 273 P. 428 REFERENCE #1
VAN CLEEF LAKE
CAYUGA-SENECA CANAL

NOTES:

1. FOR CLARITY, NOT ALL FEATURES ARE SHOWN.
2. AOC 1 EXCAVATION EXTENTS SHOWN ARE BASED ON PRE-ISTR SOIL CONDITIONS. EXCAVATION MAY BE DEFERRED UNTIL AFTER ISTR IS IMPLEMENTED AND SOIL CONDITIONS REEVALUATED.
3. THE HO DITCHES COMPRISE AOC 5.
4. EXCAVATION/CAPPING EXTENTS SHOWN ARE APPROXIMATE. REFER TO OPERABLE UNIT 2 DESIGN DRAWINGS FOR MORE DETAILS.

0 100' 200'
GRAPHIC SCALE

LEGEND:

- PROPERTY BOUNDARY
- 100-YEAR FLOODPLAIN (385.44 FEET ABOVE SEA LEVEL)
- EDGE OF WATER
- HO DITCH CENTERLINE
- 440 ELEVATION CONTOUR (FEET ABOVE SEA LEVEL)
- CHAIN-LINK FENCE
- APPROXIMATE AREA(S) PLANNED FOR NEW OR ADDITIONAL VAPOR INTRUSION MITIGATION MEASURES DURING ISTR
- WETLAND EXTENTS
- INTERCEPTOR PIPE
- HISTORICAL OUTFALL PIPE
- OVERLAND HISTORICAL OUTFALL FLOW (NOW BURIED)
- AOC BOUNDARY
- PROPOSED EXCAVATION EXTENTS FOR AOC 1 (SEE NOTE 2)
- PROPOSED ISTR TREATMENT AREA EXTENTS
- PROPOSED EXCAVATION EXTENTS FOR AOC 5 (SEE NOTE 4)
- PROPOSED CAPPING EXTENTS FOR AOC 5 (SEE NOTE 4)

AOC AREA OF CONCERN
HO HISTORICAL OUTFALL
ISTR IN SITU THERMAL REMEDIATION

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FORMER PHILIPS DISPLAY COMPONENTS FACILITY
SENECA FALLS, NEW YORK
REMEDIAL DESIGN REPORT

REMEDIAL ACTION AREAS

ARCADIS

FIGURE 2

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RDR-X-COMBINED UTILS
RDR-X-TITLE

RR TRACKS
BUILDING #8
BUILDING #1B
BUILDING #1
BLDG. #1A
BUILDING #4
BUILDING #6
BUILDING #2
BLDG. #2A
BUILDING #3
BUILDING #5
DECK
BUILDING #7A
BUILDING #7
BUILDING #9
BUILDING #10
BUILDING #13
BUILDING #9A
BLDG #9B
BUILDING #11
BUILDING #11B
BLDG. #13B
BLDG
POLE BARN
BUILDING #11A
BLDG
BUILDING #7B
GAS BLDG
GUARD HOUSE
BUILDING #12
WATER AST
ELECTRIC SUBSTATION
CONC BLOCK BLDG
STEEL TOWER
EDGE OF WATER (4/23/01)
EDGE OF WATER (4/23/01)
CAYUGA & SENECA CANAL

NOTE:

1. ALL LOCATIONS ARE APPROXIMATE.

0 50' 100'
GRAPHIC SCALE

LEGEND

- W — WATER LINE
- E — ELECTRIC LINE
- OH — ELECTRIC LINE (OVERHEAD)
- GAS — GAS LINE
- INTERCEPTOR PIPE / STORM SEWER PIPE
- R — STORM WATER (ROOF DRAINS)
- PR — PROCESS WASTE LINES
- S — SANITARY SEWER
- FW — FORMER WATER LINE
- FIRE HYDRANT
- MANHOLE / CATCH BASIN
- RAILROAD TRACK
- PROPERTY BOUNDARY
- x — x — FENCE

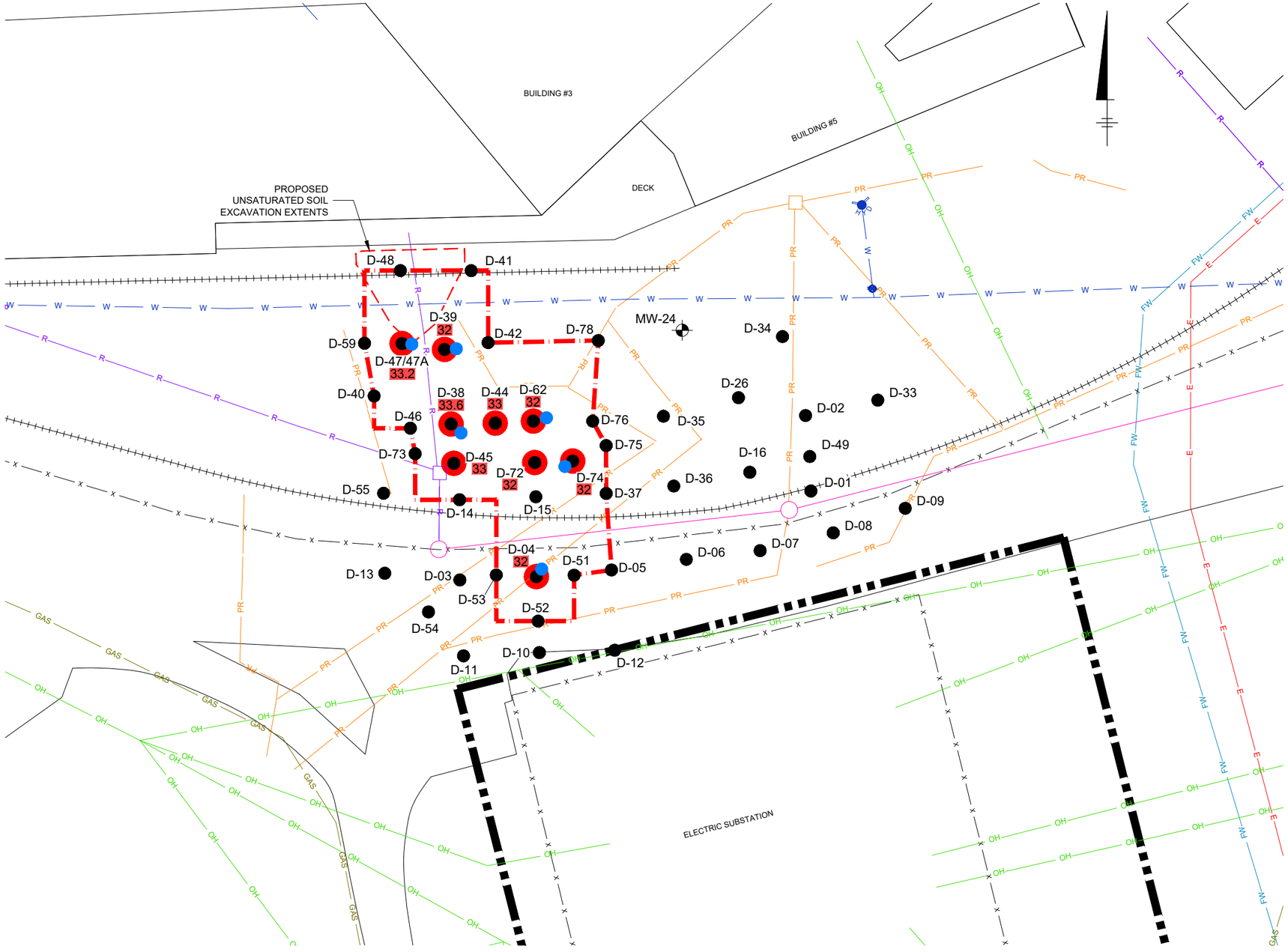
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SITE UTILITIES (OPERABLE UNIT 1)

ARCADIS

FIGURE 3

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LEGEND

- WATER LINE
- ELECTRIC LINE
- ELECTRIC LINE (OVERHEAD)
- GAS LINE
- STORM SEWER PIPE
- STORMWATER (ROOF DRAINS)
- PROCESS WASTE LINES
- FORMER WATER LINE
- FIRE HYDRANT
- MANHOLE / CATCH BASIN
- RAILROAD TRACK
- PROPERTY BOUNDARY
- FENCE
- MONITORING WELL
- BORING LOCATIONS WITH DNAPL POSITIVELY IDENTIFIED
- D-45 / 33 — COMPLETED BORING LOCATION; MAXIMUM DEPTH OF DNAPL (feet below ground surface)
- PROPOSED ISTR TREATMENT AREA
- PROPOSED CONFIRMATION SOIL SAMPLING LOCATION TO ASSESS ISTR SYSTEM PERFORMANCE

ABBREVIATIONS

DNAPL	DENSE NON-AQUEOUS PHASE LIQUID
ISTR	IN SITU THERMAL REMEDIATION

NOTES:

1. ALL HISTORICAL LOCATIONS AND UTILITY EXTENTS ARE APPROXIMATE.

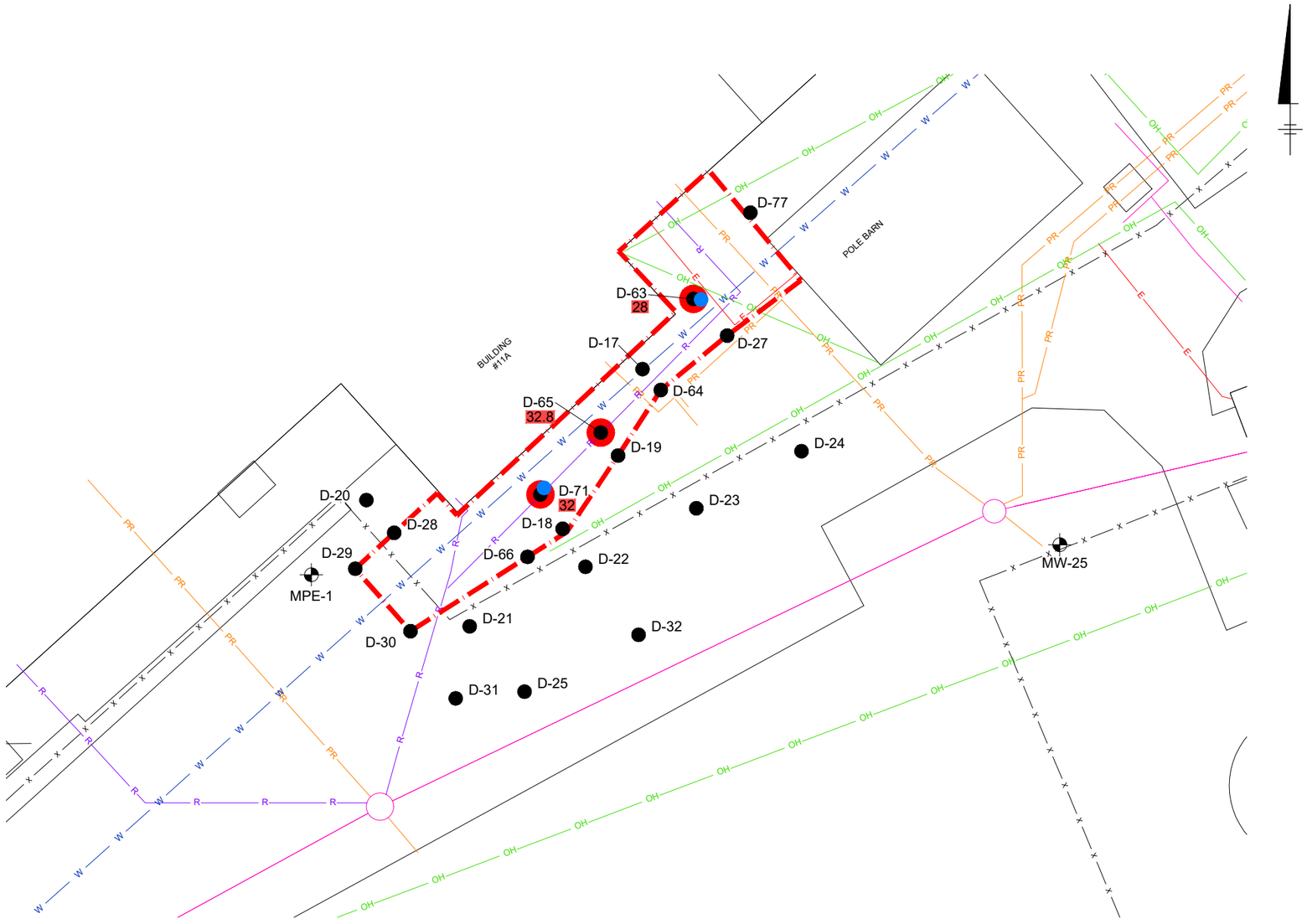
0 15' 30'
GRAPHIC SCALE

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ESTIMATED EXTENT OF DNAPL AND PROPOSED CONFIRMATION SAMPLING LOCATIONS - AOC1

ARCADIS

FIGURE
4



LEGEND

- WATER LINE
- ELECTRIC LINE
- ELECTRIC LINE (OVERHEAD)
- STORM SEWER PIPE
- STORMWATER (ROOF DRAINS)
- PROCESS WASTE LINES
- MANHOLE / CATCH BASIN
- FENCE
- MONITORING WELL
- BORING LOCATIONS WITH DNAPL POSITIVELY IDENTIFIED
- D-71 / 32 — COMPLETED BORING LOCATION
- MAXIMUM DEPTH OF DNAPL (feet below ground surface)
- PROPOSED ISTR TREATMENT AREA
- PROPOSED CONFIRMATION SOIL SAMPLING LOCATION TO ASSESS ISTR SYSTEM PERFORMANCE

ABBREVIATIONS

DNAPL	DENSE NON-AQUEOUS PHASE LIQUID
ISTR	IN SITU THERMAL REMEDIATION

NOTES:

1. ALL HISTORICAL LOCATIONS AND UTILITY EXTENTS ARE APPROXIMATE.

0 15' 30'
GRAPHIC SCALE

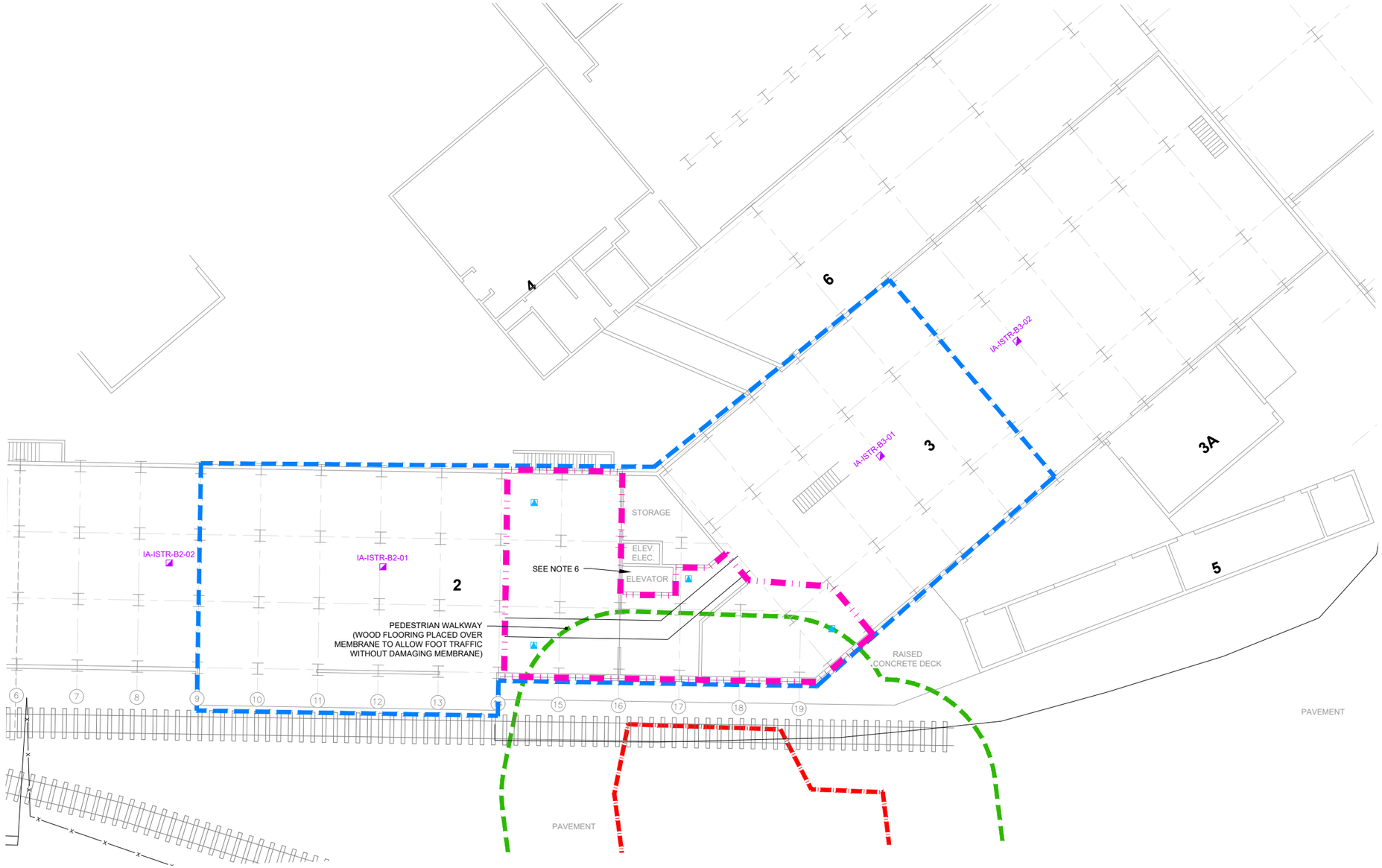
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ESTIMATED EXTENT OF DNAPL AND PROPOSED CONFIRMATION SAMPLING LOCATIONS - AOC3

ARCADIS

FIGURE
5

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LEGEND:

EXISTING FEATURES:

FENCE

RAILROAD TRACK

2 BUILDING ID

PROPOSED FEATURES:

INDOOR AIR SAMPLE LOCATION DURING ISTR

SUB–MEMBRANE DIFFERENTIAL PRESSURE MONITORING POINT (NOTE 4)

ISTR SMD ZONE / ISTR SSD ZONE (NOTE 2)

THERMAL INFLUENCE ZONE

EXTENTS OF EXCLUSION ZONE (NOTE 3)

SUBSURFACE WARMING ZONE (ESTIMATE)

ABBREVIATIONS:

ISTR	IN SITU THERMAL REMEDIATION
SMD	SUB–MEMBRANE DEPRESSURIZATION

NOTES:

1. LOCATIONS OF MEMBRANE, EXCLUSION ZONE, AND THERMAL INFLUENCE ZONE ARE SUBJECT TO CHANGE PRIOR TO OR DURING ISTR BASED ON FLOOR CONDITION, BUILDING USE, ISTR PERFORMANCE DATA, AND OTHER FIELD OBSERVATIONS.
2. SUB–MEMBRANE DEPRESSURIZATION:
   - MEMBRANE TO CONSIST OF 30–MIL HIGH DENSITY POLYETHYLENE SHEETING.
   - EXTEND MEMBRANE 12 INCHES MINIMUM UP WALLS AND COLUMNS AND USE ALUMINUM TERMINATION BAR AND HAMMER–SET HEAVY DUTY NAIL DRIVE ANCHORS TO SECURE OR OTHER METHODS BASED ON WALL OR COLUMN MATERIAL.
   - USE DOUBLE–SIDED TAPE (RAVEN INDUSTRIES TP2BR OR APPROVED EQUIVALENT) AND POLYURETHANE CAULK (SIKAFLEX 1A OR APPROVED EQUIVALENT) TO SEAL EXPOSED EDGES OF MEMBRANE.
   - OVERLAP SEAMS 6 INCHES MINIMUM AND USE HOT AIR PLASTIC WELDING TOOL AND DOUBLE–SIDED TAPE (RAVEN INDUSTRIES TP2BR OR APPROVED EQUIVALENT) TO SEAL.
   - PLACE 5–FOOT BY 5–FOOT GRID OF 2X4 LUMBER (OR OTHER APPROVED MEANS) BETWEEN MEMBRANE AND FLOOR TO ENSURE SUB–MEMBRANE AIR FLOW ACROSS ENTIRETY OF SMD ZONE.
   - LEAK TEST INSTALLED MEMBRANE VIA BLOWING WATER VAPOR (I.E., SMOKE TEST) UNDER MEMBRANE.
   - INSTALL DEDICATED EXTERIOR–MOUNTED INLINE FAN (RADONAWAY RP–145 OR APPROVED EQUIVALENT) AND CONNECT TO SUB–MEMBRANE STRATA VIA 3–INCH SCHEDULE 40 PVC PIPE.
3. VERTICAL SHEETING (10–MIL POLYETHYLENE) WILL BE HUNG AS NEEDED TO SEPARATE EXCLUSION ZONE FROM OTHER ADJOINING INDOOR AREAS. EXCEPT FOR SHORT–TERM USE, ONLY ARCADIS STAFF ARE ALLOWED TO ENTER EXCLUSION ZONE WHILE ISTR IS ONGOING (INCLUDING COOLING PHASE).
4. INSTALL SUB–MEMBRANE DIFFERENTIAL PRESSURE MONITORING POINTS USING 2–INCH SCHEDULE 40 PVC TEE (BELOW MEMBRANE) WITH 2–INCH SCHEDULE 40 PVC RISER EXTENDING ABOVE MEMBRANE AND REDUCED TO 1/4–INCH BRASS BALL VALVE.
5. THE PROPOSED SMD ZONE EXTENTS HAVE BEEN DETERMINED TO, AT A MINIMUM, ACHIEVE VAPOR INTRUSION MITIGATION WHERE THE SUBSURFACE WARMING ZONE EXTENDS UNDERNEATH THE BUILDING. THE SUBSURFACE WARMING ZONE IS WHERE SUBSURFACE WARMING OF ANY MAGNITUDE MAY BE REASONABLY EXPECTED. THE THERMAL INFLUENCE ZONE IS WHERE SUBSURFACE TEMPERATURES ARE EXPECTED TO TREAT SOILS DURING ISTR. BASED ON PREVIOUS PROJECTS, THE SUBSURFACE WARMING ZONE IS SHOWN EXTENDING 30 FEET BEYOND THE THERMAL INFLUENCE ZONE.
6. ELEVATOR SHAFT TO BE SEALED WITH POLYETHYLENE SHEETING TO PREVENT VAPORS FROM MIGRATING FROM ELEVATOR'S GRAVEL SUMP.

0 15' 30'
GRAPHIC SCALE

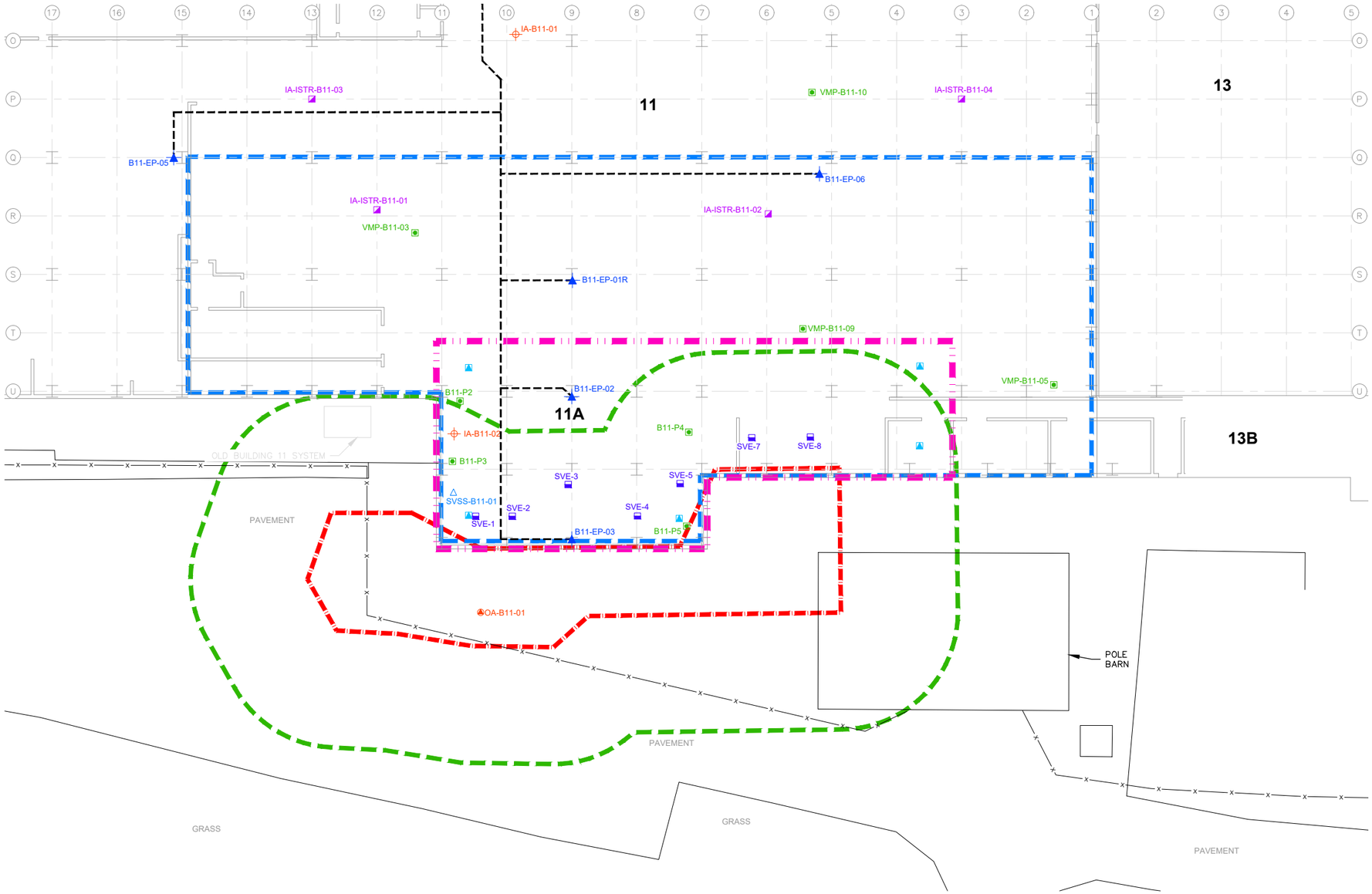
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VAPOR INTRUSION MITIGATION DURING ISTR (AOC 1)

ARCADIS

FIGURE
6

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GEN-X-FLOORPLAN-ADJUSTED



0 15' 30'
GRAPHIC SCALE

LEGEND:

EXISTING FEATURES:

- SSD EXTRACTION POINT
- SSD CONVEYANCE PIPING
- SSD VACUUM MONITORING POINT
- SUB–SLAB SOIL GAS SAMPLING LOCATION
- INDOOR AIR SAMPLING LOCATION
- OUTDOOR AIR SAMPLING LOCATION
- FENCE
- 13B BUILDING ID

PROPOSED FEATURES:

- INDOOR AIR SAMPLE LOCATION DURING ISTR
- SUB–MEMBRANE DIFFERENTIAL PRESSURE MONITORING POINT (NOTE 4)
- SHALLOW SVE WELL
- ISTR SMD ZONE / ISTR SSD ZONE (NOTE 2)
- THERMAL INFLUENCE ZONE
- EXTENTS OF EXCLUSION ZONE (NOTE 3)
- SUBSURFACE WARMING ZONE (ESTIMATE)

ABBREVIATIONS:

ISTR	IN SITU THERMAL REMEDIATION
SMD	SUB–MEMBRANE DEPRESSURIZATION
SSD	SUB–SLAB DEPRESSURIZATION
SVE	SOIL VAPOR EXTRACTION

NOTES:

1. LOCATIONS OF MEMBRANE, EXCLUSION ZONE, AND THERMAL INFLUENCE ZONE ARE SUBJECT TO CHANGE PRIOR TO OR DURING ISTR BASED ON FLOOR CONDITION, BUILDING USE, ISTR PERFORMANCE DATA, AND OTHER FIELD OBSERVATIONS.
2. SUB–MEMBRANE DEPRESSURIZATION:
   - MEMBRANE TO CONSIST OF 30–MIL HIGH DENSITY POLYETHYLENE SHEETING.
   - EXTEND MEMBRANE 12 INCHES MINIMUM UP WALLS AND COLUMNS AND USE ALUMINUM TERMINATION BAR AND HAMMER–SET HEAVY DUTY NAIL DRIVE ANCHORS TO SECURE OR OTHER METHODS BASED ON WALL OR COLUMN MATERIAL.
   - USE DOUBLE–SIDED TAPE (RAVEN INDUSTRIES TP2BR OR APPROVED EQUIVALENT) AND POLYURETHANE CAULK (SIKAFLEX 1A OR APPROVED EQUIVALENT) TO SEAL EXPOSED EDGES OF MEMBRANE.
   - OVERLAP SEAMS 6 INCHES MINIMUM AND USE HOT AIR PLASTIC WELDING TOOL AND DOUBLE–SIDED TAPE (RAVEN INDUSTRIES TP2BR OR APPROVED EQUIVALENT) TO SEAL.
   - PLACE 5–FOOT BY 5–FOOT GRID OF 2X4 LUMBER (OR OTHER APPROVED MEANS) BETWEEN MEMBRANE AND FLOOR TO ENSURE SUB–MEMBRANE AIR FLOW ACROSS ENTIRETY OF SMD ZONE.
   - LEAK TEST INSTALLED MEMBRANE VIA BLOWING WATER VAPOR (I.E., SMOKE TEST) UNDER MEMBRANE.
   - INSTALL DEDICATED EXTERIOR–MOUNTED INLINE FAN (RADONAWAY RP–145 OR APPROVED EQUIVALENT) AND CONNECT TO SUB–MEMBRANE STRATA VIA 3–INCH SCHEDULE 40 PVC PIPE.
3. VERTICAL SHEETING (10–MIL POLYETHYLENE) WILL BE HUNG AS NEEDED TO SEPARATE EXCLUSION ZONE FROM OTHER ADJOINING INDOOR AREAS. EXCEPT FOR SHORT–TERM USE, ONLY ARCADIS STAFF ARE ALLOWED TO ENTER EXCLUSION ZONE WHILE ISTR IS ONGOING (INCLUDING COOLING PHASE).
4. INSTALL SUB–MEMBRANE DIFFERENTIAL PRESSURE MONITORING POINTS USING 2–INCH SCHEDULE 40 PVC TEE (BELOW MEMBRANE) WITH 2–INCH SCHEDULE 40 PVC RISER EXTENDING ABOVE MEMBRANE AND REDUCED TO 1/4–INCH BRASS BALL VALVE.
5. THE PROPOSED SMD ZONE EXTENTS HAVE BEEN DETERMINED TO, AT A MINIMUM, ACHIEVE VAPOR INTRUSION MITIGATION WHERE THE SUBSURFACE WARMING ZONE EXTENDS UNDERNEATH THE BUILDING. THE SUBSURFACE WARMING ZONE IS WHERE SUBSURFACE WARMING OF ANY MAGNITUDE MAY BE REASONABLY EXPECTED. THE THERMAL INFLUENCE ZONE IS WHERE SUBSURFACE TEMPERATURES ARE EXPECTED TO TREAT SOILS DURING ISTR. BASED ON PREVIOUS PROJECTS, THE SUBSURFACE WARMING ZONE IS SHOWN EXTENDING 30 FEET BEYOND THE THERMAL INFLUENCE ZONE.

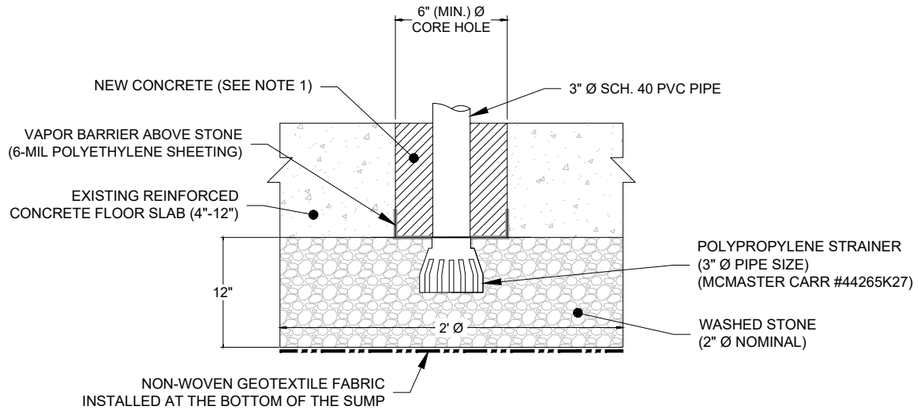
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VAPOR INTRUSION MITIGATION DURING ISTR (AOC 3)

ARCADIS

FIGURE 7

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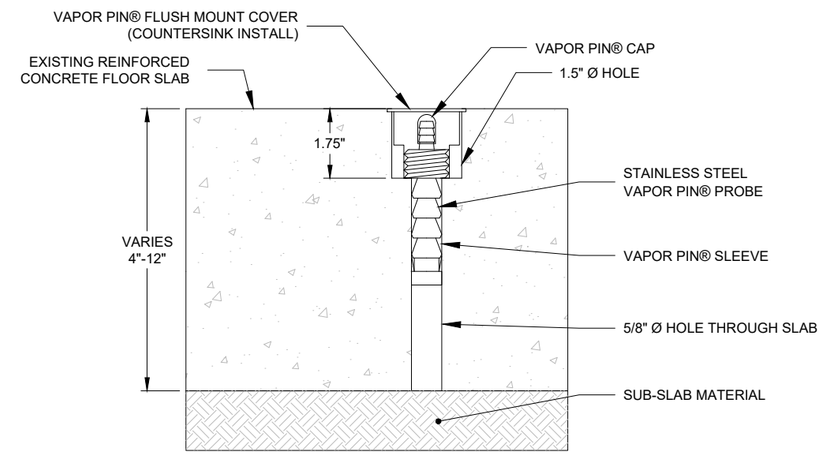


NOTES:

1. USE CONCRETE WITH MINIMUM COMPRESSIVE STRENGTH OF 4,000 POUNDS PER SQUARE INCH. PROVIDE SMOOTH STEEL TROWEL FINISH FLUSH WITH SURROUNDING CONCRETE. CONCRETE BONDING AGENT USED BETWEEN NEW AND EXISTING CONCRETE.
2. SITE-SPECIFIC HEALTH AND SAFETY PLAN AND COMMUNITY AIR MONITORING PLAN SHALL BE FOLLOWED DURING EXTRACTION POINT INSTALLATION ACTIVITIES.
3. SUB-SLAB MATERIAL SHALL NOT CONTACT FLOOR OR OTHER PROPERTY, CONTAINERIZE SUB-SLAB MATERIAL IMMEDIATELY.
4. TROWEL FINISH THE CONCRETE AFTER THE BLEED WATER HAS EVAPORATED.
5. CAP/PLUG PIPING, CLOSE VALVE, OR COVER SLAB OPENING WITH POLY SHEETING AND SEAL WITH TAPE WHEN SUCTION POINT IS NOT ACTIVELY BEING WORKED ON.
6. AOC 1 EXTRACTION POINTS WILL BE CONNECTED TO EXTERIOR-MOUNTED INLINE FAN(S). AOC 3 EXTRACTION POINTS WILL BE CONNECTED TO EITHER NEW EXTERIOR-MOUNTED INLINE FAN SYSTEM(S) OR THE EXISTING BUILDING 9/10/11 SUB-SLAB DEPRESSURIZATION SYSTEM. STARTUP TESTING WILL BE PERFORMED TO DETERMINE SYSTEM FOR AOC 3 EXTRACTION POINTS AND INLINE FAN SIZES AS APPROPRIATE.

SUB-SLAB DEPRESSURIZATION EXTRACTION POINT

NOT TO SCALE



SUB-SLAB VACUUM MONITORING POINT

NOT TO SCALE

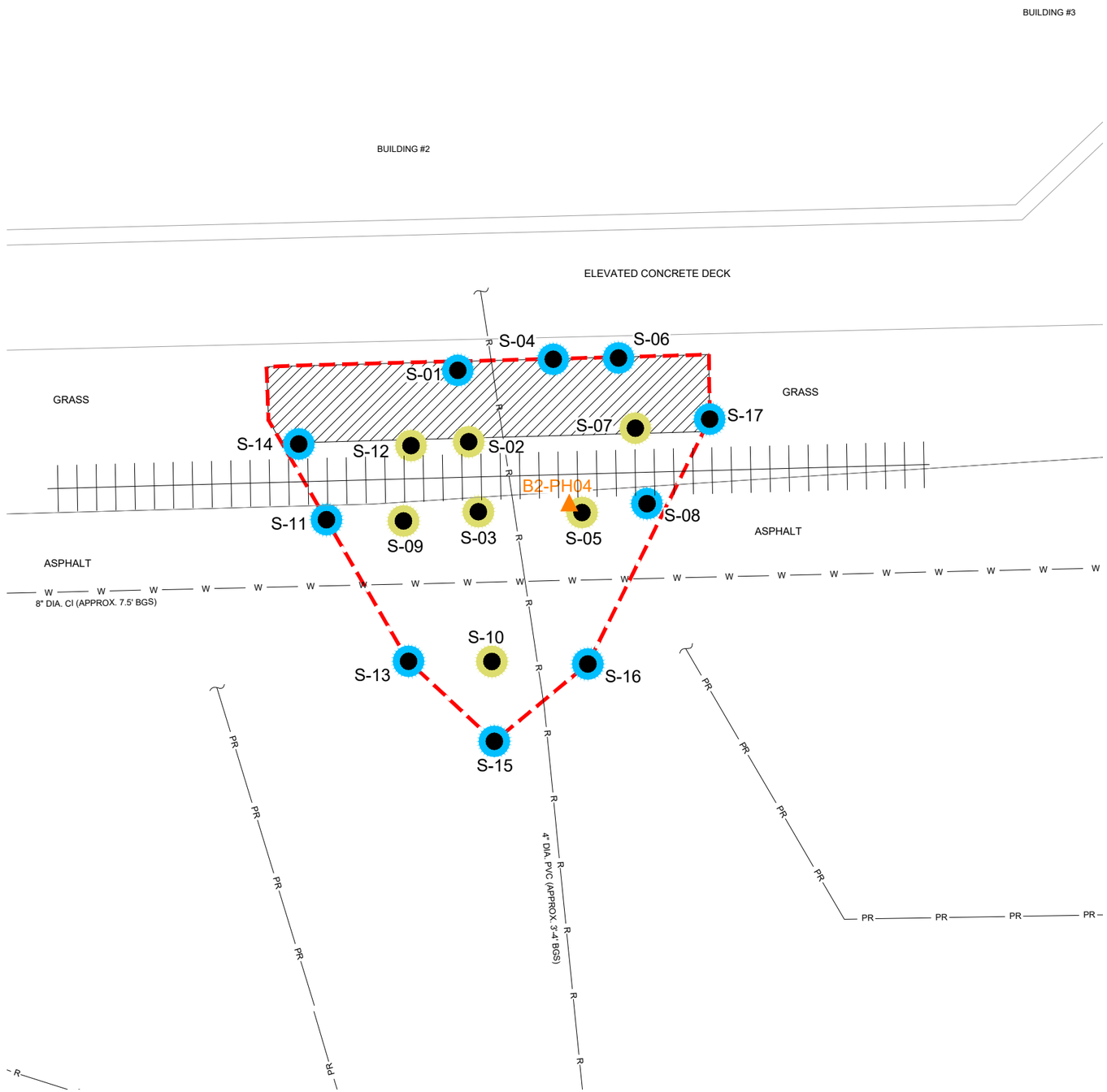
G.T.E. PRODUCTS CORPORATION, NYSDEC SITE NO. 850003
FORMER PHILIPS DISPLAY COMPONENTS FACILITY
SENECA FALLS, NEW YORK
REMEDIAL DESIGN REPORT

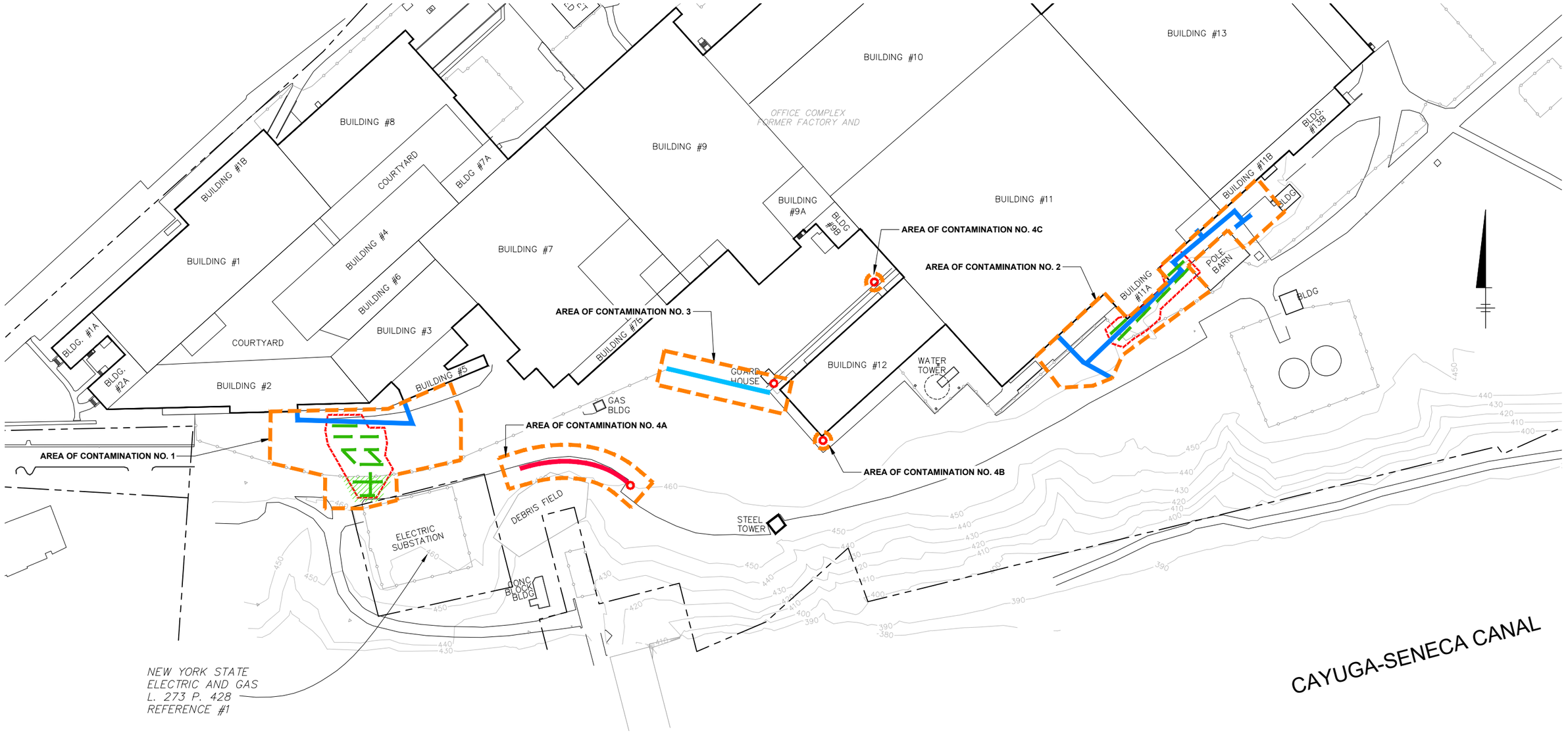
NEW SUB-SLAB DEPRESSURIZATION POINT DETAILS

ARCADIS

FIGURE
8

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PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 9/10/2025 4:20 PM BY: HARRIS, JESS
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BUILDING #3
BUILDING #2
ELEVATED CONCRETE DECK
GRASS
GRASS
ASPHALT
ASPHALT
S-01
S-02
S-03
S-04
S-05
S-06
S-07
S-08
S-09
S-10
S-11
S-12
S-13
S-14
S-15
S-16
S-17
B2-PH04
W W W



LEGEND:

- TRENCHES FOR WATER/STORMWATER LINE REROUTING/REPLACEMENT
- TRENCH FOR PRE-CAST SUBSURFACE PROCESS CORRIDOR
- TRENCHES FOR HORIZONTAL SVE WELLS, ELECTRODE LINES, OR MPE WELL LINES
- TRENCH FOR ELECTRICAL SERVICE
- PROPOSED ELECTRIC POLE LOCATION
- PROPERTY BOUNDARY
- 440 ELEVATION CONTOUR (FEET ABOVE SEA LEVEL)
- CHAIN-LINK FENCE
- SOILS TO BE REMOVED FOR SUBSURFACE VAPOR CAP INSTALLATION
- AREA(S) OF CONTAMINATION
- THERMAL INFLUENCE ZONE

ABBREVIATIONS:

- ISTR — IN SITU THERMAL REMEDIATION

NOTES:

1. ALL LOCATIONS AND EXTENTS APPROXIMATE.
2. IN ACCORDANCE WITH USEPA'S AREA OF CONTAMINATION POLICY, SOILS EXCAVATED FROM TRENCHES INDICATED ON THIS FIGURE MAY BE REUSED AS BACKFILL IN THE SAME AREA OF CONTAMINATION. SOILS PLANNED FOR REUSE AS BACKFILL MAY BE TEMPORARILY STOCKPILED WITHIN EACH RESPECTIVE AREA OF CONTAMINATION, BUT MAY NOT BE CONTAINERIZED OR TEMPORARILY REMOVED FROM THE AREA OF CONTAMINATION. SOILS WITH PID READINGS GREATER THAN 25 PPM OR MEETING THE DEFINITION OF GROSSLY CONTAMINATED MEDIA AS DEFINED IN 6 NYCRR PART 375 WILL NOT BE REUSED AS BACKFILL, AND WILL BE SEGREGATED FROM SOIL WITH NO EVIDENCE OF CONTAMINATION. PID SCREENING WILL BE PERFORMED AT LEAST ONCE PER 10 CUBIC YARDS OF EXCAVATED MATERIAL. EXCAVATED SOILS WHICH ARE NOT REUSED AS BACKFILL IN ACCORDANCE WITH THESE CRITERIA WILL BE TRANSPORTED FOR OFF-SITE DISPOSAL.

REVISED SEPTEMBER 10, 2025

0 60' 120'
GRAPHIC SCALE

G.T.E. PRODUCTS CORPORATION, NYSDEC SITE NO. 850003
FORMER PHILIPS DISPLAY COMPONENTS FACILITY
SENECA FALLS, NEW YORK
REMEDIAL DESIGN REPORT

AREAS OF CONTAMINATION FOR OPERABLE UNIT 1

ARCADIS

FIGURE
10

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PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 9/10/2025 3:19 PM BY: HARRIS, JESS
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Appendix A

In Situ Waste Characterization Sample Locations and Analytical Data

Table A-1
In-Situ Soil Waste Characterization Analytical Results - Historical Outfalls 2, 4, and 5
Remedial Design
Former Philips Display Components Facility
Seneca Falls, New York

	Location ID:		H02-DITCH-02	H04-DITCH-05	H04-DITCH-06	H05-DITCH-01	H05-DITCH-04
	Sample Depth (feet bgs):		0 - 4	0 - 3.5	0 - 4	0 - 2	0 - 3
	Date Collected:		7/25/2022	7/26/2022	7/26/2022	7/26/2022	7/26/2022
Analyte	CAS#	Unit					
Herbicides							
2,4,5-TP (Silvex)	93-72-1	ug/kg	21 U	20 U	22 U	20 U	24 U
2,4-D	94-75-7	ug/kg	21 U	20 U	22 U	20 U	24 U
Metals-TCLP							
Arsenic	7440-38-2	mg/l	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U
Barium	7440-39-3	mg/l	3.3 ^+F1	6.6 ^+	3.6 ^+	1.0 U^+	2.5 ^+
Cadmium	7440-43-9	mg/l	2.5 F1	13.0	11.2	0.60 ^2^+	12.3
Chromium	7440-47-3	mg/l	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Lead	7439-92-1	mg/l	0.075	0.020 U	0.33	0.020 U	0.37
Mercury	7439-97-6	mg/l	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U
Selenium	7782-49-2	mg/l	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U
Silver	7440-22-4	mg/l	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U
Pesticides							
4,4-DDD	72-54-8	ug/kg	21 U	1.9 U	2.2 U	21 U	24 U
4,4-DDE	72-55-9	ug/kg	31 F1	1.9 U	5.3	21 U	49
4,4-DDT	50-29-3	ug/kg	21 UF1	1.9 U	2.2 U	21 U	24 U
Aldrin	309-00-2	ug/kg	21 U	1.9 U	2.2 U	21 U	24 U
Alpha-BHC	319-84-6	ug/kg	21 UF1	1.9 U	2.2 U	21 U	24 U
Alpha-chlordane	5103-71-9	ug/kg	21 U	1.9 U	2.2 U	21 U	49
Beta-BHC	319-85-7	ug/kg	21 UF1F2	1.9 U	2.2 U	21 U	24 U
Delta-BHC	319-86-8	ug/kg	21 UF1F2	1.9 U	2.2 U	21 U	24 U
Dieldrin	60-57-1	ug/kg	21 UF1	1.9 U	2.2 U	21 U	67
Endosulfan I	959-98-8	ug/kg	21 UF1	1.9 U	2.2 U	21 U	37
Endosulfan II	33213-65-9	ug/kg	21 U	1.9 U	2.2 U	21 U	24 U
Endosulfan sulfate	1031-07-8	ug/kg	21 U	1.9 U	2.2 U	21 U	24 U
Endrin	72-20-8	ug/kg	21 UF2	1.9 U	2.2 U	21 U	35
Endrin aldehyde	7421-93-4	ug/kg	21 UF1F2	1.9 U	2.2 U	21 U	24 U
Endrin ketone	53494-70-5	ug/kg	21 UF1	1.9 U	2.2 U	21 U	24 U
Gamma-BHC	58-89-9	ug/kg	21 UF1F2	1.9 U	2.2 U	21 U	33
Heptachlor	76-44-8	ug/kg	21 UF1	1.9 U	2.2 U	21 U	24 U
Heptachlor epoxide	1024-57-3	ug/kg	21 U	1.9 U	2.2 U	21 U	280
Methoxychlor	72-43-5	ug/kg	21 U	1.9 U	2.2 U	21 U	24 U
Toxaphene	8001-35-2	ug/kg	210 U	19 U	22 U	210 U	240 U
trans-chlordane	5103-74-2	ug/kg	21 U	1.9 U	2.2 U	21 U	24 U
SVOCs							
1,1-Biphenyl	92-52-4	ug/kg	1100 U	200 U	230 U	210 U	250 U
2,4,5-Trichlorophenol	95-95-4	ug/kg	1100 U	200 U	230 U	210 U	250 U
2,4,6-Trichlorophenol	88-06-2	ug/kg	1100 U	200 U	230 U	210 U	250 U
2,4-Dichlorophenol	120-83-2	ug/kg	1100 U	200 U	230 U	210 U	250 U
2,4-Dimethylphenol	105-67-9	ug/kg	1100 U	200 U	230 U	210 U	250 U
2,4-Dinitrophenol	51-28-5	ug/kg	10000 U	1900 U	2200 U	2000 U	2400 U
2,4-Dinitrotoluene	121-14-2	ug/kg	1100 U	200 U	230 U	210 U	250 U

Table A-1
In-Situ Soil Waste Characterization Analytical Results - Historical Outfalls 2, 4, and 5
Remedial Design
Former Philips Display Components Facility
Seneca Falls, New York

	Location ID:		H02-DITCH-02	H04-DITCH-05	H04-DITCH-06	H05-DITCH-01	H05-DITCH-04
	Sample Depth (feet bgs):		0 - 4	0 - 3.5	0 - 4	0 - 2	0 - 3
	Date Collected:		7/25/2022	7/26/2022	7/26/2022	7/26/2022	7/26/2022
Analyte	CAS#	Unit					
SVOCs (cont.)							
2,6-Dinitrotoluene	606-20-2	ug/kg	1100 U	200 U	230 U	210 U	250 U
2-Chloronaphthalene	91-58-7	ug/kg	1100 U	200 U	230 U	210 U	250 U
2-Chlorophenol	95-57-8	ug/kg	2100 U	380 U	440 U	400 U	480 U
2-Methyl-4,6-dinitrophenol	534-52-1	ug/kg	2100 U	380 U	440 U	400 U	480 U
2-Methylnaphthalene	91-57-6	ug/kg	1100 U	200 U	230 U	210 U	250 U
2-Methylphenol	95-48-7	ug/kg	1100 U	200 U	230 U	210 U	250 U
2-Nitroaniline	88-74-4	ug/kg	2100 U	380 U	440 U	400 U	480 U
2-Nitrophenol	88-75-5	ug/kg	1100 U	200 U	230 U	210 U	250 U
3,3-Dichlorobenzidine	91-94-1	ug/kg	2100 U	380 U	440 U	400 U	480 U
3-Nitroaniline	99-09-2	ug/kg	2100 U	380 U	440 U	400 U	480 U
4-Bromophenyl phenyl ether	101-55-3	ug/kg	1100 U	200 U	230 U	210 U	250 U
4-Chloro-3-Methylphenol	59-50-7	ug/kg	1100 U	200 U	230 U	210 U	250 U
4-Chlorophenyl phenyl ether	7005-72-3	ug/kg	1100 U	200 U	230 U	210 U	250 U
4-Methylphenol	106-44-5	ug/kg	2100 U	380 U	440 U	400 U	480 U
4-Nitroaniline	100-01-6	ug/kg	2100 U	380 U	440 U	400 U	480 U
4-Nitrophenol	100-02-7	ug/kg	2100 U	380 U	440 U	400 U	480 U
Acenaphthene	83-32-9	ug/kg	1100 U	200 U	230 U	210 U	250 U
Acenaphthylene	208-96-8	ug/kg	1100 U	200 U	230 U	210 U	250 U
Acetophenone	98-86-2	ug/kg	1100 U	200 U	230 U	210 U	250 U
Anthracene	120-12-7	ug/kg	1100 U	200 U	230 U	210 U	250 U
Atrazine	1912-24-9	ug/kg	1100 U	200 U	230 U	210 U	250 U
Benz(a)anthracene	56-55-3	ug/kg	2700	200 U	230 U	220	250 U
Benzaldehyde	100-52-7	ug/kg	1100 U	200 U	230 U	210 U	250 U
Benzo(a)pyrene	50-32-8	ug/kg	3100	200 U	230 U	210 U	250 U
Benzo(b)fluoranthene	205-99-2	ug/kg	3400	200 U	230 U	250	250 U
Benzo(g,h,i)perylene	191-24-2	ug/kg	2200	200 U	230 U	210 U	250 U
Benzo(k)fluoranthene	207-08-9	ug/kg	1400	200 U	230 U	210 U	250 U
bis(2-Chloroethoxy)methane	111-91-1	ug/kg	1100 U	200 U	230 U	210 U	250 U
bis(2-Chloroethyl)ether	111-44-4	ug/kg	1100 U	200 U	230 U	210 U	250 U
bis(2-Chloroisopropyl)ether	39638-32-9	ug/kg	1100 U	200 U	230 U	210 U	250 U
bis(2-Ethylhexyl)phthalate	117-81-7	ug/kg	1400	200 U	230 U	210 U	250 U
Butyl benzyl phthalate	85-68-7	ug/kg	1100 U	200 U	230 U	210 U	250 U
Caprolactam	105-60-2	ug/kg	1100 U	200 U	230 U	210 U	250 U
Carbazole	86-74-8	ug/kg	1100 U	200 U	230 U	210 U	250 U
Chrysene	218-01-9	ug/kg	3000	200 U	230 U	220	250 U
Dibenz(a,h)anthracene	53-70-3	ug/kg	1100 U	200 U	230 U	210 U	250 U
Dibenzofuran	132-64-9	ug/kg	1100 U	200 U	230 U	210 U	250 U
Diethyl phthalate	84-66-2	ug/kg	1100 U	200 U	230 U	210 U	250 U
Dimethyl phthalate	131-11-3	ug/kg	1100 U	200 U	230 U	210 U	250 U
Di-n-butyl phthalate	84-74-2	ug/kg	1100 U	200 U	230 U	210 U	250 U
Di-n-octyl phthalate	117-84-0	ug/kg	1100 U	200 U	230 U	210 U	250 U

Table A-1
In-Situ Soil Waste Characterization Analytical Results - Historical Outfalls 2, 4, and 5
Remedial Design
Former Philips Display Components Facility
Seneca Falls, New York

	Location ID:		H02-DITCH-02	H04-DITCH-05	H04-DITCH-06	H05-DITCH-01	H05-DITCH-04
	Sample Depth (feet bgs):		0 - 4	0 - 3.5	0 - 4	0 - 2	0 - 3
	Date Collected:		7/25/2022	7/26/2022	7/26/2022	7/26/2022	7/26/2022
Analyte	CAS#	Unit					
SVOCs (cont.)							
Fluoranthene	206-44-0	ug/kg	4600	200 U	290	390	250 U
Fluorene	86-73-7	ug/kg	1100 U	200 U	230 U	210 U	250 U
Hexachloro-1,3-butadiene	87-68-3	ug/kg	1100 U	200 U	230 U	210 U	250 U
Hexachlorobenzene	118-74-1	ug/kg	1100 U	200 U	230 U	210 U	250 U
Hexachlorocyclopentadiene	77-47-4	ug/kg	1100 U	200 U	230 U	210 U	250 U
Hexachloroethane	67-72-1	ug/kg	1100 U	200 U	230 U	210 U	250 U
Indeno(1,2,3-cd)pyrene	193-39-5	ug/kg	2100	200 U	230 U	210 U	250 U
Isophorone	78-59-1	ug/kg	1100 U	200 U	230 U	210 U	250 U
Naphthalene	91-20-3	ug/kg	1100 U	200 U	230 U	210 U	250 U
Nitrobenzene	98-95-3	ug/kg	1100 U	200 U	230 U	210 U	250 U
N-Nitrosodi-n-propylamine	621-64-7	ug/kg	1100 U	200 U	230 U	210 U	250 U
N-Nitrosodiphenylamine	86-30-6	ug/kg	1100 U	200 U	230 U	210 U	250 U
p-Chloroaniline	106-47-8	ug/kg	1100 U	200 U	230 U	210 U	250 U
Pentachlorophenol	87-86-5	ug/kg	2100 U	380 U	440 U	400 U	480 U
Phenanthrene	85-01-8	ug/kg	3500	200 U	240	280	250 U
Phenol	108-95-2	ug/kg	1100 U	200 U	230 U	210 U	250 U
Pyrene	129-00-0	ug/kg	4300	200 U	310	450	250 U
VOCs							
1,1,1-Trichloroethane	71-55-6	ug/kg	6.3 Uvs	5.8 Uvs	6.7 Uvs	6.2 Uvs	7.4 Uvs
1,1,2,2-Tetrachloroethane	79-34-5	ug/kg	6.3 Uvs	5.8 Uvs	6.7 Uvs	6.2 Uvs	7.4 Uvs
1,1,2-trichloro-1,2,2-trifluoroethane	76-13-1	ug/kg	13 vs	5.8 Uvs	6.7 Uvs	6.2 Uvs	7.4 Uvs
1,1,2-Trichloroethane	79-00-5	ug/kg	6.3 Uvs	5.8 Uvs	6.7 Uvs	6.2 Uvs	7.4 Uvs
1,1-Dichloroethane	75-34-3	ug/kg	6.3 Uvs	5.8 Uvs	6.7 Uvs	6.2 Uvs	7.4 Uvs
1,1-Dichloroethene	75-35-4	ug/kg	6.3 Uvs	5.8 Uvs	6.7 Uvs	6.2 Uvs	7.4 Uvs
1,2,4-Trichlorobenzene	120-82-1	ug/kg	6.3 Uvs	5.8 Uvs	6.7 Uvs	6.2 Uvs	7.4 Uvs
1,2-Dibromo-3-chloropropane	96-12-8	ug/kg	6.3 Uvs	5.8 Uvs	6.7 Uvs	6.2 Uvs	7.4 Uvs
1,2-Dibromoethane	106-93-4	ug/kg	6.3 Uvs	5.8 Uvs	6.7 Uvs	6.2 Uvs	7.4 Uvs
1,2-Dichlorobenzene	95-50-1	ug/kg	6.3 Uvs	5.8 Uvs	6.7 Uvs	6.2 Uvs	7.4 Uvs
1,2-Dichloroethane	107-06-2	ug/kg	6.3 Uvs	5.8 Uvs	6.7 Uvs	6.2 Uvs	7.4 Uvs
1,2-Dichloropropane	78-87-5	ug/kg	6.3 Uvs	5.8 Uvs	6.7 Uvs	6.2 Uvs	7.4 Uvs
1,3-Dichlorobenzene	541-73-1	ug/kg	6.3 Uvs	5.8 Uvs	6.7 Uvs	6.2 Uvs	7.4 Uvs
1,4-Dichlorobenzene	106-46-7	ug/kg	6.3 Uvs	5.8 Uvs	6.7 Uvs	6.2 Uvs	7.4 Uvs
2-Butanone (MEK)	78-93-3	ug/kg	32 Uvs	29 Uvs	33 Uvs	31 Uvs	37 Uvs
4-Methyl-2-Pentanone	108-10-1	ug/kg	32 Uvs	29 Uvs	33 Uvs	31 Uvs	37 Uvs
Acetone	67-64-1	ug/kg	32 Uvs	29 Uvs	33 Uvs	52 vs	37 Uvs
Benzene	71-43-2	ug/kg	6.3 Uvs	5.8 Uvs	6.7 Uvs	6.2 Uvs	7.4 Uvs
Bromodichloromethane	75-27-4	ug/kg	6.3 Uvs	5.8 Uvs	6.7 Uvs	6.2 Uvs	7.4 Uvs
Bromoform	75-25-2	ug/kg	6.3 U*+vs	5.8 U*+vs	6.7 U*+vs	6.2 U*+vs	7.4 U*+vs
Bromomethane	74-83-9	ug/kg	6.3 Uvs	5.8 Uvs	6.7 Uvs	6.2 Uvs	7.4 Uvs
Carbon Disulfide	75-15-0	ug/kg	6.3 Uvs	5.8 Uvs	6.7 Uvs	6.2 Uvs	7.4 Uvs
Carbon Tetrachloride	56-23-5	ug/kg	6.3 U*+vs	5.8 Uvs	6.7 U*+vs	6.2 Uvs	7.4 U*+vs

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Remedial Design
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	Location ID:		H02-DITCH-02	H04-DITCH-05	H04-DITCH-06	H05-DITCH-01	H05-DITCH-04
	Sample Depth (feet bgs):		0 - 4	0 - 3.5	0 - 4	0 - 2	0 - 3
	Date Collected:		7/25/2022	7/26/2022	7/26/2022	7/26/2022	7/26/2022
Analyte	CAS#	Unit					
VOCs (cont.)							
CFC-11	75-69-4	ug/kg	6.3 Uvs	5.8 Uvs	6.7 Uvs	6.2 Uvs	7.4 Uvs
CFC-12	75-71-8	ug/kg	6.3 Uvs	5.8 Uvs	6.7 Uvs	6.2 Uvs	7.4 Uvs
Chlorobenzene	108-90-7	ug/kg	6.3 Uvs	5.8 Uvs	6.7 Uvs	6.2 Uvs	7.4 Uvs
Chlorodibromomethane	124-48-1	ug/kg	6.3 U*+vs	5.8 U*+vs	6.7 U*+vs	6.2 U*+vs	7.4 U*+vs
Chloroethane	75-00-3	ug/kg	6.3 Uvs	5.8 Uvs	6.7 Uvs	6.2 Uvs	7.4 Uvs
Chloroform	67-66-3	ug/kg	6.3 Uvs	5.8 Uvs	6.7 Uvs	6.2 Uvs	7.4 Uvs
Chloromethane	74-87-3	ug/kg	6.3 Uvs	5.8 Uvs	6.7 Uvs	6.2 Uvs	7.4 Uvs
cis-1,2-Dichloroethene	156-59-2	ug/kg	6.3 Uvs	5.8 Uvs	6.7 Uvs	6.2 Uvs	7.4 Uvs
cis-1,3-Dichloropropene	10061-01-5	ug/kg	6.3 Uvs	5.8 Uvs	6.7 Uvs	6.2 Uvs	7.4 Uvs
Cyclohexane	110-82-7	ug/kg	6.3 Uvs	5.8 Uvs	6.7 Uvs	6.2 Uvs	7.4 Uvs
Dichloromethane	75-09-2	ug/kg	6.3 Uvs	5.8 Uvs	6.7 Uvs	6.2 Uvs	7.4 Uvs
Ethylbenzene	100-41-4	ug/kg	6.3 Uvs	5.8 Uvs	6.7 Uvs	6.2 Uvs	7.4 Uvs
Isopropylbenzene	98-82-8	ug/kg	6.3 Uvs	5.8 Uvs	6.7 Uvs	6.2 Uvs	7.4 Uvs
Methyl Acetate	79-20-9	ug/kg	32 Uvs	29 Uvs	33 Uvs	31 Uvs	37 Uvs
Methyl N-Butyl Ketone (2-Hexanone)	591-78-6	ug/kg	32 Uvs	29 Uvs	33 Uvs	31 Uvs	37 Uvs
Methylcyclohexane	108-87-2	ug/kg	6.3 Uvs	5.8 Uvs	6.7 Uvs	6.2 Uvs	7.4 Uvs
Methyl-tert-butylether	1634-04-4	ug/kg	6.3 Uvs	5.8 Uvs	6.7 Uvs	6.2 Uvs	7.4 Uvs
Styrene (Monomer)	100-42-5	ug/kg	6.3 Uvs	5.8 Uvs	6.7 Uvs	6.2 Uvs	7.4 Uvs
Tetrachloroethene	127-18-4	ug/kg	6.3 Uvs	5.8 Uvs	6.7 Uvs	6.2 Uvs	7.4 Uvs
Toluene	108-88-3	ug/kg	6.3 Uvs	5.8 Uvs	6.7 Uvs	6.2 Uvs	7.4 Uvs
Total Xylenes	1330-20-7	ug/kg	13 Uvs	12 Uvs	13 Uvs	12 Uvs	15 Uvs
trans-1,2-Dichloroethene	156-60-5	ug/kg	6.3 Uvs	5.8 Uvs	6.7 Uvs	6.2 Uvs	7.4 Uvs
trans-1,3-Dichloropropene	10061-02-6	ug/kg	6.3 Uvs	5.8 Uvs	6.7 Uvs	6.2 Uvs	7.4 Uvs
Trichloroethene	79-01-6	ug/kg	43 vs	5.8 Uvs	13 vs	6.2 Uvs	10 vs
Vinyl chloride	75-01-4	ug/kg	6.3 Uvs	5.8 Uvs	6.7 Uvs	6.2 Uvs	7.4 Uvs

Abbreviations and Symbols:
µg/kg = microgram per kilogram
bgs = below ground surface
CAS = Chemical Abstracts Service
mg/L = milligrams per liter
SVOC = semi-volatile organic compound
VOC = volatile organic compound

Qualifiers:
J = Estimated concentration below the reporting limit but above the method detection limit.
T = The laboratory control sample or laboratory control sample duplicate result was outside of acceptance criteria.
U = The compound was analyzed for but not determined to be present at or above the associated reporting limit.
*+ = LCS and/or LCSD is outside acceptance limits, high biased.
vs = Reported analyte concentrations are below 200 ug/kg and may be biased low due to the sample not being collected according to 5035A- L low-level specifications.
F1 = MS and/or MSD recovery exceeds control limits.
^+ = Continuing calibration verification (CCV) is outside acceptance limits, high biased.
^2 = Calibration blank (ICB and/or CCB) is outside acceptance limits.
F2 = MS/MSD RPD exceeds control limits.

Table A-2
In Situ Soil Waste Characterization Analytical Results - Historical Outfalls 6 and 7
Remedial Design
Former Philips Display Components Facility
Seneca Falls, New York

	Location ID:		H067-EX1-COMP	H067-EX2-COMP	H067-EX3-COMP	H067-EX4-COMP	H067-EX5-COMP	H067-EX6-COMP	H067-EX7-COMP
	Sample Depth (feet bgs):		varies	varies	varies	varies	varies	varies	varies
	Date:		7/19/2022	7/19/2022	7/20/2022	7/21/2022	7/22/2022	7/25/2022	7/25/2022
Analyte	CAS#	Unit							
TCLP Metals									
Arsenic	7440-38-2	mg/l	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U [0.015 U]
Barium	7440-39-3	mg/l	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]
Cadmium	7440-43-9	mg/l	0.24	0.21	0.12	0.42	0.13	0.082	0.12 [0.070]
Chromium	7440-47-3	mg/l	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U [0.020 U]
Lead	7439-92-1	mg/l	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U [0.020 U]
Mercury	7439-97-6	mg/l	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U [0.00020 U]
Selenium	7782-49-2	mg/l	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U [0.025 U]
Silver	7440-22-4	mg/l	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U [0.0060 U]
TCLP VOCs									
1,1-Dichloroethene	75-35-4	mg/l	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U [0.010 U]
1,2-Dichloroethane	107-06-2	mg/l	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U [0.010 U]
2-Butanone (MEK)	78-93-3	mg/l	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U*+	0.050 U*+ [0.050 U*+]
Benzene	71-43-2	mg/l	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U [0.010 U]
Carbon Tetrachloride	56-23-5	mg/l	0.010 U	0.010 U	0.010 U	0.010 UF1	0.010 U	0.010 U	0.010 U [0.010 U]
Chlorobenzene	108-90-7	mg/l	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U [0.010 U]
Chloroform	67-66-3	mg/l	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U [0.010 U]
Tetrachloroethene	127-18-4	mg/l	0.010 U	0.010 U	0.010 U	0.010 UF1	0.010 U	0.010 U	0.010 U [0.010 U]
Trichloroethene	79-01-6	mg/l	0.010 U	0.010 U	0.010 U	0.010 UF1	0.010 U	0.010 U	0.010 U [0.010 U]
Vinyl chloride	75-01-4	mg/l	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U [0.010 U]
TCLP SVOCs									
1,4-Dichlorobenzene	106-46-7	mg/l	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U [0.040 U]
2,4,5-Trichlorophenol	95-95-4	mg/l	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U [0.020 U]
2,4,6-Trichlorophenol	88-06-2	mg/l	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U [0.020 U]
2,4-Dinitrotoluene	121-14-2	mg/l	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U [0.020 U]
2-Methylphenol	95-48-7	mg/l	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U [0.020 U]
3-Methylphenol	108-39-4	mg/l	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U [0.040 U]
4-Methylphenol	106-44-5	mg/l	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U [0.040 U]
Hexachloro-1,3-butadiene	87-68-3	mg/l	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U [0.020 U]
Hexachlorobenzene	118-74-1	mg/l	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U [0.020 U]
Hexachloroethane	67-72-1	mg/l	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U [0.020 U]
Nitrobenzene	98-95-3	mg/l	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U [0.020 U]
Pentachlorophenol	87-86-5	mg/l	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U [0.040 U]
Pyridine	110-86-1	mg/l	0.10 U	0.10 U	0.10 U	0.10 UF1	0.10 U	0.10 U	0.10 U [0.10 U]
TCLP Pesticides									
Chlordane	57-74-9	mg/l	0.0020 U	0.0020 U	0.31 U	0.29 U	0.32 U	0.26 U	0.24 U [0.24 U]
Endrin	72-20-8	mg/l	0.00020 U	0.00020 U	0.31 U	0.29 U	0.32 U	0.26 U	0.24 U [0.24 U]
Gamma-BHC	58-89-9	mg/l	0.00020 U	0.00020 U	0.31 U	0.29 U	0.32 U	0.26 U	0.24 U [0.24 U]
Heptachlor	76-44-8	mg/l	0.00020 U	0.00020 U	0.31 U	0.29 U	0.32 U	0.26 U	0.24 U [0.24 U]
Heptachlor epoxide	1024-57-3	mg/l	0.00020 U	0.00020 U	0.31 U	0.29 U	0.32 U	0.26 U	0.24 U [0.24 U]
Methoxychlor	72-43-5	mg/l	0.00020 U	0.00020 U	0.31 U	0.29 U	0.32 U	0.26 U	0.24 U [0.24 U]
Toxaphene	8001-35-2	mg/l	0.0020 U	0.0020 U	0.31 U	0.29 UF2	0.32 U	0.26 U	0.24 U [0.24 U]

Table A-2
In Situ Soil Waste Characterization Analytical Results - Historical Outfalls 6 and 7
Remedial Design
Former Philips Display Components Facility
Seneca Falls, New York

	Location ID:		H067-EX1-COMP	H067-EX2-COMP	H067-EX3-COMP	H067-EX4-COMP	H067-EX5-COMP	H067-EX6-COMP	H067-EX7-COMP
	Sample Depth (feet bgs):		varies	varies	varies	varies	varies	varies	varies
	Date:		7/19/2022	7/19/2022	7/20/2022	7/21/2022	7/22/2022	7/25/2022	7/25/2022
Analyte	CAS#	Unit							
TCLP Herbicides									
2,4,5-TP (Silvex)	93-72-1	mg/l	0.0020 U	0.0021 U	0.0022 U	0.0021 U	0.0020 U	0.0020 U	0.0020 U [NA]
2,4-D	94-75-7	mg/l	0.0020 U	0.0021 U	0.0022 U	0.0021 U	0.0020 U	0.0020 U	0.0020 U [NA]
PCBs									
Aroclor 1016	12674-11-2	mg/kg	0.30 U	0.29 U	0.0020 U	0.0020 U	0.0020 U	0.0020 U	0.0020 U [NA]
Aroclor 1221	11104-28-2	mg/kg	0.30 U	0.29 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U [NA]
Aroclor 1232	11141-16-5	mg/kg	0.30 U	0.29 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U [NA]
Aroclor 1242	53469-21-9	mg/kg	0.30 U	0.29 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U [NA]
Aroclor 1248	12672-29-6	mg/kg	0.30 U	0.29 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U [NA]
Aroclor 1254	11097-69-1	mg/kg	0.30 U	0.29 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U	0.00020 U [NA]
Aroclor 1260	11096-82-5	mg/kg	0.30 U	0.29 U	0.0020 U	0.0020 U	0.0020 U	0.0020 U	0.0020 U [NA]

Abbreviations and Symbols:
[ ] = duplicate sample result
bgs = below ground surface
CAS = Chemical Abstracts Service
mg/kg = milligrams per kilogram
mg/L = milligrams per liter
NA = not analyzed for
PCB = polychlorinated biphenyl
SVOC = semi-volatile organic compound
TCLP = toxicity characteristic leachate procedure
µg/kg = microgram per kilogram
VOC = volatile organic compound

Qualifiers:
J = Estimated concentration below the reporting limit but above the method detection limit.
T = The laboratory control sample or laboratory control sample duplicate result was outside of acceptance criteria.
U = The compound was analyzed for but not determined to be present at or above the associated reporting limit.
F1 = MS and/or MSD recovery exceeds control limits.
F2 = MS/MSD RPD exceeds control limits.
*+ = LCS and/or LCSD is outside acceptance limits, high biased.

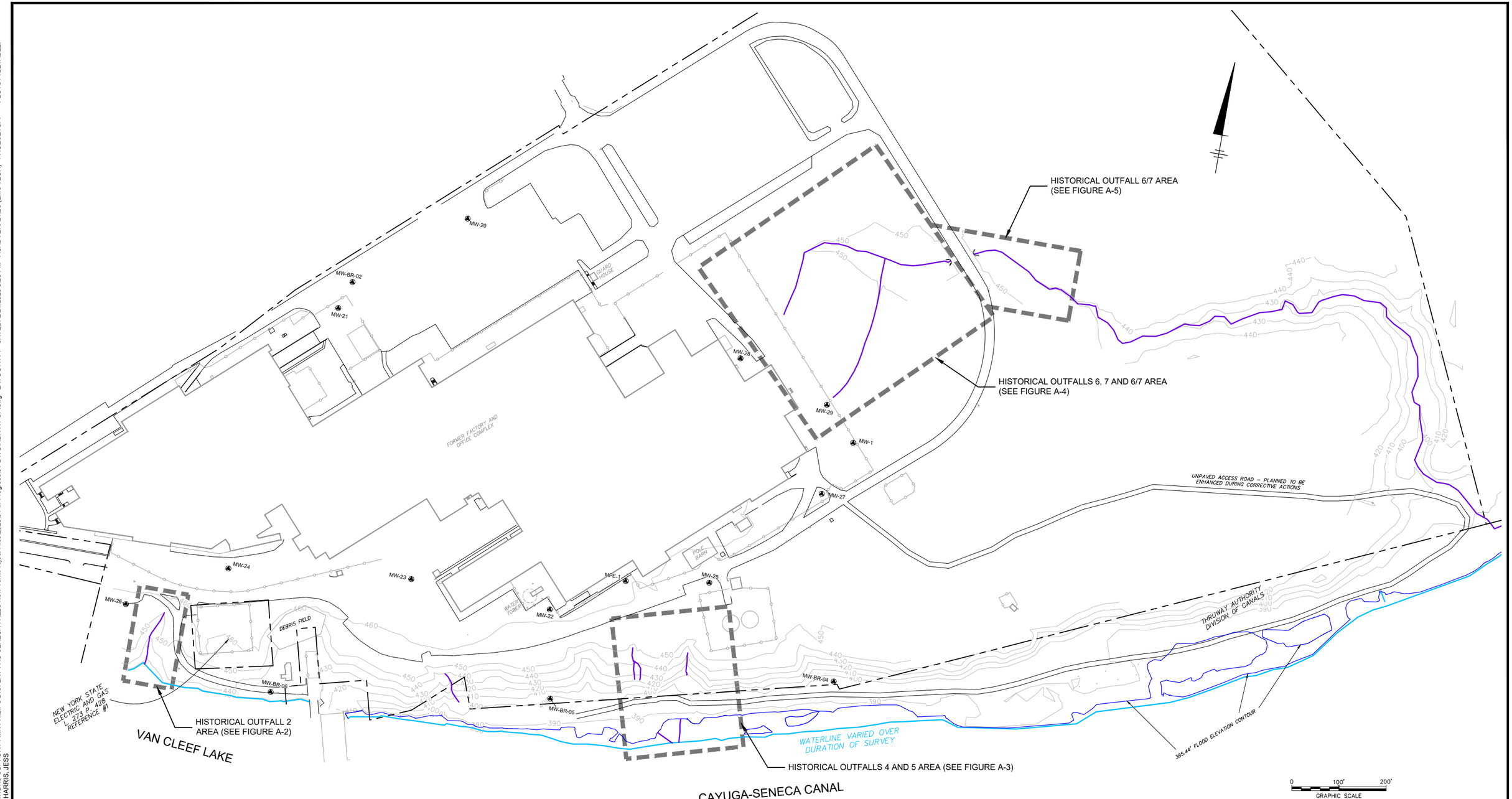
Table A-3
In Situ Soil Waste Characterization Analytical Results - Historical Outfalls 6 and 7 (F001/F002 Analytes)
Remedial Design
Former Philips Display Components Facility
Seneca Falls, New York

	Location ID:		H067-EX1-01	H067-EX2-01	H067-EX4-01	H067-EX3-02	H067-EX5-01	H067-EX6-04	H067-EX7-02
	Sample Depth (feet bgs):		1	1	0.5	0.5	0.5	0.5	0.5
	Date:		7/18/2022	7/19/2022	7/20/2022	7/20/2022	7/22/2022	7/25/2022	7/25/2022
Analyte	CAS#	Unit							
Alcohols									
Methanol	67-56-1	ug/kg	1200 U	1200 U	1200 U	1900 U	1200 U	1200 U	1200 U
SVOCs									
2-Methylphenol	95-48-7	ug/kg	200 UF2	210 U	190 U	320 U	200 U	200 U	200 U
3-Methylphenol, 4-Methylphenol	65794-96-9	ug/kg	390 UF2	400 U	370 U	620 U	390 U	400 U	390 U
Nitrobenzene	98-95-3	ug/kg	200 U	210 U	190 U	320 U	200 U	200 U	200 U
Pyridine	110-86-1	ug/kg	390 U	400 U	370 U	620 U	390 U	400 U	390 U
Total Methylphenols	ARC-TOTMEPHS	ug/kg	390 U	400 U	370 U	620 U	390 U	400 U	390 U
VOCs									
1,1,1-Trichloroethane	71-55-6	ug/kg	5.8 Uvs	6.0 Uvs	5.8 Uvs	9.3 Uvs	5.8 Uvs	6.0 Uvs	5.8 Uvs
1,1,2-trichloro-1,2,2-trifluoroethane	76-13-1	ug/kg	5.8 Uvs	6.0 Uvs	5.8 Uvs	9.3 Uvs	5.8 Uvs	6.0 Uvs	5.8 Uvs
1,1,2-Trichloroethane	79-00-5	ug/kg	5.8 Uvs	6.0 Uvs	5.8 Uvs	9.3 Uvs	5.8 Uvs	6.0 Uvs	5.8 Uvs
1,2-Dichlorobenzene	95-50-1	ug/kg	5.8 Uvs	6.0 Uvs	5.8 Uvs	9.3 U*3vs	5.8 Uvs	6.0 Uvs	5.8 Uvs
2-Butanone (MEK)	78-93-3	ug/kg	29 Uvs	30 Uvs	29 Uvs	47 Uvs	29 Uvs	30 Uvs	29 Uvs
2-Methyl-1-propanol	78-83-1	ug/kg	230 Uvs	240 Uvs	230 U*+vs	370 Uvs	230 Uvs*+	240 Uvs	230 Uvs
4-Methyl-2-Pentanone	108-10-1	ug/kg	29 Uvs	30 Uvs	29 Uvs	47 Uvs	29 Uvs	30 Uvs	29 Uvs
Acetone	67-64-1	ug/kg	29 Uvs	30 Uvs	29 Uvs	47 Uvs	29 Uvs	30 Uvs	29 Uvs
Benzene	71-43-2	ug/kg	5.8 Uvs	6.0 Uvs	5.8 Uvs	9.3 Uvs	5.8 Uvs	6.0 Uvs	5.8 Uvs
Carbon Disulfide	75-15-0	ug/kg	5.8 Uvs	6.0 Uvs	5.8 Uvs	9.3 Uvs	5.8 Uvs	6.0 Uvs	5.8 Uvs
Carbon Tetrachloride	56-23-5	ug/kg	5.8 Uvs	6.0 Uvs	5.8 Uvs	9.3 Uvs	5.8 Uvs	6.0 Uvs	5.8 Uvs
CFC-11	75-69-4	ug/kg	5.8 Uvs	6.0 Uvs	5.8 Uvs	9.3 Uvs	5.8 Uvs	6.0 Uvs	5.8 Uvs
Chlorobenzene	108-90-7	ug/kg	5.8 Uvs	6.0 Uvs	5.8 Uvs	9.3 Uvs	5.8 Uvs	6.0 Uvs	5.8 Uvs
Cyclohexanone	108-94-1	ug/kg	58 Uvs	60 Uvs	58 Uvs	93 U*3vs	58 Uvs	60 Uvs	58 Uvs
Methylene chloride	75-09-2	ug/kg	5.8 Uvs	6.0 Uvs	14 vs	9.3 Uvs	5.8 Uvs	6.0 Uvs	5.8 Uvs
Diethyl ether	60-29-7	ug/kg	29 Uvs	30 Uvs	29 Uvs	47 Uvs	29 Uvs	30 Uvs	29 Uvs
Ethyl Acetate	141-78-6	ug/kg	5.8 Uvs	6.0 Uvs	5.8 U*+vs	9.3 Uvs	5.8 Uvs*+	6.0 Uvs	5.8 Uvs
Ethylbenzene	100-41-4	ug/kg	5.8 Uvs	6.0 Uvs	5.8 Uvs	9.3 Uvs	5.8 Uvs	6.0 Uvs	5.8 Uvs
n-Butyl Alcohol	71-36-3	ug/kg	58 Uvs	60 Uvs	58 Uvs	93 Uvs	58 Uvs	60 Uvs	58 Uvs
Tetrachloroethene	127-18-4	ug/kg	5.8 Uvs	6.0 Uvs	5.8 Uvs	9.3 Uvs	5.8 Uvs	6.0 Uvs	5.8 Uvs
Toluene	108-88-3	ug/kg	5.8 Uvs	6.0 Uvs	5.8 Uvs	9.3 Uvs	5.8 Uvs	6.0 Uvs	5.8 Uvs
Total Xylenes	1330-20-7	ug/kg	12 Uvs	12 Uvs	12 Uvs	19 Uvs	12 Uvs	12 Uvs	12 Uvs
Trichloroethene	79-01-6	ug/kg	5.8 Uvs	6.0 Uvs	5.8 Uvs	9.3 Uvs	5.8 Uvs	6.0 Uvs	5.8 Uvs

Abbreviations and Symbols:
bgs = below ground surface
CAS = Chemical Abstracts Service
SVOC = semi-volatile organic compound
VOC = volatile organic compound
µg/kg = microgram per kilogram

Qualifiers:
U = The compound was analyzed for but not determined to be present at or above the associated reporting limit.
F2 = MS/MSD RPD exceeds control limits.
*+ = LCS and/or LCSD is outside acceptance limits, high biased.
vs = Reported analyte concentrations are below 200 ug/kg and may be biased low due to the sample not being collected according to 5035A- L low level specifications.

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LEGEND:

- PROPERTY BOUNDARY
- 100-YEAR FLOODPLAIN (385.44 FEET ABOVE SEA LEVEL)
- EDGE OF WATER
- CENTERLINE OF HISTORICAL OUTFALL DITCH
- 440 ELEVATION CONTOUR
- MONITORING WELL
- CHAIN-LINK FENCE

NOTES:

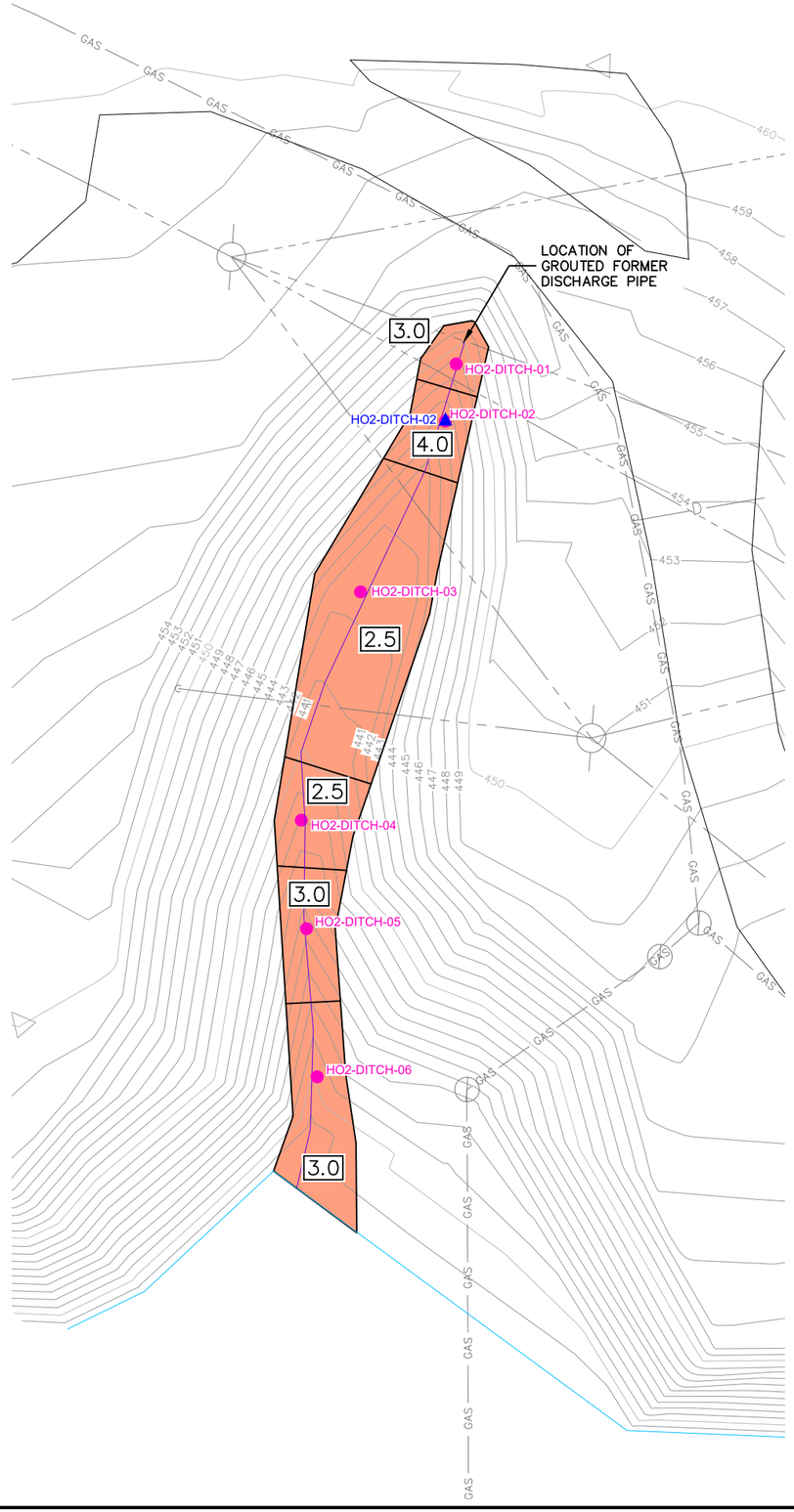
1. ALL LOCATIONS AND EXTENTS APPROXIMATE.
2. NOT ALL FEATURES ARE SHOWN FOR CLARITY.

GTE OPERATIONS SUPPORT INCORPORATED
FORMER PHILIPS DISPLAY COMPONENTS FACILITY
SENECA FALLS, NEW YORK
REMEDIAL DESIGN REPORT

SITE PLAN

ARCADIS

FIGURE
A-1



LEGEND:

- EDGE OF WATER
- PRE–DESIGN INVESTIGATION SOIL SAMPLE LOCATION (2020)
- IN SITU WASTE CHARACTERIZATION SOIL SAMPLE (2022) (SEE NOTE 2)
- 3.0 — APPROXIMATE PROPOSED EXCAVATION EXTENT AND DEPTH IN FEET BELOW GROUND SURFACE
- OVERHEAD UTILITIES
- UTILITY POLE
- GAS RISER
- GV — GAS VALVE
- D — STORM DRAIN
- GAS — GAS LINE
- 440 — ELEVATION CONTOUR
- G — GUY WIRE
- CENTERLINE OF HISTORICAL OUTFALL DITCH

NOTES:

1. EXCAVATION EXTENTS SHOWN HERE ARE APPROXIMATE AND MAY BE ADJUSTED TO ACHIEVE SLOPING REQUIREMENTS OR BASED ON PRE–EXCAVATION SURVEY. REFER TO DESIGN DRAWINGS AND SPECIFICATIONS FOR ADDITIONAL DETAILS.
2. IN SITU WASTE CHARACTERIZATION SAMPLES VERTICALLY COMPOSITED OVER ANTICIPATED EXCAVATION DEPTH.

0 10' 20'
GRAPHIC SCALE

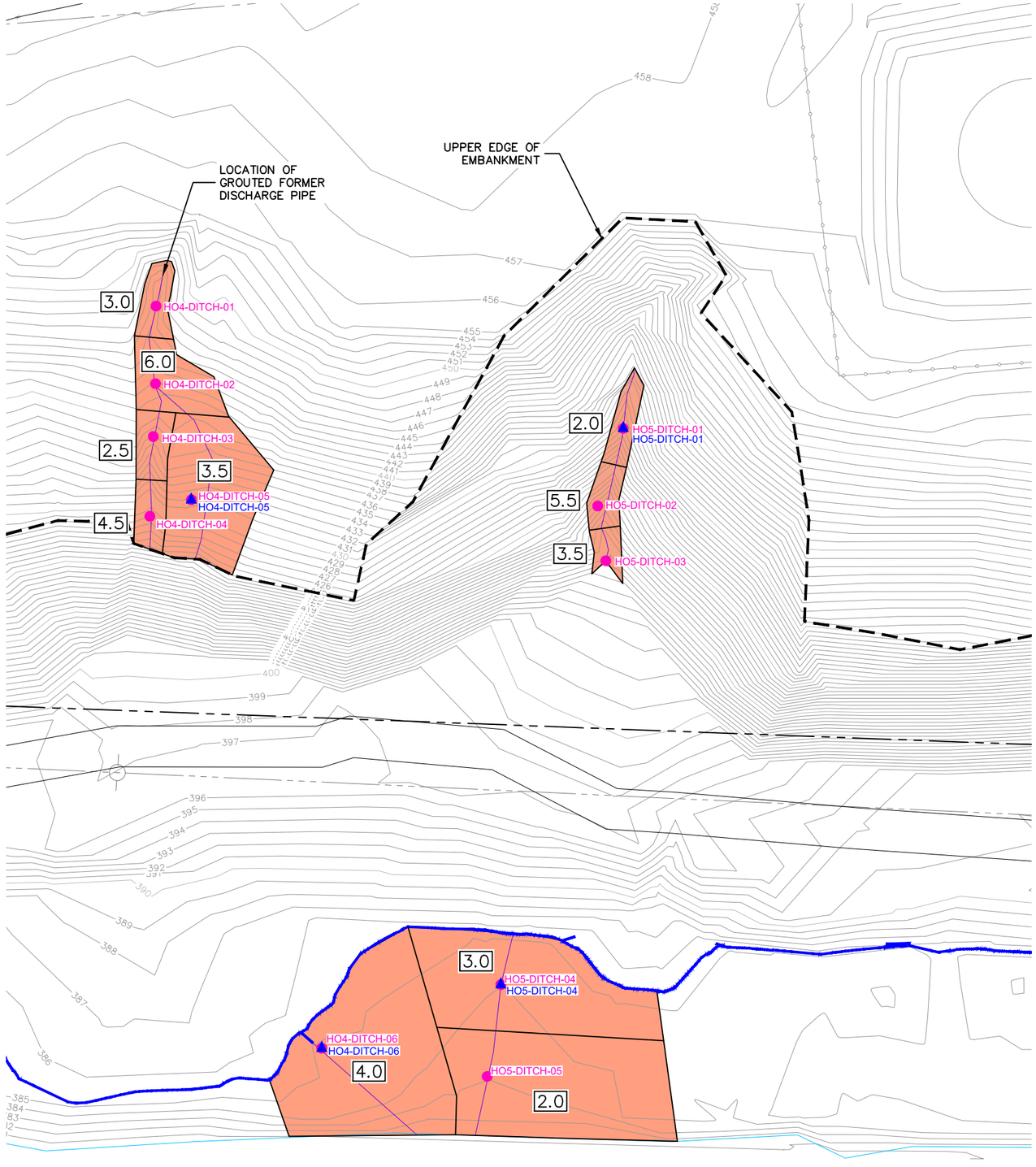
GTE OPERATIONS SUPPORT INCORPORATED
FORMER PHILIPS DISPLAY COMPONENTS FACILITY
SENECA FALLS, NEW YORK
REMEDIAL DESIGN REPORT

HISTORICAL OUTFALL 2 IN SITU WASTE CHARACTERIZATION SAMPLE LOCATIONS

ARCADIS

FIGURE
A-2

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LEGEND:

- PROPERTY BOUNDARY
- 100-YEAR FLOODPLAIN (385.44 FEET ABOVE SEA LEVEL)
- EDGE OF WATER
- PRE-DESIGN INVESTIGATION SOIL SAMPLE LOCATION (2020)
- IN SITU WASTE CHARACTERIZATION SOIL SAMPLE (2022) (SEE NOTE 2)
- 2.0 — APPROXIMATE PROPOSED EXCAVATION EXTENT AND DEPTH IN FEET BELOW GROUND SURFACE
- OVERHEAD UTILITIES
- UTILITY POLE
- 440 — ELEVATION CONTOUR
- CENTERLINE OF HISTORICAL OUTFALL DITCH

NOTES:

1. EXCAVATION EXTENTS SHOWN HERE ARE APPROXIMATE AND MAY BE ADJUSTED TO ACHIEVE SLOPING REQUIREMENTS OR BASED ON PRE-EXCAVATION SURVEY. REFER TO DESIGN DRAWINGS AND SPECIFICATIONS FOR ADDITIONAL DETAILS.
2. IN SITU WASTE CHARACTERIZATION SAMPLES VERTICALLY COMPOSITED OVER ANTICIPATED EXCAVATION DEPTH.

0 15' 30'
GRAPHIC SCALE

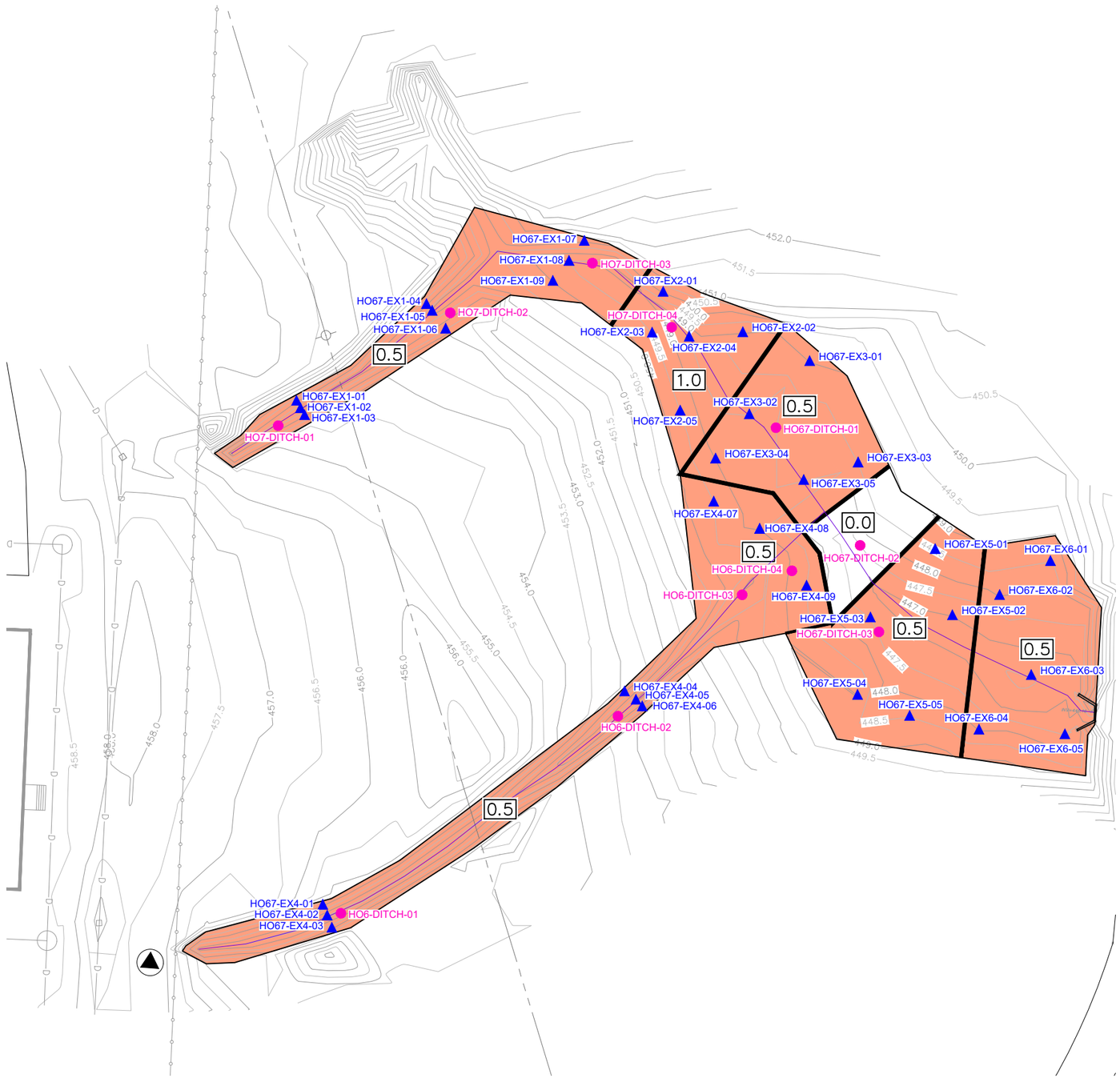
GTE OPERATIONS SUPPORT INCORPORATED
FORMER PHILIPS DISPLAY COMPONENTS FACILITY
SENECA FALLS, NEW YORK (NYSDEC SITE NO. 85003)
REMEDIAL DESIGN REPORT

HISTORICAL OUTFALLS 4 AND 5 IN SITU WASTE CHARACTERIZATION SAMPLE LOCATIONS

ARCADIS

FIGURE
A-3

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LEGEND:

- PRE–DESIGN INVESTIGATION SOIL SAMPLE LOCATION (2020)
- IN SITU WASTE CHARACTERIZATION SOIL SAMPLE (2022) (SEE NOTE 2)
- 0.5 — APPROXIMATE PROPOSED EXCAVATION EXTENT AND DEPTH IN FEET BELOW GROUND SURFACE
- EXTENTS OF WASTE CHARACTERIZATION AREAS
- OVERHEAD UTILITIES
- MONITORING WELL
- UTILITY POLE
- CATCH BASIN
- MANHOLE
- CHAIN–LINK FENCE
- STORM DRAIN
- CULVERT
- 440 — ELEVATION CONTOUR
- CENTERLINE OF HISTORICAL OUTFALL DITCH

NOTES:

1. EXCAVATION EXTENTS SHOWN HERE ARE APPROXIMATE AND MAY BE ADJUSTED TO ACHIEVE SLOPING REQUIREMENTS OR BASED ON PRE–EXCAVATION SURVEY. REFER TO DESIGN DRAWINGS AND SPECIFICATIONS FOR ADDITIONAL DETAILS.
2. IN SITU WASTE CHARACTERIZATION SAMPLES VERTICALLY COMPOSITED OVER ANTICIPATED EXCAVATION DEPTH.

0 25' 50'
GRAPHIC SCALE

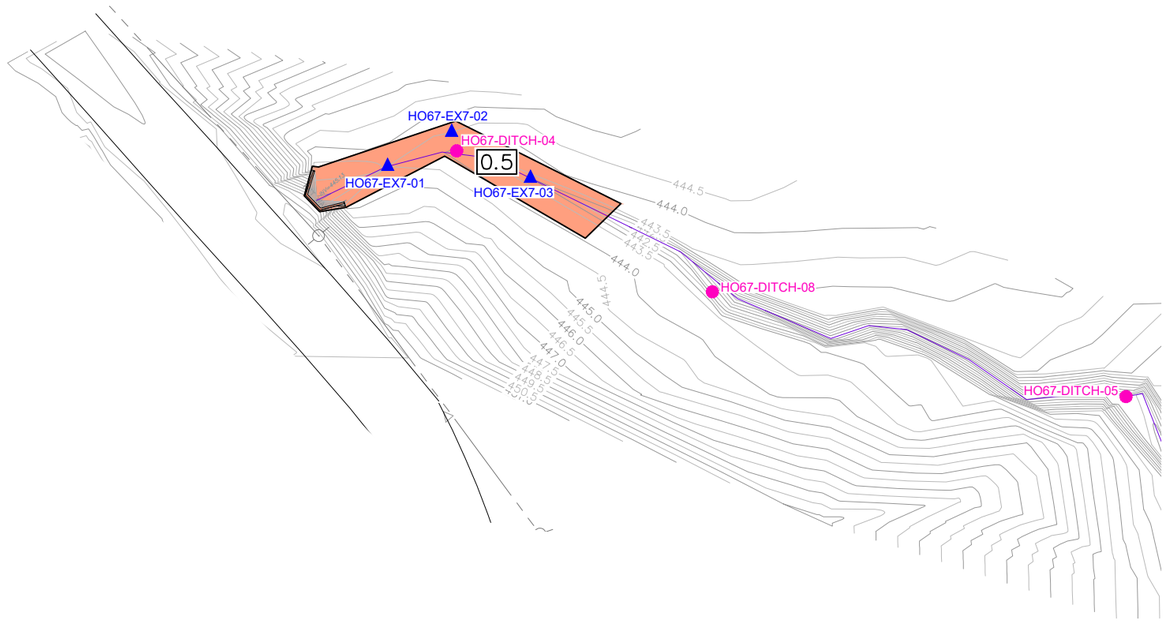
GTE OPERATIONS SUPPORT INCORPORATED
FORMER PHILIPS DISPLAY COMPONENTS FACILITY
SENECA FALLS, NEW YORK
REMEDIAL DESIGN REPORT

HISTORICAL OUTFALLS 6, 7, AND 6/7 IN SITU WASTE CHARACTERIZATION SAMPLE LOCATIONS

ARCADIS

FIGURE
A-4

C:\Users\jharris\ACCDocs\Arcadis\AUS-GTE OPERATIONS SUPPORT-FMR PHILIPS DISPLAY FAC-SENECA FALLS New York\Project Files\2023\01-In Progress\01-DWG\RDR-A4 A5-WC SAMP.dwg LAYOUT: A-4 SAVED: 2/24/2023 5:27 PM ACADVER: 24.2S (LMS TECH) PAGESETUP: PDF-D2B
PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 3/16/2023 3:04 PM BY: HARRIS, JESS
XREFS: IMAGES: PROJECTNAME: ----
RDR-X-TITLEArcadis Logo_2021.PNG



LEGEND:

- PRE–DESIGN INVESTIGATION SOIL SAMPLE LOCATION (2020)
- IN SITU WASTE CHARACTERIZATION SOIL SAMPLE (2022) (SEE NOTE 2)
- 0.5 — APPROXIMATE PROPOSED EXCAVATION EXTENT AND DEPTH IN FEET BELOW GROUND SURFACE
- OVERHEAD UTILITIES
- UTILITY POLE
- CULVERT
- 440 — ELEVATION CONTOUR
- CENTERLINE OF HISTORICAL OUTFALL DITCH

NOTES:

1. EXCAVATION EXTENTS SHOWN HERE ARE APPROXIMATE AND MAY BE ADJUSTED TO ACHIEVE SLOPING REQUIREMENTS OR BASED ON PRE–EXCAVATION SURVEY. REFER TO DESIGN DRAWINGS AND SPECIFICATIONS FOR ADDITIONAL DETAILS.
2. IN SITU WASTE CHARACTERIZATION SAMPLES VERTICALLY COMPOSITED OVER ANTICIPATED EXCAVATION DEPTH.

0 25' 50'
GRAPHIC SCALE

GTE OPERATIONS SUPPORT INCORPORATED
FORMER PHILIPS DISPLAY COMPONENTS FACILITY
SENECA FALLS, NEW YORK
REMEDIAL DESIGN REPORT

HISTORICAL OUTFALL 6/7 IN SITU WASTE CHARACTERIZATION SAMPLE LOCATIONS

ARCADIS

FIGURE
A-5

C:\Users\jlharris\ACCDocs\Arcadis\AUS-GTE OPERATIONS SUPPORT-FMR PHILIPS DISPLAY FAC-SENECA FALLS New York\Project Files\2023101-In Progress\01-DWG\RDR-A4 A5-WC SAMP.dwg LAYOUT: A-5 SAVED: 2/24/2023 5:27 PM ACADVER: 24.2S (LMS TECH) PAGESETUP: PDF-D2B
PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 3/16/2023 3:05 PM BY: HARRIS, JESS
XREFS: IMAGES: PROJECTNAME: ----
RDR-X-TITLEArcadis Logo_2021.PNG

eurofins | Environment Testing America



ANALYTICAL REPORT

Eurofins Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Tel: (716)691-2600

Laboratory Job ID: 480-200133-1
Client Project/Site: GTEOSI - Seneca Falls

For:
ARCADIS U.S. Inc
855 Route 146
Suite 210
Clifton Park, New York 12065

Attn: Mark Flusche

Authorized for release by:
8/11/2022 3:49:49 PM
Judy Stone, Senior Project Manager
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Designee for

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LINKS

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The test results in this report meet all 2003 NELAC, 2009 TNI, and 2016 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Cover Page 1
Table of Contents 2
Definitions/Glossary 3
Case Narrative 4
Detection Summary 6
Client Sample Results 7
Surrogate Summary 22
QC Sample Results 23
QC Association Summary 38
Lab Chronicle 41
Certification Summary 44
Method Summary 45
Sample Summary 46
Chain of Custody 47
Receipt Checklists 48

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
*+	LCS and/or LCSD is outside acceptance limits, high biased.
vs	Reported analyte concentrations are below 200 ug/kg and may be biased low due to the sample not being collected according to 5035A- L low-level specifications.

Metals

Qualifier	Qualifier Description
^+	Continuing Calibration Verification (CCV) is outside acceptance limits, high biased.
^2	Calibration Blank (ICB and/or CCB) is outside acceptance limits.
F1	MS and/or MSD recovery exceeds control limits.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 480-200133-1

Laboratory: Eurofins Buffalo

Narrative

Job Narrative
480-200133-1

Comments
No additional comments.

Receipt
The samples were received on 7/27/2022 10:00 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 2.7º C.

GC/MS VOA
Method 8260C: The continuing calibration verification (CCV) associated with batch 480-635513 recovered above the upper control limit for 1,1,1-Trichloroethane, 1,2-Dichloroethane, Carbon tetrachloride, Chlorodibromomethane, Dichlorobromomethane, Tetrachloroethene and Trichlorofluoromethane. The samples associated with this CCV were non-detects or below the reporting limit (RL) for the affected analytes; therefore, the data have been reported. The associated samples are impacted: H04-DITCH-05 (480-200133-2) and H05-DITCH-01 (480-200133-4).

Method 8260C: The laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) for preparation batch 480-635335 and analytical batch 480-635513 recovered outside control limits for the following analytes: Bromoform and Chlorodibromomethane. These analytes were biased high in the LCS/LCSD and were not detected in the associated sample(s); therefore, the data have been reported. The associated samples are impacted: H04-DITCH-05 (480-200133-2) and H05-DITCH-01 (480-200133-4).

Method 8260C: The laboratory control sample (LCS) for preparation batch 480-635770 and analytical batch 480-635772 recovered outside control limits for the following analytes: Bromoform, Carbon tetrachloride and Dibromochloromethane. These analytes were biased high in the LCS and were not detected in the associated samples; therefore, the data have been reported. The associated samples are: H02-DITCH-02 (480-200133-1), H04-DITCH-06 (480-200133-3) and H05-DITCH-04 (480-200133-5).

Method 8260C: The continuing calibration verification (CCV) associated with batch 480-635772 recovered above the upper control limit for 1,1,1-Trichloroethane, Bromoform, Carbon tetrachloride, Dibromochloromethane, Tetrachloroethene and Trichlorofluoromethane. The samples associated with this CCV were non-detects or above the reporting limits for the affected analytes; therefore, the data have been reported. The associated samples are impacted: H02-DITCH-02 (480-200133-1), H04-DITCH-06 (480-200133-3) and H05-DITCH-04 (480-200133-5).

Method 8260C: The surrogate Dibromofluoromethane (Surr) was outside the 20%D limits on the continuing calibration verification (CCV) but was within laboratory limits. The following samples are impacted: H02-DITCH-02 (480-200133-1), H04-DITCH-06 (480-200133-3) and H05-DITCH-04 (480-200133-5).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

GC/MS Semi VOA
Method 8270D: The following sample was diluted due to color and appearance: H02-DITCH-02 (480-200133-1). Elevated reporting limits (RL) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Metals
Method 6010C: The low level continuing calibration verification (CCVL) for analytical batch 480-636166 recovered above the upper control limit for total Barium. The samples associated with this CCVL contained this analyte at a concentration greater than 10X the value found in the CCVL; therefore, re-analysis of samples H02-DITCH-02 (480-200133-1), H04-DITCH-05 (480-200133-2), H04-DITCH-06 (480-200133-3), H05-DITCH-01 (480-200133-4) and H05-DITCH-04 (480-200133-5) was not performed.

Method 6010C: The continuing calibration blank (CCB) for analytical batch 480-636166 contained total Cadmium above the reporting limit (RL). All reported samples associated with this CCB contained this analyte at a concentration greater than 10X the value found in the CCB; therefore, re-analysis of samples was not performed.

Job ID: 480-200133-1 (Continued)

Laboratory: Eurofins Buffalo (Continued)

Method 6010C: The low level continuing calibration verification (CCVL) for analytical batch 480-636166 recovered above the upper control limit for total Cadmium. The sample associated with this CCVL contained this analyte at a concentration greater than 10X the value found in the CCVL; therefore, re-analysis of samples H05-DITCH-01 (480-200133-4) was not performed.

Method 6010C: The low level continuing calibration verification (CCVL) for analytical batch 480-636166 recovered above the upper control limit for total Barium. The sample associated with this CCVL was ND; therefore, re-analysis of sample (MB 480-635832/2-A) was not performed.

Method 6010C: The low level continuing calibration verification (CCVL) for analytical batch 480-636166 recovered above the upper control limit for total Cadmium. The sample associated with this CCVL was ND; therefore, re-analysis of sample (MB 480-635832/2-A) was not performed.

Method 6010C: The low level continuing calibration verification (CCVL) for analytical batch 480-636166 recovered above the upper control limit for total Barium. The sample associated with this CCVL contained this analyte at a concentration greater than 10X the value found in the CCVL; therefore, re-analysis of samples (LCS 480-635832/3-A) was not performed.

Method 6010C: The low level continuing calibration verification (CCVL) for analytical batch 480-636166 recovered above the upper control limit for total Cadmium. The sample associated with this CCVL contained this analyte at a concentration greater than 10X the value found in the CCVL; therefore, re-analysis of samples (LCS 480-635832/3-A) was not performed.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Organic Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Detection Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200133-1

Client Sample ID: H02-DITCH-02 — Lab Sample ID: 480-200133-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2-Trichloro-1,2,2-trifluoroethane	13	vs	6.3		ug/Kg	1	☼	8260C	Total/NA
Trichloroethene	43	vs	6.3		ug/Kg	1	☼	8260C	Total/NA
Benzo[a]anthracene	2700		1100		ug/Kg	5	☼	8270D	Total/NA
Benzo[a]pyrene	3100		1100		ug/Kg	5	☼	8270D	Total/NA
Benzo[b]fluoranthene	3400		1100		ug/Kg	5	☼	8270D	Total/NA
Benzo[g,h,i]perylene	2200		1100		ug/Kg	5	☼	8270D	Total/NA
Benzo[k]fluoranthene	1400		1100		ug/Kg	5	☼	8270D	Total/NA
Bis(2-ethylhexyl) phthalate	1400		1100		ug/Kg	5	☼	8270D	Total/NA
Chrysene	3000		1100		ug/Kg	5	☼	8270D	Total/NA
Fluoranthene	4600		1100		ug/Kg	5	☼	8270D	Total/NA
Indeno[1,2,3-cd]pyrene	2100		1100		ug/Kg	5	☼	8270D	Total/NA
Phenanthrene	3500		1100		ug/Kg	5	☼	8270D	Total/NA
Pyrene	4300		1100		ug/Kg	5	☼	8270D	Total/NA
Barium	3.3	^+ F1	1.0		mg/L	1		6010C	TCLP
Cadmium	2.5	F1	0.0020		mg/L	1		6010C	TCLP
Lead	0.075		0.020		mg/L	1		6010C	TCLP

Client Sample ID: H04-DITCH-05 — Lab Sample ID: 480-200133-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Barium	6.6	^+	1.0		mg/L	1		6010C	TCLP
Cadmium	13.0		0.010		mg/L	5		6010C	TCLP

Client Sample ID: H04-DITCH-06 — Lab Sample ID: 480-200133-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Trichloroethene	13	vs	6.7		ug/Kg	1	☼	8260C	Total/NA
Fluoranthene	290		230		ug/Kg	1	☼	8270D	Total/NA
Phenanthrene	240		230		ug/Kg	1	☼	8270D	Total/NA
Pyrene	310		230		ug/Kg	1	☼	8270D	Total/NA
Barium	3.6	^+	1.0		mg/L	1		6010C	TCLP
Cadmium	11.2		0.010		mg/L	5		6010C	TCLP
Lead	0.33		0.020		mg/L	1		6010C	TCLP

Client Sample ID: H05-DITCH-01 — Lab Sample ID: 480-200133-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	52	vs	31		ug/Kg	1	☼	8260C	Total/NA
Benzo[a]anthracene	220		210		ug/Kg	1	☼	8270D	Total/NA
Benzo[b]fluoranthene	250		210		ug/Kg	1	☼	8270D	Total/NA
Chrysene	220		210		ug/Kg	1	☼	8270D	Total/NA
Fluoranthene	390		210		ug/Kg	1	☼	8270D	Total/NA
Phenanthrene	280		210		ug/Kg	1	☼	8270D	Total/NA
Pyrene	450		210		ug/Kg	1	☼	8270D	Total/NA
Cadmium	0.60	^2 ^+	0.0020		mg/L	1		6010C	TCLP

Client Sample ID: H05-DITCH-04 — Lab Sample ID: 480-200133-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Trichloroethene	10	vs	7.4		ug/Kg	1	☼	8260C	Total/NA
Barium	2.5	^+	1.0		mg/L	1		6010C	TCLP
Cadmium	12.3		0.010		mg/L	5		6010C	TCLP
Lead	0.37		0.020		mg/L	1		6010C	TCLP

This Detection Summary does not include radiochemical test results.

Eurofins Buffalo

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200133-1

Client Sample ID: H02-DITCH-02
Date Collected: 07/25/22 13:00
Date Received: 07/27/22 10:00

Lab Sample ID: 480-200133-1
Matrix: Solid
Percent Solids: 78.2

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND	vs	6.3		ug/Kg	☼	08/01/22 17:20	08/01/22 23:26	1
1,1,2,2-Tetrachloroethane	ND	vs	6.3		ug/Kg	☼	08/01/22 17:20	08/01/22 23:26	1
1,1,2-Trichloro-1,2,2-trifluoroethane	**13**	**vs**	6.3		ug/Kg	☼	08/01/22 17:20	08/01/22 23:26	1
1,1,2-Trichloroethane	ND	vs	6.3		ug/Kg	☼	08/01/22 17:20	08/01/22 23:26	1
1,1-Dichloroethane	ND	vs	6.3		ug/Kg	☼	08/01/22 17:20	08/01/22 23:26	1
1,1-Dichloroethene	ND	vs	6.3		ug/Kg	☼	08/01/22 17:20	08/01/22 23:26	1
1,2,4-Trichlorobenzene	ND	vs	6.3		ug/Kg	☼	08/01/22 17:20	08/01/22 23:26	1
1,2-Dibromo-3-Chloropropane	ND	vs	6.3		ug/Kg	☼	08/01/22 17:20	08/01/22 23:26	1
1,2-Dibromoethane	ND	vs	6.3		ug/Kg	☼	08/01/22 17:20	08/01/22 23:26	1
1,2-Dichlorobenzene	ND	vs	6.3		ug/Kg	☼	08/01/22 17:20	08/01/22 23:26	1
1,2-Dichloroethane	ND	vs	6.3		ug/Kg	☼	08/01/22 17:20	08/01/22 23:26	1
1,2-Dichloropropane	ND	vs	6.3		ug/Kg	☼	08/01/22 17:20	08/01/22 23:26	1
1,3-Dichlorobenzene	ND	vs	6.3		ug/Kg	☼	08/01/22 17:20	08/01/22 23:26	1
1,4-Dichlorobenzene	ND	vs	6.3		ug/Kg	☼	08/01/22 17:20	08/01/22 23:26	1
2-Butanone (MEK)	ND	vs	32		ug/Kg	☼	08/01/22 17:20	08/01/22 23:26	1
2-Hexanone	ND	vs	32		ug/Kg	☼	08/01/22 17:20	08/01/22 23:26	1
4-Methyl-2-pentanone (MIBK)	ND	vs	32		ug/Kg	☼	08/01/22 17:20	08/01/22 23:26	1
Acetone	ND	vs	32		ug/Kg	☼	08/01/22 17:20	08/01/22 23:26	1
Benzene	ND	vs	6.3		ug/Kg	☼	08/01/22 17:20	08/01/22 23:26	1
Bromodichloromethane	ND	vs	6.3		ug/Kg	☼	08/01/22 17:20	08/01/22 23:26	1
Bromoform	ND	*+ vs	6.3		ug/Kg	☼	08/01/22 17:20	08/01/22 23:26	1
Bromomethane	ND	vs	6.3		ug/Kg	☼	08/01/22 17:20	08/01/22 23:26	1
Carbon disulfide	ND	vs	6.3		ug/Kg	☼	08/01/22 17:20	08/01/22 23:26	1
Carbon tetrachloride	ND	*+ vs	6.3		ug/Kg	☼	08/01/22 17:20	08/01/22 23:26	1
Chlorobenzene	ND	vs	6.3		ug/Kg	☼	08/01/22 17:20	08/01/22 23:26	1
Chloroethane	ND	vs	6.3		ug/Kg	☼	08/01/22 17:20	08/01/22 23:26	1
Chloroform	ND	vs	6.3		ug/Kg	☼	08/01/22 17:20	08/01/22 23:26	1
Chloromethane	ND	vs	6.3		ug/Kg	☼	08/01/22 17:20	08/01/22 23:26	1
cis-1,2-Dichloroethene	ND	vs	6.3		ug/Kg	☼	08/01/22 17:20	08/01/22 23:26	1
cis-1,3-Dichloropropene	ND	vs	6.3		ug/Kg	☼	08/01/22 17:20	08/01/22 23:26	1
Cyclohexane	ND	vs	6.3		ug/Kg	☼	08/01/22 17:20	08/01/22 23:26	1
Dibromochloromethane	ND	*+ vs	6.3		ug/Kg	☼	08/01/22 17:20	08/01/22 23:26	1
Dichlorodifluoromethane	ND	vs	6.3		ug/Kg	☼	08/01/22 17:20	08/01/22 23:26	1
Ethylbenzene	ND	vs	6.3		ug/Kg	☼	08/01/22 17:20	08/01/22 23:26	1
Isopropylbenzene	ND	vs	6.3		ug/Kg	☼	08/01/22 17:20	08/01/22 23:26	1
Methyl acetate	ND	vs	32		ug/Kg	☼	08/01/22 17:20	08/01/22 23:26	1
Methyl tert-butyl ether	ND	vs	6.3		ug/Kg	☼	08/01/22 17:20	08/01/22 23:26	1
Methylcyclohexane	ND	vs	6.3		ug/Kg	☼	08/01/22 17:20	08/01/22 23:26	1
Methylene Chloride	ND	vs	6.3		ug/Kg	☼	08/01/22 17:20	08/01/22 23:26	1
Styrene	ND	vs	6.3		ug/Kg	☼	08/01/22 17:20	08/01/22 23:26	1
Tetrachloroethene	ND	vs	6.3		ug/Kg	☼	08/01/22 17:20	08/01/22 23:26	1
Toluene	ND	vs	6.3		ug/Kg	☼	08/01/22 17:20	08/01/22 23:26	1
trans-1,2-Dichloroethene	ND	vs	6.3		ug/Kg	☼	08/01/22 17:20	08/01/22 23:26	1
trans-1,3-Dichloropropene	ND	vs	6.3		ug/Kg	☼	08/01/22 17:20	08/01/22 23:26	1
Trichloroethene	**43**	**vs**	6.3		ug/Kg	☼	08/01/22 17:20	08/01/22 23:26	1
Trichlorofluoromethane	ND	vs	6.3		ug/Kg	☼	08/01/22 17:20	08/01/22 23:26	1
Vinyl chloride	ND	vs	6.3		ug/Kg	☼	08/01/22 17:20	08/01/22 23:26	1
Xylenes, Total	ND	vs	13		ug/Kg	☼	08/01/22 17:20	08/01/22 23:26	1

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200133-1

Client Sample ID: H02-DITCH-02
Date Collected: 07/25/22 13:00
Date Received: 07/27/22 10:00

Lab Sample ID: 480-200133-1
Matrix: Solid
Percent Solids: 78.2

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*112*		*64 - 126*	*08/01/22 17:20*	*08/01/22 23:26*	*1*
4-Bromofluorobenzene (Surr)	*98*		*72 - 126*	*08/01/22 17:20*	*08/01/22 23:26*	*1*
Dibromofluoromethane (Surr)	*123*		*60 - 140*	*08/01/22 17:20*	*08/01/22 23:26*	*1*
Toluene-d8 (Surr)	*108*		*71 - 125*	*08/01/22 17:20*	*08/01/22 23:26*	*1*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Biphenyl	ND		1100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
bis (2-chloroisopropyl) ether	ND		1100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
2,4,5-Trichlorophenol	ND		1100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
2,4,6-Trichlorophenol	ND		1100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
2,4-Dichlorophenol	ND		1100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
2,4-Dimethylphenol	ND		1100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
2,4-Dinitrophenol	ND		10000		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
2,4-Dinitrotoluene	ND		1100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
2,6-Dinitrotoluene	ND		1100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
2-Chloronaphthalene	ND		1100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
2-Chlorophenol	ND		2100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
2-Methylphenol	ND		1100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
2-Methylnaphthalene	ND		1100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
2-Nitroaniline	ND		2100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
2-Nitrophenol	ND		1100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
3,3'-Dichlorobenzidine	ND		2100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
3-Nitroaniline	ND		2100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
4,6-Dinitro-2-methylphenol	ND		2100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
4-Bromophenyl phenyl ether	ND		1100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
4-Chloro-3-methylphenol	ND		1100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
4-Chloroaniline	ND		1100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
4-Chlorophenyl phenyl ether	ND		1100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
4-Methylphenol	ND		2100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
4-Nitroaniline	ND		2100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
4-Nitrophenol	ND		2100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
Acenaphthene	ND		1100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
Acenaphthylene	ND		1100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
Acetophenone	ND		1100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
Anthracene	ND		1100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
Atrazine	ND		1100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
Benzaldehyde	ND		1100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
Benzo[a]anthracene	**2700**		1100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
Benzo[a]pyrene	**3100**		1100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
Benzo[b]fluoranthene	**3400**		1100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
Benzo[g,h,i]perylene	**2200**		1100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
Benzo[k]fluoranthene	**1400**		1100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
Bis(2-chloroethoxy)methane	ND		1100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
Bis(2-chloroethyl)ether	ND		1100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
Bis(2-ethylhexyl) phthalate	**1400**		1100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
Butyl benzyl phthalate	ND		1100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
Caprolactam	ND		1100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
Carbazole	ND		1100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
Chrysene	**3000**		1100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5

Client Sample ID: H02-DITCH-02
Date Collected: 07/25/22 13:00
Date Received: 07/27/22 10:00

Lab Sample ID: 480-200133-1
Matrix: Solid
Percent Solids: 78.2

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dibenz(a,h)anthracene	ND		1100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
Di-n-butyl phthalate	ND		1100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
Di-n-octyl phthalate	ND		1100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
Dibenzofuran	ND		1100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
Diethyl phthalate	ND		1100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
Dimethyl phthalate	ND		1100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
Fluoranthene	**4600**		1100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
Fluorene	ND		1100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
Hexachlorobenzene	ND		1100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
Hexachlorobutadiene	ND		1100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
Hexachlorocyclopentadiene	ND		1100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
Hexachloroethane	ND		1100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
Indeno[1,2,3-cd]pyrene	**2100**		1100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
Isophorone	ND		1100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
N-Nitrosodi-n-propylamine	ND		1100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
N-Nitrosodiphenylamine	ND		1100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
Naphthalene	ND		1100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
Nitrobenzene	ND		1100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
Pentachlorophenol	ND		2100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
Phenanthrene	**3500**		1100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
Phenol	ND		1100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5
Pyrene	**4300**		1100		ug/Kg	☼	07/28/22 15:24	07/29/22 17:27	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5 (Surr)	*78*		*53 - 120*	*07/28/22 15:24*	*07/29/22 17:27*	*5*
Phenol-d5 (Surr)	*66*		*54 - 120*	*07/28/22 15:24*	*07/29/22 17:27*	*5*
p-Terphenyl-d14 (Surr)	*87*		*79 - 130*	*07/28/22 15:24*	*07/29/22 17:27*	*5*
2,4,6-Tribromophenol (Surr)	*96*		*54 - 120*	*07/28/22 15:24*	*07/29/22 17:27*	*5*
2-Fluorobiphenyl (Surr)	*94*		*60 - 120*	*07/28/22 15:24*	*07/29/22 17:27*	*5*
2-Fluorophenol (Surr)	*70*		*52 - 120*	*07/28/22 15:24*	*07/29/22 17:27*	*5*

Method: 6010C - Metals (ICP) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.015		mg/L		08/02/22 11:13	08/03/22 14:38	1
Barium	**3.3**	**^+ F1**	1.0		mg/L		08/02/22 11:13	08/03/22 14:38	1
Cadmium	**2.5**	**F1**	0.0020		mg/L		08/02/22 11:13	08/10/22 14:34	1
Chromium	ND		0.020		mg/L		08/02/22 11:13	08/03/22 14:38	1
Lead	**0.075**		0.020		mg/L		08/02/22 11:13	08/03/22 14:38	1
Selenium	ND		0.025		mg/L		08/02/22 11:13	08/03/22 14:38	1
Silver	ND		0.0060		mg/L		08/02/22 11:13	08/03/22 14:38	1

Method: 7470A - Mercury (CVAA) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00020		mg/L		08/02/22 11:44	08/02/22 15:15	1

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200133-1

Client Sample ID: H04-DITCH-05
Date Collected: 07/26/22 12:00
Date Received: 07/27/22 10:00

Lab Sample ID: 480-200133-2
Matrix: Solid
Percent Solids: 85.1

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND	vs	5.8		ug/Kg	☼	07/28/22 13:43	07/29/22 21:50	1
1,1,2,2-Tetrachloroethane	ND	vs	5.8		ug/Kg	☼	07/28/22 13:43	07/29/22 21:50	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	vs	5.8		ug/Kg	☼	07/28/22 13:43	07/29/22 21:50	1
1,1,2-Trichloroethane	ND	vs	5.8		ug/Kg	☼	07/28/22 13:43	07/29/22 21:50	1
1,1-Dichloroethane	ND	vs	5.8		ug/Kg	☼	07/28/22 13:43	07/29/22 21:50	1
1,1-Dichloroethene	ND	vs	5.8		ug/Kg	☼	07/28/22 13:43	07/29/22 21:50	1
1,2,4-Trichlorobenzene	ND	vs	5.8		ug/Kg	☼	07/28/22 13:43	07/29/22 21:50	1
1,2-Dibromo-3-Chloropropane	ND	vs	5.8		ug/Kg	☼	07/28/22 13:43	07/29/22 21:50	1
1,2-Dibromoethane	ND	vs	5.8		ug/Kg	☼	07/28/22 13:43	07/29/22 21:50	1
1,2-Dichlorobenzene	ND	vs	5.8		ug/Kg	☼	07/28/22 13:43	07/29/22 21:50	1
1,2-Dichloroethane	ND	vs	5.8		ug/Kg	☼	07/28/22 13:43	07/29/22 21:50	1
1,2-Dichloropropane	ND	vs	5.8		ug/Kg	☼	07/28/22 13:43	07/29/22 21:50	1
1,3-Dichlorobenzene	ND	vs	5.8		ug/Kg	☼	07/28/22 13:43	07/29/22 21:50	1
1,4-Dichlorobenzene	ND	vs	5.8		ug/Kg	☼	07/28/22 13:43	07/29/22 21:50	1
2-Butanone (MEK)	ND	vs	29		ug/Kg	☼	07/28/22 13:43	07/29/22 21:50	1
2-Hexanone	ND	vs	29		ug/Kg	☼	07/28/22 13:43	07/29/22 21:50	1
4-Methyl-2-pentanone (MIBK)	ND	vs	29		ug/Kg	☼	07/28/22 13:43	07/29/22 21:50	1
Acetone	ND	vs	29		ug/Kg	☼	07/28/22 13:43	07/29/22 21:50	1
Benzene	ND	vs	5.8		ug/Kg	☼	07/28/22 13:43	07/29/22 21:50	1
Bromodichloromethane	ND	vs	5.8		ug/Kg	☼	07/28/22 13:43	07/29/22 21:50	1
Bromoform	ND	*+ vs	5.8		ug/Kg	☼	07/28/22 13:43	07/29/22 21:50	1
Bromomethane	ND	vs	5.8		ug/Kg	☼	07/28/22 13:43	07/29/22 21:50	1
Carbon disulfide	ND	vs	5.8		ug/Kg	☼	07/28/22 13:43	07/29/22 21:50	1
Carbon tetrachloride	ND	vs	5.8		ug/Kg	☼	07/28/22 13:43	07/29/22 21:50	1
Chlorobenzene	ND	vs	5.8		ug/Kg	☼	07/28/22 13:43	07/29/22 21:50	1
Chloroethane	ND	vs	5.8		ug/Kg	☼	07/28/22 13:43	07/29/22 21:50	1
Chloroform	ND	vs	5.8		ug/Kg	☼	07/28/22 13:43	07/29/22 21:50	1
Chloromethane	ND	vs	5.8		ug/Kg	☼	07/28/22 13:43	07/29/22 21:50	1
cis-1,2-Dichloroethene	ND	vs	5.8		ug/Kg	☼	07/28/22 13:43	07/29/22 21:50	1
cis-1,3-Dichloropropene	ND	vs	5.8		ug/Kg	☼	07/28/22 13:43	07/29/22 21:50	1
Cyclohexane	ND	vs	5.8		ug/Kg	☼	07/28/22 13:43	07/29/22 21:50	1
Dibromochloromethane	ND	*+ vs	5.8		ug/Kg	☼	07/28/22 13:43	07/29/22 21:50	1
Dichlorodifluoromethane	ND	vs	5.8		ug/Kg	☼	07/28/22 13:43	07/29/22 21:50	1
Ethylbenzene	ND	vs	5.8		ug/Kg	☼	07/28/22 13:43	07/29/22 21:50	1
Isopropylbenzene	ND	vs	5.8		ug/Kg	☼	07/28/22 13:43	07/29/22 21:50	1
Methyl acetate	ND	vs	29		ug/Kg	☼	07/28/22 13:43	07/29/22 21:50	1
Methyl tert-butyl ether	ND	vs	5.8		ug/Kg	☼	07/28/22 13:43	07/29/22 21:50	1
Methylcyclohexane	ND	vs	5.8		ug/Kg	☼	07/28/22 13:43	07/29/22 21:50	1
Methylene Chloride	ND	vs	5.8		ug/Kg	☼	07/28/22 13:43	07/29/22 21:50	1
Styrene	ND	vs	5.8		ug/Kg	☼	07/28/22 13:43	07/29/22 21:50	1
Tetrachloroethene	ND	vs	5.8		ug/Kg	☼	07/28/22 13:43	07/29/22 21:50	1
Toluene	ND	vs	5.8		ug/Kg	☼	07/28/22 13:43	07/29/22 21:50	1
trans-1,2-Dichloroethene	ND	vs	5.8		ug/Kg	☼	07/28/22 13:43	07/29/22 21:50	1
trans-1,3-Dichloropropene	ND	vs	5.8		ug/Kg	☼	07/28/22 13:43	07/29/22 21:50	1
Trichloroethene	ND	vs	5.8		ug/Kg	☼	07/28/22 13:43	07/29/22 21:50	1
Trichlorofluoromethane	ND	vs	5.8		ug/Kg	☼	07/28/22 13:43	07/29/22 21:50	1
Vinyl chloride	ND	vs	5.8		ug/Kg	☼	07/28/22 13:43	07/29/22 21:50	1
Xylenes, Total	ND	vs	12		ug/Kg	☼	07/28/22 13:43	07/29/22 21:50	1

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200133-1

Client Sample ID: H04-DITCH-05
Date Collected: 07/26/22 12:00
Date Received: 07/27/22 10:00

Lab Sample ID: 480-200133-2
Matrix: Solid
Percent Solids: 85.1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	111		64 - 126	07/28/22 13:43	07/29/22 21:50	1
4-Bromofluorobenzene (Surr)	107		72 - 126	07/28/22 13:43	07/29/22 21:50	1
Dibromofluoromethane (Surr)	119		60 - 140	07/28/22 13:43	07/29/22 21:50	1
Toluene-d8 (Surr)	100		71 - 125	07/28/22 13:43	07/29/22 21:50	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Biphenyl	ND		200		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
bis (2-chloroisopropyl) ether	ND		200		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
2,4,5-Trichlorophenol	ND		200		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
2,4,6-Trichlorophenol	ND		200		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
2,4-Dichlorophenol	ND		200		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
2,4-Dimethylphenol	ND		200		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
2,4-Dinitrophenol	ND		1900		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
2,4-Dinitrotoluene	ND		200		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
2,6-Dinitrotoluene	ND		200		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
2-Chloronaphthalene	ND		200		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
2-Chlorophenol	ND		380		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
2-Methylphenol	ND		200		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
2-Methylnaphthalene	ND		200		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
2-Nitroaniline	ND		380		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
2-Nitrophenol	ND		200		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
3,3'-Dichlorobenzidine	ND		380		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
3-Nitroaniline	ND		380		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
4,6-Dinitro-2-methylphenol	ND		380		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
4-Bromophenyl phenyl ether	ND		200		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
4-Chloro-3-methylphenol	ND		200		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
4-Chloroaniline	ND		200		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
4-Chlorophenyl phenyl ether	ND		200		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
4-Methylphenol	ND		380		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
4-Nitroaniline	ND		380		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
4-Nitrophenol	ND		380		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
Acenaphthene	ND		200		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
Acenaphthylene	ND		200		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
Acetophenone	ND		200		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
Anthracene	ND		200		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
Atrazine	ND		200		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
Benzaldehyde	ND		200		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
Benzo[a]anthracene	ND		200		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
Benzo[a]pyrene	ND		200		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
Benzo[b]fluoranthene	ND		200		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
Benzo[g,h,i]perylene	ND		200		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
Benzo[k]fluoranthene	ND		200		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
Bis(2-chloroethoxy)methane	ND		200		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
Bis(2-chloroethyl)ether	ND		200		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
Bis(2-ethylhexyl) phthalate	ND		200		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
Butyl benzyl phthalate	ND		200		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
Caprolactam	ND		200		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
Carbazole	ND		200		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
Chrysene	ND		200		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1

Client Sample ID: H04-DITCH-05
Date Collected: 07/26/22 12:00
Date Received: 07/27/22 10:00

Lab Sample ID: 480-200133-2
Matrix: Solid
Percent Solids: 85.1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dibenz(a,h)anthracene	ND		200		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
Di-n-butyl phthalate	ND		200		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
Di-n-octyl phthalate	ND		200		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
Dibenzofuran	ND		200		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
Diethyl phthalate	ND		200		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
Dimethyl phthalate	ND		200		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
Fluoranthene	ND		200		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
Fluorene	ND		200		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
Hexachlorobenzene	ND		200		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
Hexachlorobutadiene	ND		200		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
Hexachlorocyclopentadiene	ND		200		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
Hexachloroethane	ND		200		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
Indeno[1,2,3-cd]pyrene	ND		200		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
Isophorone	ND		200		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
N-Nitrosodi-n-propylamine	ND		200		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
N-Nitrosodiphenylamine	ND		200		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
Naphthalene	ND		200		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
Nitrobenzene	ND		200		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
Pentachlorophenol	ND		380		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
Phenanthrene	ND		200		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
Phenol	ND		200		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1
Pyrene	ND		200		ug/Kg	☼	07/28/22 15:24	07/29/22 17:51	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5 (Surr)	*79*		*53 - 120*	*07/28/22 15:24*	*07/29/22 17:51*	*1*
Phenol-d5 (Surr)	*70*		*54 - 120*	*07/28/22 15:24*	*07/29/22 17:51*	*1*
p-Terphenyl-d14 (Surr)	*102*		*79 - 130*	*07/28/22 15:24*	*07/29/22 17:51*	*1*
2,4,6-Tribromophenol (Surr)	*99*		*54 - 120*	*07/28/22 15:24*	*07/29/22 17:51*	*1*
2-Fluorobiphenyl (Surr)	*94*		*60 - 120*	*07/28/22 15:24*	*07/29/22 17:51*	*1*
2-Fluorophenol (Surr)	*75*		*52 - 120*	*07/28/22 15:24*	*07/29/22 17:51*	*1*

Method: 6010C - Metals (ICP) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.015		mg/L		08/02/22 11:13	08/03/22 14:59	1
Barium	**6.6**	**^+**	1.0		mg/L		08/02/22 11:13	08/03/22 14:59	1
Cadmium	**13.0**		0.010		mg/L		08/02/22 11:13	08/04/22 16:02	5
Chromium	ND		0.020		mg/L		08/02/22 11:13	08/03/22 14:59	1
Lead	ND		0.020		mg/L		08/02/22 11:13	08/03/22 14:59	1
Selenium	ND		0.025		mg/L		08/02/22 11:13	08/03/22 14:59	1
Silver	ND		0.0060		mg/L		08/02/22 11:13	08/03/22 14:59	1

Method: 7470A - Mercury (CVAA) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00020		mg/L		08/02/22 11:44	08/02/22 15:21	1

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200133-1

Client Sample ID: H04-DITCH-06
Date Collected: 07/26/22 09:30
Date Received: 07/27/22 10:00

Lab Sample ID: 480-200133-3
Matrix: Solid
Percent Solids: 73.8

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND	vs	6.7		ug/Kg	☼	08/01/22 17:20	08/01/22 23:50	1
1,1,2,2-Tetrachloroethane	ND	vs	6.7		ug/Kg	☼	08/01/22 17:20	08/01/22 23:50	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	vs	6.7		ug/Kg	☼	08/01/22 17:20	08/01/22 23:50	1
1,1,2-Trichloroethane	ND	vs	6.7		ug/Kg	☼	08/01/22 17:20	08/01/22 23:50	1
1,1-Dichloroethane	ND	vs	6.7		ug/Kg	☼	08/01/22 17:20	08/01/22 23:50	1
1,1-Dichloroethene	ND	vs	6.7		ug/Kg	☼	08/01/22 17:20	08/01/22 23:50	1
1,2,4-Trichlorobenzene	ND	vs	6.7		ug/Kg	☼	08/01/22 17:20	08/01/22 23:50	1
1,2-Dibromo-3-Chloropropane	ND	vs	6.7		ug/Kg	☼	08/01/22 17:20	08/01/22 23:50	1
1,2-Dibromoethane	ND	vs	6.7		ug/Kg	☼	08/01/22 17:20	08/01/22 23:50	1
1,2-Dichlorobenzene	ND	vs	6.7		ug/Kg	☼	08/01/22 17:20	08/01/22 23:50	1
1,2-Dichloroethane	ND	vs	6.7		ug/Kg	☼	08/01/22 17:20	08/01/22 23:50	1
1,2-Dichloropropane	ND	vs	6.7		ug/Kg	☼	08/01/22 17:20	08/01/22 23:50	1
1,3-Dichlorobenzene	ND	vs	6.7		ug/Kg	☼	08/01/22 17:20	08/01/22 23:50	1
1,4-Dichlorobenzene	ND	vs	6.7		ug/Kg	☼	08/01/22 17:20	08/01/22 23:50	1
2-Butanone (MEK)	ND	vs	33		ug/Kg	☼	08/01/22 17:20	08/01/22 23:50	1
2-Hexanone	ND	vs	33		ug/Kg	☼	08/01/22 17:20	08/01/22 23:50	1
4-Methyl-2-pentanone (MIBK)	ND	vs	33		ug/Kg	☼	08/01/22 17:20	08/01/22 23:50	1
Acetone	ND	vs	33		ug/Kg	☼	08/01/22 17:20	08/01/22 23:50	1
Benzene	ND	vs	6.7		ug/Kg	☼	08/01/22 17:20	08/01/22 23:50	1
Bromodichloromethane	ND	vs	6.7		ug/Kg	☼	08/01/22 17:20	08/01/22 23:50	1
Bromoform	ND	*+ vs	6.7		ug/Kg	☼	08/01/22 17:20	08/01/22 23:50	1
Bromomethane	ND	vs	6.7		ug/Kg	☼	08/01/22 17:20	08/01/22 23:50	1
Carbon disulfide	ND	vs	6.7		ug/Kg	☼	08/01/22 17:20	08/01/22 23:50	1
Carbon tetrachloride	ND	*+ vs	6.7		ug/Kg	☼	08/01/22 17:20	08/01/22 23:50	1
Chlorobenzene	ND	vs	6.7		ug/Kg	☼	08/01/22 17:20	08/01/22 23:50	1
Chloroethane	ND	vs	6.7		ug/Kg	☼	08/01/22 17:20	08/01/22 23:50	1
Chloroform	ND	vs	6.7		ug/Kg	☼	08/01/22 17:20	08/01/22 23:50	1
Chloromethane	ND	vs	6.7		ug/Kg	☼	08/01/22 17:20	08/01/22 23:50	1
cis-1,2-Dichloroethene	ND	vs	6.7		ug/Kg	☼	08/01/22 17:20	08/01/22 23:50	1
cis-1,3-Dichloropropene	ND	vs	6.7		ug/Kg	☼	08/01/22 17:20	08/01/22 23:50	1
Cyclohexane	ND	vs	6.7		ug/Kg	☼	08/01/22 17:20	08/01/22 23:50	1
Dibromochloromethane	ND	*+ vs	6.7		ug/Kg	☼	08/01/22 17:20	08/01/22 23:50	1
Dichlorodifluoromethane	ND	vs	6.7		ug/Kg	☼	08/01/22 17:20	08/01/22 23:50	1
Ethylbenzene	ND	vs	6.7		ug/Kg	☼	08/01/22 17:20	08/01/22 23:50	1
Isopropylbenzene	ND	vs	6.7		ug/Kg	☼	08/01/22 17:20	08/01/22 23:50	1
Methyl acetate	ND	vs	33		ug/Kg	☼	08/01/22 17:20	08/01/22 23:50	1
Methyl tert-butyl ether	ND	vs	6.7		ug/Kg	☼	08/01/22 17:20	08/01/22 23:50	1
Methylcyclohexane	ND	vs	6.7		ug/Kg	☼	08/01/22 17:20	08/01/22 23:50	1
Methylene Chloride	ND	vs	6.7		ug/Kg	☼	08/01/22 17:20	08/01/22 23:50	1
Styrene	ND	vs	6.7		ug/Kg	☼	08/01/22 17:20	08/01/22 23:50	1
Tetrachloroethene	ND	vs	6.7		ug/Kg	☼	08/01/22 17:20	08/01/22 23:50	1
Toluene	ND	vs	6.7		ug/Kg	☼	08/01/22 17:20	08/01/22 23:50	1
trans-1,2-Dichloroethene	ND	vs	6.7		ug/Kg	☼	08/01/22 17:20	08/01/22 23:50	1
trans-1,3-Dichloropropene	ND	vs	6.7		ug/Kg	☼	08/01/22 17:20	08/01/22 23:50	1
Trichloroethene	**13**	**vs**	6.7		ug/Kg	☼	08/01/22 17:20	08/01/22 23:50	1
Trichlorofluoromethane	ND	vs	6.7		ug/Kg	☼	08/01/22 17:20	08/01/22 23:50	1
Vinyl chloride	ND	vs	6.7		ug/Kg	☼	08/01/22 17:20	08/01/22 23:50	1
Xylenes, Total	ND	vs	13		ug/Kg	☼	08/01/22 17:20	08/01/22 23:50	1

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200133-1

Client Sample ID: H04-DITCH-06
Date Collected: 07/26/22 09:30
Date Received: 07/27/22 10:00

Lab Sample ID: 480-200133-3
Matrix: Solid
Percent Solids: 73.8

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*107*		*64 - 126*	*08/01/22 17:20*	*08/01/22 23:50*	*1*
4-Bromofluorobenzene (Surr)	*92*		*72 - 126*	*08/01/22 17:20*	*08/01/22 23:50*	*1*
Dibromofluoromethane (Surr)	*117*		*60 - 140*	*08/01/22 17:20*	*08/01/22 23:50*	*1*
Toluene-d8 (Surr)	*108*		*71 - 125*	*08/01/22 17:20*	*08/01/22 23:50*	*1*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Biphenyl	ND		230		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
bis (2-chloroisopropyl) ether	ND		230		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
2,4,5-Trichlorophenol	ND		230		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
2,4,6-Trichlorophenol	ND		230		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
2,4-Dichlorophenol	ND		230		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
2,4-Dimethylphenol	ND		230		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
2,4-Dinitrophenol	ND		2200		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
2,4-Dinitrotoluene	ND		230		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
2,6-Dinitrotoluene	ND		230		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
2-Chloronaphthalene	ND		230		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
2-Chlorophenol	ND		440		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
2-Methylphenol	ND		230		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
2-Methylnaphthalene	ND		230		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
2-Nitroaniline	ND		440		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
2-Nitrophenol	ND		230		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
3,3'-Dichlorobenzidine	ND		440		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
3-Nitroaniline	ND		440		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
4,6-Dinitro-2-methylphenol	ND		440		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
4-Bromophenyl phenyl ether	ND		230		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
4-Chloro-3-methylphenol	ND		230		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
4-Chloroaniline	ND		230		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
4-Chlorophenyl phenyl ether	ND		230		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
4-Methylphenol	ND		440		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
4-Nitroaniline	ND		440		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
4-Nitrophenol	ND		440		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
Acenaphthene	ND		230		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
Acenaphthylene	ND		230		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
Acetophenone	ND		230		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
Anthracene	ND		230		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
Atrazine	ND		230		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
Benzaldehyde	ND		230		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
Benzo[a]anthracene	ND		230		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
Benzo[a]pyrene	ND		230		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
Benzo[b]fluoranthene	ND		230		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
Benzo[g,h,i]perylene	ND		230		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
Benzo[k]fluoranthene	ND		230		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
Bis(2-chloroethoxy)methane	ND		230		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
Bis(2-chloroethyl)ether	ND		230		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
Bis(2-ethylhexyl) phthalate	ND		230		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
Butyl benzyl phthalate	ND		230		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
Caprolactam	ND		230		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
Carbazole	ND		230		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
Chrysene	ND		230		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200133-1

Client Sample ID: H04-DITCH-06
Date Collected: 07/26/22 09:30
Date Received: 07/27/22 10:00

Lab Sample ID: 480-200133-3
Matrix: Solid
Percent Solids: 73.8

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dibenz(a,h)anthracene	ND		230		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
Di-n-butyl phthalate	ND		230		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
Di-n-octyl phthalate	ND		230		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
Dibenzofuran	ND		230		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
Diethyl phthalate	ND		230		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
Dimethyl phthalate	ND		230		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
Fluoranthene	**290**		230		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
Fluorene	ND		230		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
Hexachlorobenzene	ND		230		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
Hexachlorobutadiene	ND		230		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
Hexachlorocyclopentadiene	ND		230		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
Hexachloroethane	ND		230		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
Indeno[1,2,3-cd]pyrene	ND		230		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
Isophorone	ND		230		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
N-Nitrosodi-n-propylamine	ND		230		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
N-Nitrosodiphenylamine	ND		230		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
Naphthalene	ND		230		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
Nitrobenzene	ND		230		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
Pentachlorophenol	ND		440		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
Phenanthrene	**240**		230		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
Phenol	ND		230		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1
Pyrene	**310**		230		ug/Kg	☼	07/28/22 15:24	07/29/22 17:02	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5 (Surr)	*80*		*53 - 120*	*07/28/22 15:24*	*07/29/22 17:02*	*1*
Phenol-d5 (Surr)	*74*		*54 - 120*	*07/28/22 15:24*	*07/29/22 17:02*	*1*
p-Terphenyl-d14 (Surr)	*107*		*79 - 130*	*07/28/22 15:24*	*07/29/22 17:02*	*1*
2,4,6-Tribromophenol (Surr)	*98*		*54 - 120*	*07/28/22 15:24*	*07/29/22 17:02*	*1*
2-Fluorobiphenyl (Surr)	*94*		*60 - 120*	*07/28/22 15:24*	*07/29/22 17:02*	*1*
2-Fluorophenol (Surr)	*74*		*52 - 120*	*07/28/22 15:24*	*07/29/22 17:02*	*1*

Method: 6010C - Metals (ICP) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.015		mg/L		08/02/22 11:13	08/03/22 15:03	1
Barium	**3.6**	**^+**	1.0		mg/L		08/02/22 11:13	08/03/22 15:03	1
Cadmium	**11.2**		0.010		mg/L		08/02/22 11:13	08/04/22 16:06	5
Chromium	ND		0.020		mg/L		08/02/22 11:13	08/03/22 15:03	1
Lead	**0.33**		0.020		mg/L		08/02/22 11:13	08/03/22 15:03	1
Selenium	ND		0.025		mg/L		08/02/22 11:13	08/03/22 15:03	1
Silver	ND		0.0060		mg/L		08/02/22 11:13	08/03/22 15:03	1

Method: 7470A - Mercury (CVAA) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00020		mg/L		08/02/22 11:44	08/02/22 15:22	1

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200133-1

Client Sample ID: H05-DITCH-01
Date Collected: 07/26/22 11:30
Date Received: 07/27/22 10:00

Lab Sample ID: 480-200133-4
Matrix: Solid
Percent Solids: 80.6

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND	vs	6.2		ug/Kg	☼	07/28/22 13:43	07/29/22 22:38	1
1,1,2,2-Tetrachloroethane	ND	vs	6.2		ug/Kg	☼	07/28/22 13:43	07/29/22 22:38	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	vs	6.2		ug/Kg	☼	07/28/22 13:43	07/29/22 22:38	1
1,1,2-Trichloroethane	ND	vs	6.2		ug/Kg	☼	07/28/22 13:43	07/29/22 22:38	1
1,1-Dichloroethane	ND	vs	6.2		ug/Kg	☼	07/28/22 13:43	07/29/22 22:38	1
1,1-Dichloroethene	ND	vs	6.2		ug/Kg	☼	07/28/22 13:43	07/29/22 22:38	1
1,2,4-Trichlorobenzene	ND	vs	6.2		ug/Kg	☼	07/28/22 13:43	07/29/22 22:38	1
1,2-Dibromo-3-Chloropropane	ND	vs	6.2		ug/Kg	☼	07/28/22 13:43	07/29/22 22:38	1
1,2-Dibromoethane	ND	vs	6.2		ug/Kg	☼	07/28/22 13:43	07/29/22 22:38	1
1,2-Dichlorobenzene	ND	vs	6.2		ug/Kg	☼	07/28/22 13:43	07/29/22 22:38	1
1,2-Dichloroethane	ND	vs	6.2		ug/Kg	☼	07/28/22 13:43	07/29/22 22:38	1
1,2-Dichloropropane	ND	vs	6.2		ug/Kg	☼	07/28/22 13:43	07/29/22 22:38	1
1,3-Dichlorobenzene	ND	vs	6.2		ug/Kg	☼	07/28/22 13:43	07/29/22 22:38	1
1,4-Dichlorobenzene	ND	vs	6.2		ug/Kg	☼	07/28/22 13:43	07/29/22 22:38	1
2-Butanone (MEK)	ND	vs	31		ug/Kg	☼	07/28/22 13:43	07/29/22 22:38	1
2-Hexanone	ND	vs	31		ug/Kg	☼	07/28/22 13:43	07/29/22 22:38	1
4-Methyl-2-pentanone (MIBK)	ND	vs	31		ug/Kg	☼	07/28/22 13:43	07/29/22 22:38	1
Acetone	**52**	**vs**	31		ug/Kg	☼	07/28/22 13:43	07/29/22 22:38	1
Benzene	ND	vs	6.2		ug/Kg	☼	07/28/22 13:43	07/29/22 22:38	1
Bromodichloromethane	ND	vs	6.2		ug/Kg	☼	07/28/22 13:43	07/29/22 22:38	1
Bromoform	ND	*+ vs	6.2		ug/Kg	☼	07/28/22 13:43	07/29/22 22:38	1
Bromomethane	ND	vs	6.2		ug/Kg	☼	07/28/22 13:43	07/29/22 22:38	1
Carbon disulfide	ND	vs	6.2		ug/Kg	☼	07/28/22 13:43	07/29/22 22:38	1
Carbon tetrachloride	ND	vs	6.2		ug/Kg	☼	07/28/22 13:43	07/29/22 22:38	1
Chlorobenzene	ND	vs	6.2		ug/Kg	☼	07/28/22 13:43	07/29/22 22:38	1
Chloroethane	ND	vs	6.2		ug/Kg	☼	07/28/22 13:43	07/29/22 22:38	1
Chloroform	ND	vs	6.2		ug/Kg	☼	07/28/22 13:43	07/29/22 22:38	1
Chloromethane	ND	vs	6.2		ug/Kg	☼	07/28/22 13:43	07/29/22 22:38	1
cis-1,2-Dichloroethene	ND	vs	6.2		ug/Kg	☼	07/28/22 13:43	07/29/22 22:38	1
cis-1,3-Dichloropropene	ND	vs	6.2		ug/Kg	☼	07/28/22 13:43	07/29/22 22:38	1
Cyclohexane	ND	vs	6.2		ug/Kg	☼	07/28/22 13:43	07/29/22 22:38	1
Dibromochloromethane	ND	*+ vs	6.2		ug/Kg	☼	07/28/22 13:43	07/29/22 22:38	1
Dichlorodifluoromethane	ND	vs	6.2		ug/Kg	☼	07/28/22 13:43	07/29/22 22:38	1
Ethylbenzene	ND	vs	6.2		ug/Kg	☼	07/28/22 13:43	07/29/22 22:38	1
Isopropylbenzene	ND	vs	6.2		ug/Kg	☼	07/28/22 13:43	07/29/22 22:38	1
Methyl acetate	ND	vs	31		ug/Kg	☼	07/28/22 13:43	07/29/22 22:38	1
Methyl tert-butyl ether	ND	vs	6.2		ug/Kg	☼	07/28/22 13:43	07/29/22 22:38	1
Methylcyclohexane	ND	vs	6.2		ug/Kg	☼	07/28/22 13:43	07/29/22 22:38	1
Methylene Chloride	ND	vs	6.2		ug/Kg	☼	07/28/22 13:43	07/29/22 22:38	1
Styrene	ND	vs	6.2		ug/Kg	☼	07/28/22 13:43	07/29/22 22:38	1
Tetrachloroethene	ND	vs	6.2		ug/Kg	☼	07/28/22 13:43	07/29/22 22:38	1
Toluene	ND	vs	6.2		ug/Kg	☼	07/28/22 13:43	07/29/22 22:38	1
trans-1,2-Dichloroethene	ND	vs	6.2		ug/Kg	☼	07/28/22 13:43	07/29/22 22:38	1
trans-1,3-Dichloropropene	ND	vs	6.2		ug/Kg	☼	07/28/22 13:43	07/29/22 22:38	1
Trichloroethene	ND	vs	6.2		ug/Kg	☼	07/28/22 13:43	07/29/22 22:38	1
Trichlorofluoromethane	ND	vs	6.2		ug/Kg	☼	07/28/22 13:43	07/29/22 22:38	1
Vinyl chloride	ND	vs	6.2		ug/Kg	☼	07/28/22 13:43	07/29/22 22:38	1
Xylenes, Total	ND	vs	12		ug/Kg	☼	07/28/22 13:43	07/29/22 22:38	1

Client Sample ID: H05-DITCH-01
Date Collected: 07/26/22 11:30
Date Received: 07/27/22 10:00

Lab Sample ID: 480-200133-4
Matrix: Solid
Percent Solids: 80.6

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*115*		*64 - 126*	*07/28/22 13:43*	*07/29/22 22:38*	*1*
4-Bromofluorobenzene (Surr)	*99*		*72 - 126*	*07/28/22 13:43*	*07/29/22 22:38*	*1*
Dibromofluoromethane (Surr)	*119*		*60 - 140*	*07/28/22 13:43*	*07/29/22 22:38*	*1*
Toluene-d8 (Surr)	*103*		*71 - 125*	*07/28/22 13:43*	*07/29/22 22:38*	*1*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Biphenyl	ND		210		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
bis (2-chloroisopropyl) ether	ND		210		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
2,4,5-Trichlorophenol	ND		210		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
2,4,6-Trichlorophenol	ND		210		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
2,4-Dichlorophenol	ND		210		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
2,4-Dimethylphenol	ND		210		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
2,4-Dinitrophenol	ND		2000		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
2,4-Dinitrotoluene	ND		210		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
2,6-Dinitrotoluene	ND		210		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
2-Chloronaphthalene	ND		210		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
2-Chlorophenol	ND		400		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
2-Methylphenol	ND		210		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
2-Methylnaphthalene	ND		210		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
2-Nitroaniline	ND		400		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
2-Nitrophenol	ND		210		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
3,3'-Dichlorobenzidine	ND		400		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
3-Nitroaniline	ND		400		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
4,6-Dinitro-2-methylphenol	ND		400		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
4-Bromophenyl phenyl ether	ND		210		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
4-Chloro-3-methylphenol	ND		210		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
4-Chloroaniline	ND		210		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
4-Chlorophenyl phenyl ether	ND		210		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
4-Methylphenol	ND		400		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
4-Nitroaniline	ND		400		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
4-Nitrophenol	ND		400		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
Acenaphthene	ND		210		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
Acenaphthylene	ND		210		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
Acetophenone	ND		210		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
Anthracene	ND		210		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
Atrazine	ND		210		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
Benzaldehyde	ND		210		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
Benzo[a]anthracene	**220**		210		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
Benzo[a]pyrene	ND		210		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
Benzo[b]fluoranthene	**250**		210		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
Benzo[g,h,i]perylene	ND		210		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
Benzo[k]fluoranthene	ND		210		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
Bis(2-chloroethoxy)methane	ND		210		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
Bis(2-chloroethyl)ether	ND		210		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
Bis(2-ethylhexyl) phthalate	ND		210		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
Butyl benzyl phthalate	ND		210		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
Caprolactam	ND		210		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
Carbazole	ND		210		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
Chrysene	**220**		210		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1

Client Sample ID: H05-DITCH-01
Date Collected: 07/26/22 11:30
Date Received: 07/27/22 10:00

Lab Sample ID: 480-200133-4
Matrix: Solid
Percent Solids: 80.6

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dibenz(a,h)anthracene	ND		210		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
Di-n-butyl phthalate	ND		210		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
Di-n-octyl phthalate	ND		210		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
Dibenzofuran	ND		210		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
Diethyl phthalate	ND		210		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
Dimethyl phthalate	ND		210		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
Fluoranthene	**390**		210		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
Fluorene	ND		210		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
Hexachlorobenzene	ND		210		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
Hexachlorobutadiene	ND		210		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
Hexachlorocyclopentadiene	ND		210		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
Hexachloroethane	ND		210		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
Indeno[1,2,3-cd]pyrene	ND		210		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
Isophorone	ND		210		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
N-Nitrosodi-n-propylamine	ND		210		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
N-Nitrosodiphenylamine	ND		210		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
Naphthalene	ND		210		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
Nitrobenzene	ND		210		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
Pentachlorophenol	ND		400		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
Phenanthrene	**280**		210		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
Phenol	ND		210		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1
Pyrene	**450**		210		ug/Kg	☼	07/28/22 15:24	07/29/22 18:16	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5 (Surr)	*78*		*53 - 120*	*07/28/22 15:24*	*07/29/22 18:16*	*1*
Phenol-d5 (Surr)	*69*		*54 - 120*	*07/28/22 15:24*	*07/29/22 18:16*	*1*
p-Terphenyl-d14 (Surr)	*91*		*79 - 130*	*07/28/22 15:24*	*07/29/22 18:16*	*1*
2,4,6-Tribromophenol (Surr)	*98*		*54 - 120*	*07/28/22 15:24*	*07/29/22 18:16*	*1*
2-Fluorobiphenyl (Surr)	*94*		*60 - 120*	*07/28/22 15:24*	*07/29/22 18:16*	*1*
2-Fluorophenol (Surr)	*70*		*52 - 120*	*07/28/22 15:24*	*07/29/22 18:16*	*1*

Method: 6010C - Metals (ICP) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.015		mg/L		08/02/22 11:13	08/03/22 15:18	1
Barium	ND	^+	1.0		mg/L		08/02/22 11:13	08/03/22 15:18	1
Cadmium	**0.60**	**^2 ^+**	0.0020		mg/L		08/02/22 11:13	08/03/22 15:18	1
Chromium	ND		0.020		mg/L		08/02/22 11:13	08/03/22 15:18	1
Lead	ND		0.020		mg/L		08/02/22 11:13	08/03/22 15:18	1
Selenium	ND		0.025		mg/L		08/02/22 11:13	08/03/22 15:18	1
Silver	ND		0.0060		mg/L		08/02/22 11:13	08/03/22 15:18	1

Method: 7470A - Mercury (CVAA) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00020		mg/L		08/02/22 11:44	08/02/22 15:23	1

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200133-1

Client Sample ID: H05-DITCH-04
Date Collected: 07/26/22 10:00
Date Received: 07/27/22 10:00

Lab Sample ID: 480-200133-5
Matrix: Solid
Percent Solids: 67.1

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND	vs	7.4		ug/Kg	☼	08/01/22 17:20	08/02/22 00:14	1
1,1,2,2-Tetrachloroethane	ND	vs	7.4		ug/Kg	☼	08/01/22 17:20	08/02/22 00:14	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	vs	7.4		ug/Kg	☼	08/01/22 17:20	08/02/22 00:14	1
1,1,2-Trichloroethane	ND	vs	7.4		ug/Kg	☼	08/01/22 17:20	08/02/22 00:14	1
1,1-Dichloroethane	ND	vs	7.4		ug/Kg	☼	08/01/22 17:20	08/02/22 00:14	1
1,1-Dichloroethene	ND	vs	7.4		ug/Kg	☼	08/01/22 17:20	08/02/22 00:14	1
1,2,4-Trichlorobenzene	ND	vs	7.4		ug/Kg	☼	08/01/22 17:20	08/02/22 00:14	1
1,2-Dibromo-3-Chloropropane	ND	vs	7.4		ug/Kg	☼	08/01/22 17:20	08/02/22 00:14	1
1,2-Dibromoethane	ND	vs	7.4		ug/Kg	☼	08/01/22 17:20	08/02/22 00:14	1
1,2-Dichlorobenzene	ND	vs	7.4		ug/Kg	☼	08/01/22 17:20	08/02/22 00:14	1
1,2-Dichloroethane	ND	vs	7.4		ug/Kg	☼	08/01/22 17:20	08/02/22 00:14	1
1,2-Dichloropropane	ND	vs	7.4		ug/Kg	☼	08/01/22 17:20	08/02/22 00:14	1
1,3-Dichlorobenzene	ND	vs	7.4		ug/Kg	☼	08/01/22 17:20	08/02/22 00:14	1
1,4-Dichlorobenzene	ND	vs	7.4		ug/Kg	☼	08/01/22 17:20	08/02/22 00:14	1
2-Butanone (MEK)	ND	vs	37		ug/Kg	☼	08/01/22 17:20	08/02/22 00:14	1
2-Hexanone	ND	vs	37		ug/Kg	☼	08/01/22 17:20	08/02/22 00:14	1
4-Methyl-2-pentanone (MIBK)	ND	vs	37		ug/Kg	☼	08/01/22 17:20	08/02/22 00:14	1
Acetone	ND	vs	37		ug/Kg	☼	08/01/22 17:20	08/02/22 00:14	1
Benzene	ND	vs	7.4		ug/Kg	☼	08/01/22 17:20	08/02/22 00:14	1
Bromodichloromethane	ND	vs	7.4		ug/Kg	☼	08/01/22 17:20	08/02/22 00:14	1
Bromoform	ND	*+ vs	7.4		ug/Kg	☼	08/01/22 17:20	08/02/22 00:14	1
Bromomethane	ND	vs	7.4		ug/Kg	☼	08/01/22 17:20	08/02/22 00:14	1
Carbon disulfide	ND	vs	7.4		ug/Kg	☼	08/01/22 17:20	08/02/22 00:14	1
Carbon tetrachloride	ND	*+ vs	7.4		ug/Kg	☼	08/01/22 17:20	08/02/22 00:14	1
Chlorobenzene	ND	vs	7.4		ug/Kg	☼	08/01/22 17:20	08/02/22 00:14	1
Chloroethane	ND	vs	7.4		ug/Kg	☼	08/01/22 17:20	08/02/22 00:14	1
Chloroform	ND	vs	7.4		ug/Kg	☼	08/01/22 17:20	08/02/22 00:14	1
Chloromethane	ND	vs	7.4		ug/Kg	☼	08/01/22 17:20	08/02/22 00:14	1
cis-1,2-Dichloroethene	ND	vs	7.4		ug/Kg	☼	08/01/22 17:20	08/02/22 00:14	1
cis-1,3-Dichloropropene	ND	vs	7.4		ug/Kg	☼	08/01/22 17:20	08/02/22 00:14	1
Cyclohexane	ND	vs	7.4		ug/Kg	☼	08/01/22 17:20	08/02/22 00:14	1
Dibromochloromethane	ND	*+ vs	7.4		ug/Kg	☼	08/01/22 17:20	08/02/22 00:14	1
Dichlorodifluoromethane	ND	vs	7.4		ug/Kg	☼	08/01/22 17:20	08/02/22 00:14	1
Ethylbenzene	ND	vs	7.4		ug/Kg	☼	08/01/22 17:20	08/02/22 00:14	1
Isopropylbenzene	ND	vs	7.4		ug/Kg	☼	08/01/22 17:20	08/02/22 00:14	1
Methyl acetate	ND	vs	37		ug/Kg	☼	08/01/22 17:20	08/02/22 00:14	1
Methyl tert-butyl ether	ND	vs	7.4		ug/Kg	☼	08/01/22 17:20	08/02/22 00:14	1
Methylcyclohexane	ND	vs	7.4		ug/Kg	☼	08/01/22 17:20	08/02/22 00:14	1
Methylene Chloride	ND	vs	7.4		ug/Kg	☼	08/01/22 17:20	08/02/22 00:14	1
Styrene	ND	vs	7.4		ug/Kg	☼	08/01/22 17:20	08/02/22 00:14	1
Tetrachloroethene	ND	vs	7.4		ug/Kg	☼	08/01/22 17:20	08/02/22 00:14	1
Toluene	ND	vs	7.4		ug/Kg	☼	08/01/22 17:20	08/02/22 00:14	1
trans-1,2-Dichloroethene	ND	vs	7.4		ug/Kg	☼	08/01/22 17:20	08/02/22 00:14	1
trans-1,3-Dichloropropene	ND	vs	7.4		ug/Kg	☼	08/01/22 17:20	08/02/22 00:14	1
Trichloroethene	**10**	**vs**	7.4		ug/Kg	☼	08/01/22 17:20	08/02/22 00:14	1
Trichlorofluoromethane	ND	vs	7.4		ug/Kg	☼	08/01/22 17:20	08/02/22 00:14	1
Vinyl chloride	ND	vs	7.4		ug/Kg	☼	08/01/22 17:20	08/02/22 00:14	1
Xylenes, Total	ND	vs	15		ug/Kg	☼	08/01/22 17:20	08/02/22 00:14	1

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200133-1

Client Sample ID: H05-DITCH-04
Date Collected: 07/26/22 10:00
Date Received: 07/27/22 10:00

Lab Sample ID: 480-200133-5
Matrix: Solid
Percent Solids: 67.1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*111*		*64 - 126*	*08/01/22 17:20*	*08/02/22 00:14*	*1*
4-Bromofluorobenzene (Surr)	*93*		*72 - 126*	*08/01/22 17:20*	*08/02/22 00:14*	*1*
Dibromofluoromethane (Surr)	*119*		*60 - 140*	*08/01/22 17:20*	*08/02/22 00:14*	*1*
Toluene-d8 (Surr)	*104*		*71 - 125*	*08/01/22 17:20*	*08/02/22 00:14*	*1*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Biphenyl	ND		250		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
bis (2-chloroisopropyl) ether	ND		250		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
2,4,5-Trichlorophenol	ND		250		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
2,4,6-Trichlorophenol	ND		250		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
2,4-Dichlorophenol	ND		250		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
2,4-Dimethylphenol	ND		250		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
2,4-Dinitrophenol	ND		2400		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
2,4-Dinitrotoluene	ND		250		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
2,6-Dinitrotoluene	ND		250		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
2-Chloronaphthalene	ND		250		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
2-Chlorophenol	ND		480		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
2-Methylphenol	ND		250		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
2-Methylnaphthalene	ND		250		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
2-Nitroaniline	ND		480		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
2-Nitrophenol	ND		250		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
3,3'-Dichlorobenzidine	ND		480		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
3-Nitroaniline	ND		480		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
4,6-Dinitro-2-methylphenol	ND		480		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
4-Bromophenyl phenyl ether	ND		250		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
4-Chloro-3-methylphenol	ND		250		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
4-Chloroaniline	ND		250		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
4-Chlorophenyl phenyl ether	ND		250		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
4-Methylphenol	ND		480		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
4-Nitroaniline	ND		480		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
4-Nitrophenol	ND		480		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
Acenaphthene	ND		250		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
Acenaphthylene	ND		250		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
Acetophenone	ND		250		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
Anthracene	ND		250		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
Atrazine	ND		250		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
Benzaldehyde	ND		250		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
Benzo[a]anthracene	ND		250		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
Benzo[a]pyrene	ND		250		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
Benzo[b]fluoranthene	ND		250		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
Benzo[g,h,i]perylene	ND		250		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
Benzo[k]fluoranthene	ND		250		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
Bis(2-chloroethoxy)methane	ND		250		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
Bis(2-chloroethyl)ether	ND		250		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
Bis(2-ethylhexyl) phthalate	ND		250		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
Butyl benzyl phthalate	ND		250		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
Caprolactam	ND		250		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
Carbazole	ND		250		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
Chrysene	ND		250		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1

Client Sample ID: H05-DITCH-04
Date Collected: 07/26/22 10:00
Date Received: 07/27/22 10:00

Lab Sample ID: 480-200133-5
Matrix: Solid
Percent Solids: 67.1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dibenz(a,h)anthracene	ND		250		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
Di-n-butyl phthalate	ND		250		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
Di-n-octyl phthalate	ND		250		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
Dibenzofuran	ND		250		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
Diethyl phthalate	ND		250		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
Dimethyl phthalate	ND		250		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
Fluoranthene	ND		250		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
Fluorene	ND		250		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
Hexachlorobenzene	ND		250		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
Hexachlorobutadiene	ND		250		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
Hexachlorocyclopentadiene	ND		250		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
Hexachloroethane	ND		250		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
Indeno[1,2,3-cd]pyrene	ND		250		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
Isophorone	ND		250		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
N-Nitrosodi-n-propylamine	ND		250		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
N-Nitrosodiphenylamine	ND		250		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
Naphthalene	ND		250		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
Nitrobenzene	ND		250		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
Pentachlorophenol	ND		480		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
Phenanthrene	ND		250		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
Phenol	ND		250		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1
Pyrene	ND		250		ug/Kg	☼	07/28/22 15:24	07/29/22 18:40	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5 (Surr)	*85*		*53 - 120*	*07/28/22 15:24*	*07/29/22 18:40*	*1*
Phenol-d5 (Surr)	*75*		*54 - 120*	*07/28/22 15:24*	*07/29/22 18:40*	*1*
p-Terphenyl-d14 (Surr)	*96*		*79 - 130*	*07/28/22 15:24*	*07/29/22 18:40*	*1*
2,4,6-Tribromophenol (Surr)	*107*		*54 - 120*	*07/28/22 15:24*	*07/29/22 18:40*	*1*
2-Fluorobiphenyl (Surr)	*99*		*60 - 120*	*07/28/22 15:24*	*07/29/22 18:40*	*1*
2-Fluorophenol (Surr)	*77*		*52 - 120*	*07/28/22 15:24*	*07/29/22 18:40*	*1*

Method: 6010C - Metals (ICP) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.015		mg/L		08/02/22 11:13	08/03/22 15:22	1
Barium	**2.5**	**^+**	1.0		mg/L		08/02/22 11:13	08/03/22 15:22	1
Cadmium	**12.3**		0.010		mg/L		08/02/22 11:13	08/04/22 16:21	5
Chromium	ND		0.020		mg/L		08/02/22 11:13	08/03/22 15:22	1
Lead	**0.37**		0.020		mg/L		08/02/22 11:13	08/03/22 15:22	1
Selenium	ND		0.025		mg/L		08/02/22 11:13	08/03/22 15:22	1
Silver	ND		0.0060		mg/L		08/02/22 11:13	08/03/22 15:22	1

Method: 7470A - Mercury (CVAA) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00020		mg/L		08/02/22 11:44	08/02/22 15:27	1

Surrogate Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200133-1

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(64-126)	(72-126)	(60-140)	(71-125)
480-200133-1	H02-DITCH-02	112	98	123	108
480-200133-2	H04-DITCH-05	111	107	119	100
480-200133-3	H04-DITCH-06	107	92	117	108
480-200133-4	H05-DITCH-01	115	99	119	103
480-200133-5	H05-DITCH-04	111	93	119	104
LCS 480-635335/1-A	Lab Control Sample	106	110	112	97
LCS 480-635770/1-A	Lab Control Sample	111	117	120	98
LCSD 480-635335/2-A	Lab Control Sample Dup	112	114	117	98
MB 480-635335/3-A	Method Blank	113	111	117	93
MB 480-635770/2-A	Method Blank	117	115	123	97

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		NBZ	PHL	TPHd14	TBP	FBP	2FP
Lab Sample ID	Client Sample ID	(53-120)	(54-120)	(79-130)	(54-120)	(60-120)	(52-120)
480-200133-1	H02-DITCH-02	78	66	87	96	94	70
480-200133-2	H04-DITCH-05	79	70	102	99	94	75
480-200133-3	H04-DITCH-06	80	74	107	98	94	74
480-200133-3 MS	H04-DITCH-06	61	58	89	98	80	54
480-200133-3 MSD	H04-DITCH-06	72	73	90	103	87	70
480-200133-4	H05-DITCH-01	78	69	91	98	94	70
480-200133-5	H05-DITCH-04	85	75	96	107	99	77
LCS 480-635362/2-A	Lab Control Sample	73	67	105	107	89	69
MB 480-635362/1-A	Method Blank	83	81	94	99	91	83

Surrogate Legend

NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHd14 = p-Terphenyl-d14 (Surr)
TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)

Method: 8260C - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 480-635335/3-A
Matrix: Solid
Analysis Batch: 635513

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 635335

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		5.0		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
1,1,2,2-Tetrachloroethane	ND		5.0		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		5.0		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
1,1,2-Trichloroethane	ND		5.0		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
1,1-Dichloroethane	ND		5.0		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
1,1-Dichloroethene	ND		5.0		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
1,2,4-Trichlorobenzene	ND		5.0		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
1,2-Dibromo-3-Chloropropane	ND		5.0		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
1,2-Dibromoethane	ND		5.0		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
1,2-Dichlorobenzene	ND		5.0		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
1,2-Dichloroethane	ND		5.0		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
1,2-Dichloropropane	ND		5.0		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
1,3-Dichlorobenzene	ND		5.0		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
1,4-Dichlorobenzene	ND		5.0		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
2-Butanone (MEK)	ND		25		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
2-Hexanone	ND		25		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
4-Methyl-2-pentanone (MIBK)	ND		25		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
Acetone	ND		25		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
Benzene	ND		5.0		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
Bromodichloromethane	ND		5.0		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
Bromoform	ND		5.0		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
Bromomethane	ND		5.0		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
Carbon disulfide	ND		5.0		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
Carbon tetrachloride	ND		5.0		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
Chlorobenzene	ND		5.0		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
Chloroethane	ND		5.0		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
Chloroform	ND		5.0		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
Chloromethane	ND		5.0		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
cis-1,2-Dichloroethene	ND		5.0		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
cis-1,3-Dichloropropene	ND		5.0		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
Cyclohexane	ND		5.0		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
Dibromochloromethane	ND		5.0		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
Dichlorodifluoromethane	ND		5.0		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
Ethylbenzene	ND		5.0		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
Isopropylbenzene	ND		5.0		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
Methyl acetate	ND		25		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
Methyl tert-butyl ether	ND		5.0		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
Methylcyclohexane	ND		5.0		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
Methylene Chloride	ND		5.0		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
Styrene	ND		5.0		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
Tetrachloroethene	ND		5.0		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
Toluene	ND		5.0		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
trans-1,2-Dichloroethene	ND		5.0		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
trans-1,3-Dichloropropene	ND		5.0		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
Trichloroethene	ND		5.0		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
Trichlorofluoromethane	ND		5.0		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
Vinyl chloride	ND		5.0		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
Xylenes, Total	ND		10		ug/Kg		07/28/22 13:43	07/29/22 16:36	1

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: MB 480-635335/3-A
Matrix: Solid
Analysis Batch: 635513

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 635335

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	113		64 - 126	07/28/22 13:43	07/29/22 16:36	1
4-Bromofluorobenzene (Surr)	111		72 - 126	07/28/22 13:43	07/29/22 16:36	1
Dibromofluoromethane (Surr)	117		60 - 140	07/28/22 13:43	07/29/22 16:36	1
Toluene-d8 (Surr)	93		71 - 125	07/28/22 13:43	07/29/22 16:36	1

Lab Sample ID: LCS 480-635335/1-A
Matrix: Solid
Analysis Batch: 635513

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 635335

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
1,1,1-Trichloroethane	50.0	60.3		ug/Kg		121	77 - 121
1,1,2,2-Tetrachloroethane	50.0	42.4		ug/Kg		85	80 - 120
1,1,2-Trichloro-1,2,2-trifluoroethane	50.0	45.5		ug/Kg		91	60 - 140
1,1,2-Trichloroethane	50.0	47.0		ug/Kg		94	78 - 122
1,1-Dichloroethane	50.0	47.9		ug/Kg		96	73 - 126
1,1-Dichloroethene	50.0	47.4		ug/Kg		95	59 - 125
1,2,4-Trichlorobenzene	50.0	52.7		ug/Kg		105	64 - 120
1,2-Dibromo-3-Chloropropane	50.0	54.9		ug/Kg		110	63 - 124
1,2-Dibromoethane	50.0	53.6		ug/Kg		107	78 - 120
1,2-Dichlorobenzene	50.0	48.9		ug/Kg		98	75 - 120
1,2-Dichloroethane	50.0	58.1		ug/Kg		116	77 - 122
1,2-Dichloropropane	50.0	44.6		ug/Kg		89	75 - 124
1,3-Dichlorobenzene	50.0	48.7		ug/Kg		97	74 - 120
1,4-Dichlorobenzene	50.0	49.0		ug/Kg		98	73 - 120
2-Butanone (MEK)	250	244		ug/Kg		98	70 - 134
2-Hexanone	250	246		ug/Kg		99	59 - 130
4-Methyl-2-pentanone (MIBK)	250	241		ug/Kg		96	65 - 133
Acetone	250	245		ug/Kg		98	61 - 137
Benzene	50.0	45.2		ug/Kg		90	79 - 127
Bromodichloromethane	50.0	60.1		ug/Kg		120	80 - 122
Bromoform	50.0	77.7	*+	ug/Kg		155	68 - 126
Bromomethane	50.0	49.1		ug/Kg		98	37 - 149
Carbon disulfide	50.0	44.3		ug/Kg		89	64 - 131
Carbon tetrachloride	50.0	66.3		ug/Kg		133	75 - 135
Chlorobenzene	50.0	52.4		ug/Kg		105	76 - 124
Chloroethane	50.0	36.0		ug/Kg		72	69 - 135
Chloroform	50.0	51.2		ug/Kg		102	80 - 120
Chloromethane	50.0	48.7		ug/Kg		97	63 - 127
cis-1,2-Dichloroethene	50.0	48.7		ug/Kg		97	81 - 120
cis-1,3-Dichloropropene	50.0	50.2		ug/Kg		100	80 - 120
Cyclohexane	50.0	43.6		ug/Kg		87	65 - 120
Dibromochloromethane	50.0	70.8	*+	ug/Kg		142	76 - 125
Dichlorodifluoromethane	50.0	54.2		ug/Kg		108	57 - 142
Ethylbenzene	50.0	49.9		ug/Kg		100	80 - 120
Isopropylbenzene	50.0	46.1		ug/Kg		92	72 - 120
Methyl acetate	100	90.4		ug/Kg		90	55 - 136
Methyl tert-butyl ether	50.0	47.0		ug/Kg		94	63 - 125
Methylcyclohexane	50.0	42.9		ug/Kg		86	60 - 140

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 480-635335/1-A
Matrix: Solid
Analysis Batch: 635513

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 635335

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Methylene Chloride	50.0	48.7		ug/Kg		97	61 - 127
Styrene	50.0	50.7		ug/Kg		101	80 - 120
Tetrachloroethene	50.0	58.7		ug/Kg		117	74 - 122
Toluene	50.0	47.5		ug/Kg		95	74 - 128
trans-1,2-Dichloroethene	50.0	49.1		ug/Kg		98	78 - 126
trans-1,3-Dichloropropene	50.0	52.5		ug/Kg		105	73 - 123
Trichloroethene	50.0	51.5		ug/Kg		103	77 - 129
Trichlorofluoromethane	50.0	60.4		ug/Kg		121	65 - 146
Vinyl chloride	50.0	37.9		ug/Kg		76	61 - 133

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*106*		*64 - 126*
4-Bromofluorobenzene (Surr)	*110*		*72 - 126*
Dibromofluoromethane (Surr)	*112*		*60 - 140*
Toluene-d8 (Surr)	*97*		*71 - 125*

Lab Sample ID: LCSD 480-635335/2-A
Matrix: Solid
Analysis Batch: 635513

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 635335

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
1,1,1-Trichloroethane	50.0	56.6		ug/Kg		113	77 - 121	6	20
1,1,2,2-Tetrachloroethane	50.0	41.5		ug/Kg		83	80 - 120	2	20
1,1,2-Trichloro-1,2,2-trifluoroethane	50.0	43.0		ug/Kg		86	60 - 140	6	20
1,1,2-Trichloroethane	50.0	46.1		ug/Kg		92	78 - 122	2	20
1,1-Dichloroethane	50.0	44.9		ug/Kg		90	73 - 126	7	20
1,1-Dichloroethene	50.0	44.7		ug/Kg		89	59 - 125	6	20
1,2,4-Trichlorobenzene	50.0	50.7		ug/Kg		101	64 - 120	4	20
1,2-Dibromo-3-Chloropropane	50.0	54.5		ug/Kg		109	63 - 124	1	20
1,2-Dibromoethane	50.0	52.6		ug/Kg		105	78 - 120	2	20
1,2-Dichlorobenzene	50.0	47.0		ug/Kg		94	75 - 120	4	20
1,2-Dichloroethane	50.0	56.8		ug/Kg		114	77 - 122	2	20
1,2-Dichloropropane	50.0	43.5		ug/Kg		87	75 - 124	3	20
1,3-Dichlorobenzene	50.0	46.9		ug/Kg		94	74 - 120	4	20
1,4-Dichlorobenzene	50.0	46.3		ug/Kg		93	73 - 120	6	20
2-Butanone (MEK)	250	231		ug/Kg		92	70 - 134	5	20
2-Hexanone	250	241		ug/Kg		96	59 - 130	2	20
4-Methyl-2-pentanone (MIBK)	250	239		ug/Kg		96	65 - 133	1	20
Acetone	250	220		ug/Kg		88	61 - 137	11	20
Benzene	50.0	43.6		ug/Kg		87	79 - 127	4	20
Bromodichloromethane	50.0	58.0		ug/Kg		116	80 - 122	4	20
Bromoform	50.0	76.5	*+	ug/Kg		153	68 - 126	2	20
Bromomethane	50.0	47.1		ug/Kg		94	37 - 149	4	20
Carbon disulfide	50.0	41.0		ug/Kg		82	64 - 131	8	20
Carbon tetrachloride	50.0	63.2		ug/Kg		126	75 - 135	5	20
Chlorobenzene	50.0	50.5		ug/Kg		101	76 - 124	4	20
Chloroethane	50.0	35.3		ug/Kg		71	69 - 135	2	20
Chloroform	50.0	49.8		ug/Kg		100	80 - 120	3	20

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCSD 480-635335/2-A
Matrix: Solid
Analysis Batch: 635513

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 635335

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloromethane			50.0	47.1		ug/Kg		94	63 - 127	3	20
cis-1,2-Dichloroethene			50.0	47.4		ug/Kg		95	81 - 120	3	20
cis-1,3-Dichloropropene			50.0	47.8		ug/Kg		96	80 - 120	5	20
Cyclohexane			50.0	42.9		ug/Kg		86	65 - 120	2	20
Dibromochloromethane			50.0	69.8	*+	ug/Kg		140	76 - 125	1	20
Dichlorodifluoromethane			50.0	49.7		ug/Kg		99	57 - 142	9	20
Ethylbenzene			50.0	47.7		ug/Kg		95	80 - 120	5	20
Isopropylbenzene			50.0	43.4		ug/Kg		87	72 - 120	6	20
Methyl acetate			100	87.7		ug/Kg		88	55 - 136	3	20
Methyl tert-butyl ether			50.0	46.9		ug/Kg		94	63 - 125	0	20
Methylcyclohexane			50.0	41.1		ug/Kg		82	60 - 140	4	20
Methylene Chloride			50.0	47.6		ug/Kg		95	61 - 127	2	20
Styrene			50.0	48.2		ug/Kg		96	80 - 120	5	20
Tetrachloroethene			50.0	54.5		ug/Kg		109	74 - 122	7	20
Toluene			50.0	44.8		ug/Kg		90	74 - 128	6	20
trans-1,2-Dichloroethene			50.0	46.3		ug/Kg		93	78 - 126	6	20
trans-1,3-Dichloropropene			50.0	51.7		ug/Kg		103	73 - 123	2	20
Trichloroethene			50.0	49.3		ug/Kg		99	77 - 129	4	20
Trichlorofluoromethane			50.0	57.1		ug/Kg		114	65 - 146	6	20
Vinyl chloride			50.0	35.4		ug/Kg		71	61 - 133	7	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*112*		*64 - 126*
4-Bromofluorobenzene (Surr)	*114*		*72 - 126*
Dibromofluoromethane (Surr)	*117*		*60 - 140*
Toluene-d8 (Surr)	*98*		*71 - 125*

Lab Sample ID: MB 480-635770/2-A
Matrix: Solid
Analysis Batch: 635772

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 635770

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		5.0		ug/Kg		08/01/22 17:20	08/01/22 21:23	1
1,1,2,2-Tetrachloroethane	ND		5.0		ug/Kg		08/01/22 17:20	08/01/22 21:23	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		5.0		ug/Kg		08/01/22 17:20	08/01/22 21:23	1
1,1,2-Trichloroethane	ND		5.0		ug/Kg		08/01/22 17:20	08/01/22 21:23	1
1,1-Dichloroethane	ND		5.0		ug/Kg		08/01/22 17:20	08/01/22 21:23	1
1,1-Dichloroethene	ND		5.0		ug/Kg		08/01/22 17:20	08/01/22 21:23	1
1,2,4-Trichlorobenzene	ND		5.0		ug/Kg		08/01/22 17:20	08/01/22 21:23	1
1,2-Dibromo-3-Chloropropane	ND		5.0		ug/Kg		08/01/22 17:20	08/01/22 21:23	1
1,2-Dibromoethane	ND		5.0		ug/Kg		08/01/22 17:20	08/01/22 21:23	1
1,2-Dichlorobenzene	ND		5.0		ug/Kg		08/01/22 17:20	08/01/22 21:23	1
1,2-Dichloroethane	ND		5.0		ug/Kg		08/01/22 17:20	08/01/22 21:23	1
1,2-Dichloropropane	ND		5.0		ug/Kg		08/01/22 17:20	08/01/22 21:23	1
1,3-Dichlorobenzene	ND		5.0		ug/Kg		08/01/22 17:20	08/01/22 21:23	1
1,4-Dichlorobenzene	ND		5.0		ug/Kg		08/01/22 17:20	08/01/22 21:23	1
2-Butanone (MEK)	ND		25		ug/Kg		08/01/22 17:20	08/01/22 21:23	1
2-Hexanone	ND		25		ug/Kg		08/01/22 17:20	08/01/22 21:23	1

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: MB 480-635770/2-A
Matrix: Solid
Analysis Batch: 635772

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 635770

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4-Methyl-2-pentanone (MIBK)	ND		25		ug/Kg		08/01/22 17:20	08/01/22 21:23	1
Acetone	ND		25		ug/Kg		08/01/22 17:20	08/01/22 21:23	1
Benzene	ND		5.0		ug/Kg		08/01/22 17:20	08/01/22 21:23	1
Bromodichloromethane	ND		5.0		ug/Kg		08/01/22 17:20	08/01/22 21:23	1
Bromoform	ND		5.0		ug/Kg		08/01/22 17:20	08/01/22 21:23	1
Bromomethane	ND		5.0		ug/Kg		08/01/22 17:20	08/01/22 21:23	1
Carbon disulfide	ND		5.0		ug/Kg		08/01/22 17:20	08/01/22 21:23	1
Carbon tetrachloride	ND		5.0		ug/Kg		08/01/22 17:20	08/01/22 21:23	1
Chlorobenzene	ND		5.0		ug/Kg		08/01/22 17:20	08/01/22 21:23	1
Chloroethane	ND		5.0		ug/Kg		08/01/22 17:20	08/01/22 21:23	1
Chloroform	ND		5.0		ug/Kg		08/01/22 17:20	08/01/22 21:23	1
Chloromethane	ND		5.0		ug/Kg		08/01/22 17:20	08/01/22 21:23	1
cis-1,2-Dichloroethene	ND		5.0		ug/Kg		08/01/22 17:20	08/01/22 21:23	1
cis-1,3-Dichloropropene	ND		5.0		ug/Kg		08/01/22 17:20	08/01/22 21:23	1
Cyclohexane	ND		5.0		ug/Kg		08/01/22 17:20	08/01/22 21:23	1
Dibromochloromethane	ND		5.0		ug/Kg		08/01/22 17:20	08/01/22 21:23	1
Dichlorodifluoromethane	ND		5.0		ug/Kg		08/01/22 17:20	08/01/22 21:23	1
Ethylbenzene	ND		5.0		ug/Kg		08/01/22 17:20	08/01/22 21:23	1
Isopropylbenzene	ND		5.0		ug/Kg		08/01/22 17:20	08/01/22 21:23	1
Methyl acetate	ND		25		ug/Kg		08/01/22 17:20	08/01/22 21:23	1
Methyl tert-butyl ether	ND		5.0		ug/Kg		08/01/22 17:20	08/01/22 21:23	1
Methylcyclohexane	ND		5.0		ug/Kg		08/01/22 17:20	08/01/22 21:23	1
Methylene Chloride	ND		5.0		ug/Kg		08/01/22 17:20	08/01/22 21:23	1
Styrene	ND		5.0		ug/Kg		08/01/22 17:20	08/01/22 21:23	1
Tetrachloroethene	ND		5.0		ug/Kg		08/01/22 17:20	08/01/22 21:23	1
Toluene	ND		5.0		ug/Kg		08/01/22 17:20	08/01/22 21:23	1
trans-1,2-Dichloroethene	ND		5.0		ug/Kg		08/01/22 17:20	08/01/22 21:23	1
trans-1,3-Dichloropropene	ND		5.0		ug/Kg		08/01/22 17:20	08/01/22 21:23	1
Trichloroethene	ND		5.0		ug/Kg		08/01/22 17:20	08/01/22 21:23	1
Trichlorofluoromethane	ND		5.0		ug/Kg		08/01/22 17:20	08/01/22 21:23	1
Vinyl chloride	ND		5.0		ug/Kg		08/01/22 17:20	08/01/22 21:23	1
Xylenes, Total	ND		10		ug/Kg		08/01/22 17:20	08/01/22 21:23	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*117*		*64 - 126*	*08/01/22 17:20*	*08/01/22 21:23*	*1*
4-Bromofluorobenzene (Surr)	*115*		*72 - 126*	*08/01/22 17:20*	*08/01/22 21:23*	*1*
Dibromofluoromethane (Surr)	*123*		*60 - 140*	*08/01/22 17:20*	*08/01/22 21:23*	*1*
Toluene-d8 (Surr)	*97*		*71 - 125*	*08/01/22 17:20*	*08/01/22 21:23*	*1*

Lab Sample ID: LCS 480-635770/1-A
Matrix: Solid
Analysis Batch: 635772

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 635770

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
1,1,1-Trichloroethane	50.0	59.5		ug/Kg		119	77 - 121
1,1,2,2-Tetrachloroethane	50.0	40.2		ug/Kg		80	80 - 120
1,1,2-Trichloro-1,2,2-trifluoroethane	50.0	49.3		ug/Kg		99	60 - 140
1,1,2-Trichloroethane	50.0	45.1		ug/Kg		90	78 - 122

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 480-635770/1-A
Matrix: Solid
Analysis Batch: 635772

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 635770

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
1,1-Dichloroethane	50.0	45.7		ug/Kg		91	73 - 126
1,1-Dichloroethene	50.0	46.0		ug/Kg		92	59 - 125
1,2,4-Trichlorobenzene	50.0	49.2		ug/Kg		98	64 - 120
1,2-Dibromo-3-Chloropropane	50.0	54.0		ug/Kg		108	63 - 124
1,2-Dibromoethane	50.0	51.2		ug/Kg		102	78 - 120
1,2-Dichlorobenzene	50.0	46.7		ug/Kg		93	75 - 120
1,2-Dichloroethane	50.0	55.4		ug/Kg		111	77 - 122
1,2-Dichloropropane	50.0	43.0		ug/Kg		86	75 - 124
1,3-Dichlorobenzene	50.0	45.9		ug/Kg		92	74 - 120
1,4-Dichlorobenzene	50.0	45.7		ug/Kg		91	73 - 120
2-Butanone (MEK)	250	217		ug/Kg		87	70 - 134
2-Hexanone	250	231		ug/Kg		92	59 - 130
4-Methyl-2-pentanone (MIBK)	250	233		ug/Kg		93	65 - 133
Acetone	250	207		ug/Kg		83	61 - 137
Benzene	50.0	44.0		ug/Kg		88	79 - 127
Bromodichloromethane	50.0	58.8		ug/Kg		118	80 - 122
Bromoform	50.0	76.1	*+	ug/Kg		152	68 - 126
Bromomethane	50.0	48.2		ug/Kg		96	37 - 149
Carbon disulfide	50.0	42.4		ug/Kg		85	64 - 131
Carbon tetrachloride	50.0	68.6	*+	ug/Kg		137	75 - 135
Chlorobenzene	50.0	49.5		ug/Kg		99	76 - 124
Chloroethane	50.0	36.2		ug/Kg		72	69 - 135
Chloroform	50.0	50.4		ug/Kg		101	80 - 120
Chloromethane	50.0	44.5		ug/Kg		89	63 - 127
cis-1,2-Dichloroethene	50.0	46.1		ug/Kg		92	81 - 120
cis-1,3-Dichloropropene	50.0	45.7		ug/Kg		91	80 - 120
Cyclohexane	50.0	44.1		ug/Kg		88	65 - 120
Dibromochloromethane	50.0	68.2	*+	ug/Kg		136	76 - 125
Dichlorodifluoromethane	50.0	55.5		ug/Kg		111	57 - 142
Ethylbenzene	50.0	46.4		ug/Kg		93	80 - 120
Isopropylbenzene	50.0	42.8		ug/Kg		86	72 - 120
Methyl acetate	100	84.5		ug/Kg		85	55 - 136
Methyl tert-butyl ether	50.0	47.1		ug/Kg		94	63 - 125
Methylcyclohexane	50.0	44.6		ug/Kg		89	60 - 140
Methylene Chloride	50.0	47.5		ug/Kg		95	61 - 127
Styrene	50.0	47.1		ug/Kg		94	80 - 120
Tetrachloroethene	50.0	55.9		ug/Kg		112	74 - 122
Toluene	50.0	44.4		ug/Kg		89	74 - 128
trans-1,2-Dichloroethene	50.0	47.9		ug/Kg		96	78 - 126
trans-1,3-Dichloropropene	50.0	48.9		ug/Kg		98	73 - 123
Trichloroethene	50.0	49.4		ug/Kg		99	77 - 129
Trichlorofluoromethane	50.0	62.4		ug/Kg		125	65 - 146
Vinyl chloride	50.0	35.5		ug/Kg		71	61 - 133

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*111*		*64 - 126*
4-Bromofluorobenzene (Surr)	*117*		*72 - 126*
Dibromofluoromethane (Surr)	*120*		*60 - 140*

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 480-635770/1-A
Matrix: Solid
Analysis Batch: 635772

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 635770

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Toluene-d8 (Surr)	98		71 - 125

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 480-635362/1-A
Matrix: Solid
Analysis Batch: 635498

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 635362

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Biphenyl	ND		170		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
bis (2-chloroisopropyl) ether	ND		170		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
2,4,5-Trichlorophenol	ND		170		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
2,4,6-Trichlorophenol	ND		170		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
2,4-Dichlorophenol	ND		170		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
2,4-Dimethylphenol	ND		170		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
2,4-Dinitrophenol	ND		1600		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
2,4-Dinitrotoluene	ND		170		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
2,6-Dinitrotoluene	ND		170		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
2-Chloronaphthalene	ND		170		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
2-Chlorophenol	ND		320		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
2-Methylphenol	ND		170		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
2-Methylnaphthalene	ND		170		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
2-Nitroaniline	ND		320		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
2-Nitrophenol	ND		170		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
3,3'-Dichlorobenzidine	ND		320		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
3-Nitroaniline	ND		320		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
4,6-Dinitro-2-methylphenol	ND		320		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
4-Bromophenyl phenyl ether	ND		170		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
4-Chloro-3-methylphenol	ND		170		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
4-Chloroaniline	ND		170		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
4-Chlorophenyl phenyl ether	ND		170		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
4-Methylphenol	ND		320		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
4-Nitroaniline	ND		320		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
4-Nitrophenol	ND		320		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
Acenaphthene	ND		170		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
Acenaphthylene	ND		170		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
Acetophenone	ND		170		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
Anthracene	ND		170		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
Atrazine	ND		170		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
Benzaldehyde	ND		170		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
Benzo[a]anthracene	ND		170		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
Benzo[a]pyrene	ND		170		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
Benzo[b]fluoranthene	ND		170		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
Benzo[g,h,i]perylene	ND		170		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
Benzo[k]fluoranthene	ND		170		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
Bis(2-chloroethoxy)methane	ND		170		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
Bis(2-chloroethyl)ether	ND		170		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
Bis(2-ethylhexyl) phthalate	ND		170		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
Butyl benzyl phthalate	ND		170		ug/Kg		07/28/22 15:24	07/29/22 15:26	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 480-635362/1-A
Matrix: Solid
Analysis Batch: 635498

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 635362

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Caprolactam	ND		170		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
Carbazole	ND		170		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
Chrysene	ND		170		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
Dibenz(a,h)anthracene	ND		170		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
Di-n-butyl phthalate	ND		170		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
Di-n-octyl phthalate	ND		170		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
Dibenzofuran	ND		170		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
Diethyl phthalate	ND		170		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
Dimethyl phthalate	ND		170		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
Fluoranthene	ND		170		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
Fluorene	ND		170		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
Hexachlorobenzene	ND		170		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
Hexachlorobutadiene	ND		170		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
Hexachlorocyclopentadiene	ND		170		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
Hexachloroethane	ND		170		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
Indeno[1,2,3-cd]pyrene	ND		170		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
Isophorone	ND		170		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
N-Nitrosodi-n-propylamine	ND		170		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
N-Nitrosodiphenylamine	ND		170		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
Naphthalene	ND		170		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
Nitrobenzene	ND		170		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
Pentachlorophenol	ND		320		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
Phenanthrene	ND		170		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
Phenol	ND		170		ug/Kg		07/28/22 15:24	07/29/22 15:26	1
Pyrene	ND		170		ug/Kg		07/28/22 15:24	07/29/22 15:26	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Nitrobenzene-d5 (Surr)	*83*		*53 - 120*	*07/28/22 15:24*	*07/29/22 15:26*	*1*
Phenol-d5 (Surr)	*81*		*54 - 120*	*07/28/22 15:24*	*07/29/22 15:26*	*1*
p-Terphenyl-d14 (Surr)	*94*		*79 - 130*	*07/28/22 15:24*	*07/29/22 15:26*	*1*
2,4,6-Tribromophenol (Surr)	*99*		*54 - 120*	*07/28/22 15:24*	*07/29/22 15:26*	*1*
2-Fluorobiphenyl (Surr)	*91*		*60 - 120*	*07/28/22 15:24*	*07/29/22 15:26*	*1*
2-Fluorophenol (Surr)	*83*		*52 - 120*	*07/28/22 15:24*	*07/29/22 15:26*	*1*

Lab Sample ID: LCS 480-635362/2-A
Matrix: Solid
Analysis Batch: 635498

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 635362

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Biphenyl	1660	1440		ug/Kg		87	59 - 120
bis (2-chloroisopropyl) ether	1660	1160		ug/Kg		70	44 - 120
2,4,5-Trichlorophenol	1660	1390		ug/Kg		84	59 - 126
2,4,6-Trichlorophenol	1660	1420		ug/Kg		86	59 - 123
2,4-Dichlorophenol	1660	1340		ug/Kg		81	61 - 120
2,4-Dimethylphenol	1660	1230		ug/Kg		74	59 - 120
2,4-Dinitrophenol	3310	2310		ug/Kg		70	41 - 146
2,4-Dinitrotoluene	1660	1210		ug/Kg		73	63 - 120
2,6-Dinitrotoluene	1660	1370		ug/Kg		83	66 - 120

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 480-635362/2-A
Matrix: Solid
Analysis Batch: 635498

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 635362

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
2-Chloronaphthalene	1660	1470		ug/Kg		89	57 - 120
2-Chlorophenol	1660	1230		ug/Kg		74	53 - 120
2-Methylphenol	1660	1140		ug/Kg		69	54 - 120
2-Methylnaphthalene	1660	1150		ug/Kg		70	59 - 120
2-Nitroaniline	1660	1300		ug/Kg		79	61 - 120
2-Nitrophenol	1660	1310		ug/Kg		79	56 - 120
3,3'-Dichlorobenzidine	3310	2490		ug/Kg		75	54 - 120
3-Nitroaniline	1660	983		ug/Kg		59	48 - 120
4,6-Dinitro-2-methylphenol	3310	3030		ug/Kg		92	49 - 122
4-Bromophenyl phenyl ether	1660	1860		ug/Kg		112	58 - 120
4-Chloro-3-methylphenol	1660	1140		ug/Kg		69	61 - 120
4-Chloroaniline	1660	1040		ug/Kg		63	38 - 120
4-Chlorophenyl phenyl ether	1660	1390		ug/Kg		84	63 - 124
4-Methylphenol	1660	1150		ug/Kg		70	55 - 120
4-Nitroaniline	1660	1070		ug/Kg		65	56 - 120
4-Nitrophenol	3310	2230		ug/Kg		67	43 - 147
Acenaphthene	1660	1400		ug/Kg		84	62 - 120
Acenaphthylene	1660	1400		ug/Kg		84	58 - 121
Acetophenone	1660	1230		ug/Kg		74	54 - 120
Anthracene	1660	1490		ug/Kg		90	62 - 120
Atrazine	3310	2380		ug/Kg		72	60 - 127
Benzaldehyde	3310	2420		ug/Kg		73	10 - 150
Benzo[a]anthracene	1660	1490		ug/Kg		90	65 - 120
Benzo[a]pyrene	1660	1570		ug/Kg		95	64 - 120
Benzo[b]fluoranthene	1660	1590		ug/Kg		96	64 - 120
Benzo[g,h,i]perylene	1660	1830		ug/Kg		110	45 - 145
Benzo[k]fluoranthene	1660	1640		ug/Kg		99	65 - 120
Bis(2-chloroethoxy)methane	1660	1230		ug/Kg		74	55 - 120
Bis(2-chloroethyl)ether	1660	1220		ug/Kg		74	45 - 120
Bis(2-ethylhexyl) phthalate	1660	1500		ug/Kg		91	61 - 133
Butyl benzyl phthalate	1660	1560		ug/Kg		94	61 - 129
Caprolactam	3310	2260		ug/Kg		68	47 - 120
Carbazole	1660	1420		ug/Kg		85	65 - 120
Chrysene	1660	1480		ug/Kg		89	64 - 120
Dibenz(a,h)anthracene	1660	1780		ug/Kg		107	54 - 132
Di-n-butyl phthalate	1660	1500		ug/Kg		90	58 - 130
Di-n-octyl phthalate	1660	1440		ug/Kg		87	57 - 133
Dibenzofuran	1660	1350		ug/Kg		82	63 - 120
Diethyl phthalate	1660	1330		ug/Kg		80	66 - 120
Dimethyl phthalate	1660	1350		ug/Kg		81	65 - 124
Fluoranthene	1660	1410		ug/Kg		85	62 - 120
Fluorene	1660	1350		ug/Kg		82	63 - 120
Hexachlorobenzene	1660	1710		ug/Kg		103	60 - 120
Hexachlorobutadiene	1660	1370		ug/Kg		83	45 - 120
Hexachlorocyclopentadiene	1660	1440		ug/Kg		87	47 - 120
Hexachloroethane	1660	1220		ug/Kg		74	41 - 120
Indeno[1,2,3-cd]pyrene	1660	1820		ug/Kg		110	56 - 134
Isophorone	1660	1240		ug/Kg		75	56 - 120
N-Nitrosodi-n-propylamine	1660	1160		ug/Kg		70	52 - 120

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 480-635362/2-A
Matrix: Solid
Analysis Batch: 635498

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 635362

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
N-Nitrosodiphenylamine			1660	1670		ug/Kg		101	51 - 128		
Naphthalene			1660	1280		ug/Kg		78	55 - 120		
Nitrobenzene			1660	1210		ug/Kg		73	54 - 120		
Pentachlorophenol			3310	2940		ug/Kg		89	51 - 120		
Phenanthrene			1660	1480		ug/Kg		89	60 - 120		
Phenol			1660	1080		ug/Kg		65	53 - 120		
Pyrene			1660	1840		ug/Kg		111	61 - 133		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Nitrobenzene-d5 (Surr)	*73*		*53 - 120*
Phenol-d5 (Surr)	*67*		*54 - 120*
p-Terphenyl-d14 (Surr)	*105*		*79 - 130*
2,4,6-Tribromophenol (Surr)	*107*		*54 - 120*
2-Fluorobiphenyl (Surr)	*89*		*60 - 120*
2-Fluorophenol (Surr)	*69*		*52 - 120*

Lab Sample ID: 480-200133-3 MS
Matrix: Solid
Analysis Batch: 635498

Client Sample ID: H04-DITCH-06
Prep Type: Total/NA
Prep Batch: 635362

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
Biphenyl	ND		2220	1780		ug/Kg	☼	80	58 - 120		
bis (2-chloroisopropyl) ether	ND		2220	1300		ug/Kg	☼	58	31 - 120		
2,4,5-Trichlorophenol	ND		2220	1750		ug/Kg	☼	79	46 - 120		
2,4,6-Trichlorophenol	ND		2220	1780		ug/Kg	☼	80	41 - 123		
2,4-Dichlorophenol	ND		2220	1610		ug/Kg	☼	73	45 - 120		
2,4-Dimethylphenol	ND		2220	1500		ug/Kg	☼	67	52 - 120		
2,4-Dinitrophenol	ND		4440	3010		ug/Kg	☼	68	41 - 146		
2,4-Dinitrotoluene	ND		2220	1610		ug/Kg	☼	73	63 - 125		
2,6-Dinitrotoluene	ND		2220	1660		ug/Kg	☼	75	66 - 120		
2-Chloronaphthalene	ND		2220	1770		ug/Kg	☼	80	57 - 120		
2-Chlorophenol	ND		2220	1400		ug/Kg	☼	63	43 - 120		
2-Methylphenol	ND		2220	1360		ug/Kg	☼	61	48 - 120		
2-Methylnaphthalene	ND		2220	1430		ug/Kg	☼	64	55 - 120		
2-Nitroaniline	ND		2220	1650		ug/Kg	☼	74	61 - 120		
2-Nitrophenol	ND		2220	1530		ug/Kg	☼	69	37 - 120		
3,3'-Dichlorobenzidine	ND		4440	3590		ug/Kg	☼	81	37 - 126		
3-Nitroaniline	ND		2220	1420		ug/Kg	☼	64	48 - 120		
4,6-Dinitro-2-methylphenol	ND		4440	3950		ug/Kg	☼	89	23 - 149		
4-Bromophenyl phenyl ether	ND		2220	2270		ug/Kg	☼	102	58 - 120		
4-Chloro-3-methylphenol	ND		2220	1460		ug/Kg	☼	66	49 - 125		
4-Chloroaniline	ND		2220	1300		ug/Kg	☼	58	38 - 120		
4-Chlorophenyl phenyl ether	ND		2220	1680		ug/Kg	☼	76	63 - 124		
4-Methylphenol	ND		2220	1350		ug/Kg	☼	61	50 - 120		
4-Nitroaniline	ND		2220	1440		ug/Kg	☼	65	47 - 120		
4-Nitrophenol	ND		4440	3210		ug/Kg	☼	72	31 - 147		
Acenaphthene	ND		2220	1660		ug/Kg	☼	75	60 - 120		
Acenaphthylene	ND		2220	1720		ug/Kg	☼	77	58 - 121		

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 480-200133-3 MS
Matrix: Solid
Analysis Batch: 635498

Client Sample ID: H04-DITCH-06
Prep Type: Total/NA
Prep Batch: 635362

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Acetophenone	ND		2220	1350		ug/Kg	☼	61	47 - 120
Anthracene	ND		2220	1950		ug/Kg	☼	88	62 - 120
Atrazine	ND		4440	3090		ug/Kg	☼	70	60 - 150
Benzaldehyde	ND		4440	3200		ug/Kg	☼	72	10 - 150
Benzo[a]anthracene	ND		2220	1880		ug/Kg	☼	79	65 - 120
Benzo[a]pyrene	ND		2220	2020		ug/Kg	☼	84	64 - 120
Benzo[b]fluoranthene	ND		2220	1810		ug/Kg	☼	74	10 - 150
Benzo[g,h,i]perylene	ND		2220	2470		ug/Kg	☼	106	45 - 145
Benzo[k]fluoranthene	ND		2220	2140		ug/Kg	☼	92	23 - 150
Bis(2-chloroethoxy)methane	ND		2220	1440		ug/Kg	☼	65	52 - 120
Bis(2-chloroethyl)ether	ND		2220	1360		ug/Kg	☼	61	45 - 120
Bis(2-ethylhexyl) phthalate	ND		2220	1990		ug/Kg	☼	81	61 - 133
Butyl benzyl phthalate	ND		2220	1830		ug/Kg	☼	82	61 - 120
Caprolactam	ND		4440	3040		ug/Kg	☼	68	37 - 133
Carbazole	ND		2220	1870		ug/Kg	☼	84	59 - 120
Chrysene	ND		2220	1950		ug/Kg	☼	80	64 - 120
Dibenz(a,h)anthracene	ND		2220	2460		ug/Kg	☼	111	54 - 132
Di-n-butyl phthalate	ND		2220	1970		ug/Kg	☼	79	58 - 130
Di-n-octyl phthalate	ND		2220	1840		ug/Kg	☼	83	57 - 133
Dibenzofuran	ND		2220	1680		ug/Kg	☼	76	62 - 120
Diethyl phthalate	ND		2220	1690		ug/Kg	☼	76	66 - 120
Dimethyl phthalate	ND		2220	1730		ug/Kg	☼	78	65 - 124
Fluoranthene	290		2220	1820		ug/Kg	☼	69	62 - 120
Fluorene	ND		2220	1720		ug/Kg	☼	78	63 - 120
Hexachlorobenzene	ND		2220	2250		ug/Kg	☼	101	60 - 120
Hexachlorobutadiene	ND		2220	1690		ug/Kg	☼	76	45 - 120
Hexachlorocyclopentadiene	ND		2220	1560		ug/Kg	☼	70	31 - 120
Hexachloroethane	ND		2220	1290		ug/Kg	☼	58	21 - 120
Indeno[1,2,3-cd]pyrene	ND		2220	2430		ug/Kg	☼	105	56 - 134
Isophorone	ND		2220	1480		ug/Kg	☼	67	56 - 120
N-Nitrosodi-n-propylamine	ND		2220	1380		ug/Kg	☼	62	46 - 120
N-Nitrosodiphenylamine	ND		2220	2210		ug/Kg	☼	100	20 - 128
Naphthalene	ND		2220	1480		ug/Kg	☼	67	46 - 120
Nitrobenzene	ND		2220	1440		ug/Kg	☼	65	49 - 120
Pentachlorophenol	ND		4440	4300		ug/Kg	☼	97	25 - 136
Phenanthrene	240		2220	2000		ug/Kg	☼	79	60 - 122
Phenol	ND		2220	1290		ug/Kg	☼	58	50 - 120
Pyrene	310		2220	2110		ug/Kg	☼	81	61 - 133

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Nitrobenzene-d5 (Surr)	*61*		*53 - 120*
Phenol-d5 (Surr)	*58*		*54 - 120*
p-Terphenyl-d14 (Surr)	*89*		*79 - 130*
2,4,6-Tribromophenol (Surr)	*98*		*54 - 120*
2-Fluorobiphenyl (Surr)	*80*		*60 - 120*
2-Fluorophenol (Surr)	*54*		*52 - 120*

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 480-200133-3 MSD
Matrix: Solid
Analysis Batch: 635498

Client Sample ID: H04-DITCH-06
Prep Type: Total/NA
Prep Batch: 635362

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Biphenyl	ND		2200	1840		ug/Kg	☼	84	58 - 120	3	20
bis (2-chloroisopropyl) ether	ND		2200	1480		ug/Kg	☼	67	31 - 120	13	24
2,4,5-Trichlorophenol	ND		2200	1850		ug/Kg	☼	84	46 - 120	6	18
2,4,6-Trichlorophenol	ND		2200	1980		ug/Kg	☼	90	41 - 123	11	19
2,4-Dichlorophenol	ND		2200	1880		ug/Kg	☼	86	45 - 120	16	19
2,4-Dimethylphenol	ND		2200	1690		ug/Kg	☼	77	52 - 120	12	42
2,4-Dinitrophenol	ND		4390	3330		ug/Kg	☼	76	41 - 146	10	22
2,4-Dinitrotoluene	ND		2200	1710		ug/Kg	☼	78	63 - 125	6	20
2,6-Dinitrotoluene	ND		2200	1780		ug/Kg	☼	81	66 - 120	7	15
2-Chloronaphthalene	ND		2200	1910		ug/Kg	☼	87	57 - 120	8	21
2-Chlorophenol	ND		2200	1680		ug/Kg	☼	77	43 - 120	19	25
2-Methylphenol	ND		2200	1730		ug/Kg	☼	79	48 - 120	24	27
2-Methylnaphthalene	ND		2200	1580		ug/Kg	☼	72	55 - 120	10	21
2-Nitroaniline	ND		2200	1740		ug/Kg	☼	79	61 - 120	5	15
2-Nitrophenol	ND		2200	1820		ug/Kg	☼	83	37 - 120	17	18
3,3'-Dichlorobenzidine	ND		4390	3680		ug/Kg	☼	84	37 - 126	2	25
3-Nitroaniline	ND		2200	1670		ug/Kg	☼	76	48 - 120	16	19
4,6-Dinitro-2-methylphenol	ND		4390	4170		ug/Kg	☼	95	23 - 149	6	15
4-Bromophenyl phenyl ether	ND		2200	2280		ug/Kg	☼	104	58 - 120	0	15
4-Chloro-3-methylphenol	ND		2200	1660		ug/Kg	☼	76	49 - 125	13	27
4-Chloroaniline	ND		2200	1570		ug/Kg	☼	71	38 - 120	19	22
4-Chlorophenyl phenyl ether	ND		2200	1750		ug/Kg	☼	80	63 - 124	4	16
4-Methylphenol	ND		2200	1690		ug/Kg	☼	77	50 - 120	22	24
4-Nitroaniline	ND		2200	1660		ug/Kg	☼	76	47 - 120	14	24
4-Nitrophenol	ND		4390	3280		ug/Kg	☼	75	31 - 147	2	25
Acenaphthene	ND		2200	1780		ug/Kg	☼	81	60 - 120	7	35
Acenaphthylene	ND		2200	1830		ug/Kg	☼	83	58 - 121	6	18
Acetophenone	ND		2200	1590		ug/Kg	☼	73	47 - 120	16	20
Anthracene	ND		2200	1980		ug/Kg	☼	90	62 - 120	1	15
Atrazine	ND		4390	3390		ug/Kg	☼	77	60 - 150	9	20
Benzaldehyde	ND		4390	3470		ug/Kg	☼	79	10 - 150	8	20
Benzo[a]anthracene	ND		2200	1880		ug/Kg	☼	80	65 - 120	0	15
Benzo[a]pyrene	ND		2200	1910		ug/Kg	☼	80	64 - 120	5	15
Benzo[b]fluoranthene	ND		2200	1760		ug/Kg	☼	73	10 - 150	2	15
Benzo[g,h,i]perylene	ND		2200	2290		ug/Kg	☼	100	45 - 145	7	15
Benzo[k]fluoranthene	ND		2200	2110		ug/Kg	☼	92	23 - 150	1	22
Bis(2-chloroethoxy)methane	ND		2200	1680		ug/Kg	☼	77	52 - 120	15	17
Bis(2-chloroethyl)ether	ND		2200	1500		ug/Kg	☼	68	45 - 120	10	21
Bis(2-ethylhexyl) phthalate	ND		2200	1940		ug/Kg	☼	80	61 - 133	2	15
Butyl benzyl phthalate	ND		2200	1900		ug/Kg	☼	87	61 - 120	4	16
Caprolactam	ND		4390	3380		ug/Kg	☼	77	37 - 133	11	20
Carbazole	ND		2200	1980		ug/Kg	☼	90	59 - 120	6	20
Chrysene	ND		2200	1960		ug/Kg	☼	82	64 - 120	1	15
Dibenz(a,h)anthracene	ND		2200	2230		ug/Kg	☼	101	54 - 132	10	15
Di-n-butyl phthalate	ND		2200	1990		ug/Kg	☼	81	58 - 130	1	15
Di-n-octyl phthalate	ND		2200	1790		ug/Kg	☼	82	57 - 133	3	16
Dibenzofuran	ND		2200	1750		ug/Kg	☼	80	62 - 120	4	15
Diethyl phthalate	ND		2200	1820		ug/Kg	☼	83	66 - 120	7	15

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 480-200133-3 MSD
Matrix: Solid
Analysis Batch: 635498

Client Sample ID: H04-DITCH-06
Prep Type: Total/NA
Prep Batch: 635362

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Dimethyl phthalate	ND		2200	1890		ug/Kg	☼	86	65 - 124	9	15
Fluoranthene	290		2200	1970		ug/Kg	☼	76	62 - 120	8	15
Fluorene	ND		2200	1730		ug/Kg	☼	79	63 - 120	0	15
Hexachlorobenzene	ND		2200	2170		ug/Kg	☼	99	60 - 120	4	15
Hexachlorobutadiene	ND		2200	1790		ug/Kg	☼	81	45 - 120	5	44
Hexachlorocyclopentadiene	ND		2200	1690		ug/Kg	☼	77	31 - 120	8	49
Hexachloroethane	ND		2200	1440		ug/Kg	☼	65	21 - 120	11	46
Indeno[1,2,3-cd]pyrene	ND		2200	2240		ug/Kg	☼	97	56 - 134	8	15
Isophorone	ND		2200	1690		ug/Kg	☼	77	56 - 120	13	17
N-Nitrosodi-n-propylamine	ND		2200	1500		ug/Kg	☼	69	46 - 120	9	31
N-Nitrosodiphenylamine	ND		2200	2190		ug/Kg	☼	100	20 - 128	1	15
Naphthalene	ND		2200	1640		ug/Kg	☼	75	46 - 120	10	29
Nitrobenzene	ND		2200	1570		ug/Kg	☼	72	49 - 120	8	24
Pentachlorophenol	ND		4390	4490		ug/Kg	☼	102	25 - 136	4	35
Phenanthrene	240		2200	2030		ug/Kg	☼	82	60 - 122	1	15
Phenol	ND		2200	1560		ug/Kg	☼	71	50 - 120	19	35
Pyrene	310		2200	2170		ug/Kg	☼	85	61 - 133	3	35

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
Nitrobenzene-d5 (Surr)	*72*		*53 - 120*
Phenol-d5 (Surr)	*73*		*54 - 120*
p-Terphenyl-d14 (Surr)	*90*		*79 - 130*
2,4,6-Tribromophenol (Surr)	*103*		*54 - 120*
2-Fluorobiphenyl (Surr)	*87*		*60 - 120*
2-Fluorophenol (Surr)	*70*		*52 - 120*

Method: 6010C - Metals (ICP)

Lab Sample ID: MB 480-635832/2-A
Matrix: Solid
Analysis Batch: 636166

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 635832

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.015		mg/L		08/02/22 11:13	08/03/22 14:30	1
Barium	ND	^+	1.0		mg/L		08/02/22 11:13	08/03/22 14:30	1
Cadmium	ND	^+	0.0020		mg/L		08/02/22 11:13	08/03/22 14:30	1
Chromium	ND		0.020		mg/L		08/02/22 11:13	08/03/22 14:30	1
Lead	ND		0.020		mg/L		08/02/22 11:13	08/03/22 14:30	1
Selenium	ND		0.025		mg/L		08/02/22 11:13	08/03/22 14:30	1
Silver	ND		0.0060		mg/L		08/02/22 11:13	08/03/22 14:30	1

Lab Sample ID: LCS 480-635832/3-A
Matrix: Solid
Analysis Batch: 636166

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 635832

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Arsenic	1.00	1.12		mg/L		112	80 - 120
Barium	1.00	1.08	^+	mg/L		108	80 - 120
Cadmium	1.00	1.05	^+	mg/L		105	80 - 120

Method: 6010C - Metals (ICP) (Continued)

Lab Sample ID: LCS 480-635832/3-A
Matrix: Solid
Analysis Batch: 636166

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 635832

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chromium	1.00	1.03		mg/L		103	80 - 120
Lead	1.00	1.03		mg/L		103	80 - 120
Selenium	1.00	1.13		mg/L		113	80 - 120
Silver	1.00	1.13		mg/L		113	80 - 120

Lab Sample ID: LB 480-635619/1-B
Matrix: Solid
Analysis Batch: 636166

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 635832

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.015		mg/L		08/02/22 11:13	08/03/22 14:15	1
Barium	ND		1.0		mg/L		08/02/22 11:13	08/03/22 14:15	1
Cadmium	ND		0.0020		mg/L		08/02/22 11:13	08/03/22 14:15	1
Chromium	ND		0.020		mg/L		08/02/22 11:13	08/03/22 14:15	1
Lead	ND		0.020		mg/L		08/02/22 11:13	08/03/22 14:15	1
Selenium	ND		0.025		mg/L		08/02/22 11:13	08/03/22 14:15	1
Silver	ND		0.0060		mg/L		08/02/22 11:13	08/03/22 14:15	1

Lab Sample ID: 480-200133-1 MS
Matrix: Solid
Analysis Batch: 636166

Client Sample ID: H02-DITCH-02
Prep Type: TCLP
Prep Batch: 635832

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Arsenic	ND		1.00	1.19		mg/L		119	75 - 125
Barium	3.3	^+ F1	1.00	4.69	F1 ^+	mg/L		137	75 - 125
Chromium	ND		1.00	1.07		mg/L		107	75 - 125
Lead	0.075		1.00	1.17		mg/L		110	75 - 125
Selenium	ND		1.00	1.22		mg/L		122	75 - 125
Silver	ND		1.00	1.02		mg/L		102	75 - 125

Lab Sample ID: 480-200133-1 MS
Matrix: Solid
Analysis Batch: 636927

Client Sample ID: H02-DITCH-02
Prep Type: TCLP
Prep Batch: 635832

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Cadmium	2.5	F1	1.00	3.71	F1	mg/L		126	75 - 125

Lab Sample ID: 480-200133-1 MSD
Matrix: Solid
Analysis Batch: 636166

Client Sample ID: H02-DITCH-02
Prep Type: TCLP
Prep Batch: 635832

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Arsenic	ND		1.00	1.06		mg/L		106	75 - 125	12	20
Barium	3.3	^+ F1	1.00	4.17	^+	mg/L		86	75 - 125	12	20
Chromium	ND		1.00	0.960		mg/L		96	75 - 125	11	20
Lead	0.075		1.00	1.04		mg/L		96	75 - 125	12	20
Selenium	ND		1.00	1.08		mg/L		108	75 - 125	12	20
Silver	ND		1.00	0.910		mg/L		91	75 - 125	11	20

Method: 6010C - Metals (ICP) (Continued)

Lab Sample ID: 480-200133-1 MSD — **Client Sample ID: H02-DITCH-02**
Matrix: Solid — **Prep Type: TCLP**
Analysis Batch: 636927 — **Prep Batch: 635832**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Cadmium	2.5	F1	1.00	3.26		mg/L		81	75 - 125	13	20

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 480-635843/2-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 635925 — **Prep Batch: 635843**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00020		mg/L		08/02/22 11:44	08/02/22 15:13	1

Lab Sample ID: LCS 480-635843/3-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 635925 — **Prep Batch: 635843**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	0.00678	0.00625		mg/L		92	80 - 120

Lab Sample ID: LB 480-635619/1-C — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: TCLP**
Analysis Batch: 635925 — **Prep Batch: 635843**

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00020		mg/L		08/02/22 11:44	08/02/22 15:12	1

Lab Sample ID: 480-200133-1 MS — **Client Sample ID: H02-DITCH-02**
Matrix: Solid — **Prep Type: TCLP**
Analysis Batch: 635925 — **Prep Batch: 635843**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	ND		0.00678	0.00685		mg/L		101	80 - 120

Lab Sample ID: 480-200133-1 MSD — **Client Sample ID: H02-DITCH-02**
Matrix: Solid — **Prep Type: TCLP**
Analysis Batch: 635925 — **Prep Batch: 635843**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Mercury	ND		0.00678	0.00643		mg/L		95	80 - 120	6	20

GC/MS VOA

Prep Batch: 635335

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200133-2	H04-DITCH-05	Total/NA	Solid	5035A_L	
480-200133-4	H05-DITCH-01	Total/NA	Solid	5035A_L	
MB 480-635335/3-A	Method Blank	Total/NA	Solid	5035A_L	
LCS 480-635335/1-A	Lab Control Sample	Total/NA	Solid	5035A_L	
LCSD 480-635335/2-A	Lab Control Sample Dup	Total/NA	Solid	5035A_L	

Analysis Batch: 635513

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200133-2	H04-DITCH-05	Total/NA	Solid	8260C	635335
480-200133-4	H05-DITCH-01	Total/NA	Solid	8260C	635335
MB 480-635335/3-A	Method Blank	Total/NA	Solid	8260C	635335
LCS 480-635335/1-A	Lab Control Sample	Total/NA	Solid	8260C	635335
LCSD 480-635335/2-A	Lab Control Sample Dup	Total/NA	Solid	8260C	635335

Prep Batch: 635770

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200133-1	H02-DITCH-02	Total/NA	Solid	5035A_L	
480-200133-3	H04-DITCH-06	Total/NA	Solid	5035A_L	
480-200133-5	H05-DITCH-04	Total/NA	Solid	5035A_L	
MB 480-635770/2-A	Method Blank	Total/NA	Solid	5035A_L	
LCS 480-635770/1-A	Lab Control Sample	Total/NA	Solid	5035A_L	

Analysis Batch: 635772

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200133-1	H02-DITCH-02	Total/NA	Solid	8260C	635770
480-200133-3	H04-DITCH-06	Total/NA	Solid	8260C	635770
480-200133-5	H05-DITCH-04	Total/NA	Solid	8260C	635770
MB 480-635770/2-A	Method Blank	Total/NA	Solid	8260C	635770
LCS 480-635770/1-A	Lab Control Sample	Total/NA	Solid	8260C	635770

GC/MS Semi VOA

Prep Batch: 635362

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200133-1	H02-DITCH-02	Total/NA	Solid	3550C	
480-200133-2	H04-DITCH-05	Total/NA	Solid	3550C	
480-200133-3	H04-DITCH-06	Total/NA	Solid	3550C	
480-200133-4	H05-DITCH-01	Total/NA	Solid	3550C	
480-200133-5	H05-DITCH-04	Total/NA	Solid	3550C	
MB 480-635362/1-A	Method Blank	Total/NA	Solid	3550C	
LCS 480-635362/2-A	Lab Control Sample	Total/NA	Solid	3550C	
480-200133-3 MS	H04-DITCH-06	Total/NA	Solid	3550C	
480-200133-3 MSD	H04-DITCH-06	Total/NA	Solid	3550C	

Analysis Batch: 635498

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200133-1	H02-DITCH-02	Total/NA	Solid	8270D	635362
480-200133-2	H04-DITCH-05	Total/NA	Solid	8270D	635362
480-200133-3	H04-DITCH-06	Total/NA	Solid	8270D	635362
480-200133-4	H05-DITCH-01	Total/NA	Solid	8270D	635362
480-200133-5	H05-DITCH-04	Total/NA	Solid	8270D	635362

GC/MS Semi VOA (Continued)

Analysis Batch: 635498 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 480-635362/1-A	Method Blank	Total/NA	Solid	8270D	635362
LCS 480-635362/2-A	Lab Control Sample	Total/NA	Solid	8270D	635362
480-200133-3 MS	H04-DITCH-06	Total/NA	Solid	8270D	635362
480-200133-3 MSD	H04-DITCH-06	Total/NA	Solid	8270D	635362

Metals

Leach Batch: 635619

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200133-1	H02-DITCH-02	TCLP	Solid	1311	
480-200133-2	H04-DITCH-05	TCLP	Solid	1311	
480-200133-3	H04-DITCH-06	TCLP	Solid	1311	
480-200133-4	H05-DITCH-01	TCLP	Solid	1311	
480-200133-5	H05-DITCH-04	TCLP	Solid	1311	
LB 480-635619/1-B	Method Blank	TCLP	Solid	1311	
LB 480-635619/1-C	Method Blank	TCLP	Solid	1311	
480-200133-1 MS	H02-DITCH-02	TCLP	Solid	1311	
480-200133-1 MSD	H02-DITCH-02	TCLP	Solid	1311	

Prep Batch: 635832

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200133-1	H02-DITCH-02	TCLP	Solid	3010A	635619
480-200133-2	H04-DITCH-05	TCLP	Solid	3010A	635619
480-200133-3	H04-DITCH-06	TCLP	Solid	3010A	635619
480-200133-4	H05-DITCH-01	TCLP	Solid	3010A	635619
480-200133-5	H05-DITCH-04	TCLP	Solid	3010A	635619
LB 480-635619/1-B	Method Blank	TCLP	Solid	3010A	635619
MB 480-635832/2-A	Method Blank	Total/NA	Solid	3010A	
LCS 480-635832/3-A	Lab Control Sample	Total/NA	Solid	3010A	
480-200133-1 MS	H02-DITCH-02	TCLP	Solid	3010A	635619
480-200133-1 MSD	H02-DITCH-02	TCLP	Solid	3010A	635619

Prep Batch: 635843

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200133-1	H02-DITCH-02	TCLP	Solid	7470A	635619
480-200133-2	H04-DITCH-05	TCLP	Solid	7470A	635619
480-200133-3	H04-DITCH-06	TCLP	Solid	7470A	635619
480-200133-4	H05-DITCH-01	TCLP	Solid	7470A	635619
480-200133-5	H05-DITCH-04	TCLP	Solid	7470A	635619
LB 480-635619/1-C	Method Blank	TCLP	Solid	7470A	635619
MB 480-635843/2-A	Method Blank	Total/NA	Solid	7470A	
LCS 480-635843/3-A	Lab Control Sample	Total/NA	Solid	7470A	
480-200133-1 MS	H02-DITCH-02	TCLP	Solid	7470A	635619
480-200133-1 MSD	H02-DITCH-02	TCLP	Solid	7470A	635619

Analysis Batch: 635925

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200133-1	H02-DITCH-02	TCLP	Solid	7470A	635843
480-200133-2	H04-DITCH-05	TCLP	Solid	7470A	635843
480-200133-3	H04-DITCH-06	TCLP	Solid	7470A	635843
480-200133-4	H05-DITCH-01	TCLP	Solid	7470A	635843

Metals (Continued)

Analysis Batch: 635925 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200133-5	H05-DITCH-04	TCLP	Solid	7470A	635843
LB 480-635619/1-C	Method Blank	TCLP	Solid	7470A	635843
MB 480-635843/2-A	Method Blank	Total/NA	Solid	7470A	635843
LCS 480-635843/3-A	Lab Control Sample	Total/NA	Solid	7470A	635843
480-200133-1 MS	H02-DITCH-02	TCLP	Solid	7470A	635843
480-200133-1 MSD	H02-DITCH-02	TCLP	Solid	7470A	635843

Analysis Batch: 636166

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200133-1	H02-DITCH-02	TCLP	Solid	6010C	635832
480-200133-2	H04-DITCH-05	TCLP	Solid	6010C	635832
480-200133-3	H04-DITCH-06	TCLP	Solid	6010C	635832
480-200133-4	H05-DITCH-01	TCLP	Solid	6010C	635832
480-200133-5	H05-DITCH-04	TCLP	Solid	6010C	635832
LB 480-635619/1-B	Method Blank	TCLP	Solid	6010C	635832
MB 480-635832/2-A	Method Blank	Total/NA	Solid	6010C	635832
LCS 480-635832/3-A	Lab Control Sample	Total/NA	Solid	6010C	635832
480-200133-1 MS	H02-DITCH-02	TCLP	Solid	6010C	635832
480-200133-1 MSD	H02-DITCH-02	TCLP	Solid	6010C	635832

Analysis Batch: 636344

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200133-2	H04-DITCH-05	TCLP	Solid	6010C	635832
480-200133-3	H04-DITCH-06	TCLP	Solid	6010C	635832
480-200133-5	H05-DITCH-04	TCLP	Solid	6010C	635832

Analysis Batch: 636927

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200133-1	H02-DITCH-02	TCLP	Solid	6010C	635832
480-200133-1 MS	H02-DITCH-02	TCLP	Solid	6010C	635832
480-200133-1 MSD	H02-DITCH-02	TCLP	Solid	6010C	635832

General Chemistry

Analysis Batch: 635192

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200133-1	H02-DITCH-02	Total/NA	Solid	Moisture	
480-200133-2	H04-DITCH-05	Total/NA	Solid	Moisture	
480-200133-3	H04-DITCH-06	Total/NA	Solid	Moisture	
480-200133-4	H05-DITCH-01	Total/NA	Solid	Moisture	
480-200133-5	H05-DITCH-04	Total/NA	Solid	Moisture	

Client Sample ID: H02-DITCH-02
Lab Sample ID: 480-200133-1

Date Collected: 07/25/22 13:00
Matrix: Solid
Date Received: 07/27/22 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
TCLP	Leach	1311			635619	BML	EET BUF	08/01/22 08:02 - 08/02/22 08:25 ¹
TCLP	Prep	3010A			635832	NVK	EET BUF	08/02/22 11:13
TCLP	Analysis	6010C		1	636927	BMB	EET BUF	08/10/22 14:34
TCLP	Leach	1311			635619	BML	EET BUF	08/01/22 08:02 - 08/02/22 08:25 ¹
TCLP	Prep	3010A			635832	NVK	EET BUF	08/02/22 11:13
TCLP	Analysis	6010C		1	636166	BMB	EET BUF	08/03/22 14:38
TCLP	Leach	1311			635619	BML	EET BUF	08/01/22 08:02 - 08/02/22 08:25 ¹
TCLP	Prep	7470A			635843	NVK	EET BUF	08/02/22 11:44
TCLP	Analysis	7470A		1	635925	NVK	EET BUF	08/02/22 15:15
Total/NA	Analysis	Moisture		1	635192	KER	EET BUF	07/27/22 16:25

Client Sample ID: H02-DITCH-02
Lab Sample ID: 480-200133-1

Date Collected: 07/25/22 13:00
Matrix: Solid
Date Received: 07/27/22 10:00
Percent Solids: 78.2

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	5035A_L			635770	CDC	EET BUF	08/01/22 17:20
Total/NA	Analysis	8260C		1	635772	CDC	EET BUF	08/01/22 23:26
Total/NA	Prep	3550C			635362	SJM	EET BUF	07/28/22 15:24
Total/NA	Analysis	8270D		5	635498	PJQ	EET BUF	07/29/22 17:27

Client Sample ID: H04-DITCH-05
Lab Sample ID: 480-200133-2

Date Collected: 07/26/22 12:00
Matrix: Solid
Date Received: 07/27/22 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
TCLP	Leach	1311			635619	BML	EET BUF	08/01/22 08:02 - 08/02/22 08:25 ¹
TCLP	Prep	3010A			635832	NVK	EET BUF	08/02/22 11:13
TCLP	Analysis	6010C		5	636344	BMB	EET BUF	08/04/22 16:02
TCLP	Leach	1311			635619	BML	EET BUF	08/01/22 08:02 - 08/02/22 08:25 ¹
TCLP	Prep	3010A			635832	NVK	EET BUF	08/02/22 11:13
TCLP	Analysis	6010C		1	636166	BMB	EET BUF	08/03/22 14:59
TCLP	Leach	1311			635619	BML	EET BUF	08/01/22 08:02 - 08/02/22 08:25 ¹
TCLP	Prep	7470A			635843	NVK	EET BUF	08/02/22 11:44
TCLP	Analysis	7470A		1	635925	NVK	EET BUF	08/02/22 15:21
Total/NA	Analysis	Moisture		1	635192	KER	EET BUF	07/27/22 16:25

Client Sample ID: H04-DITCH-05
Lab Sample ID: 480-200133-2

Date Collected: 07/26/22 12:00
Matrix: Solid
Date Received: 07/27/22 10:00
Percent Solids: 85.1

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	5035A_L			635335	AXK	EET BUF	07/28/22 13:43
Total/NA	Analysis	8260C		1	635513	CDC	EET BUF	07/29/22 21:50
Total/NA	Prep	3550C			635362	SJM	EET BUF	07/28/22 15:24
Total/NA	Analysis	8270D		1	635498	PJQ	EET BUF	07/29/22 17:51

Lab Chronicle

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200133-1

Client Sample ID: H04-DITCH-06

Lab Sample ID: 480-200133-3

Date Collected: 07/26/22 09:30

Matrix: Solid

Date Received: 07/27/22 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
TCLP	Leach	1311			635619	BML	EET BUF	08/01/22 08:02 - 08/02/22 08:25 [1]
TCLP	Prep	3010A			635832	NVK	EET BUF	08/02/22 11:13
TCLP	Analysis	6010C		5	636344	BMB	EET BUF	08/04/22 16:06
TCLP	Leach	1311			635619	BML	EET BUF	08/01/22 08:02 - 08/02/22 08:25 [1]
TCLP	Prep	3010A			635832	NVK	EET BUF	08/02/22 11:13
TCLP	Analysis	6010C		1	636166	BMB	EET BUF	08/03/22 15:03
TCLP	Leach	1311			635619	BML	EET BUF	08/01/22 08:02 - 08/02/22 08:25 [1]
TCLP	Prep	7470A			635843	NVK	EET BUF	08/02/22 11:44
TCLP	Analysis	7470A		1	635925	NVK	EET BUF	08/02/22 15:22
Total/NA	Analysis	Moisture		1	635192	KER	EET BUF	07/27/22 16:25

Client Sample ID: H04-DITCH-06

Lab Sample ID: 480-200133-3

Date Collected: 07/26/22 09:30

Matrix: Solid

Date Received: 07/27/22 10:00

Percent Solids: 73.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	5035A_L			635770	CDC	EET BUF	08/01/22 17:20
Total/NA	Analysis	8260C		1	635772	CDC	EET BUF	08/01/22 23:50
Total/NA	Prep	3550C			635362	SJM	EET BUF	07/28/22 15:24
Total/NA	Analysis	8270D		1	635498	PJQ	EET BUF	07/29/22 17:02

Client Sample ID: H05-DITCH-01

Lab Sample ID: 480-200133-4

Date Collected: 07/26/22 11:30

Matrix: Solid

Date Received: 07/27/22 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
TCLP	Leach	1311			635619	BML	EET BUF	08/01/22 08:02 - 08/02/22 08:25 [1]
TCLP	Prep	3010A			635832	NVK	EET BUF	08/02/22 11:13
TCLP	Analysis	6010C		1	636166	BMB	EET BUF	08/03/22 15:18
TCLP	Leach	1311			635619	BML	EET BUF	08/01/22 08:02 - 08/02/22 08:25 [1]
TCLP	Prep	7470A			635843	NVK	EET BUF	08/02/22 11:44
TCLP	Analysis	7470A		1	635925	NVK	EET BUF	08/02/22 15:23
Total/NA	Analysis	Moisture		1	635192	KER	EET BUF	07/27/22 16:25

Client Sample ID: H05-DITCH-01

Lab Sample ID: 480-200133-4

Date Collected: 07/26/22 11:30

Matrix: Solid

Date Received: 07/27/22 10:00

Percent Solids: 80.6

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	5035A_L			635335	AXK	EET BUF	07/28/22 13:43
Total/NA	Analysis	8260C		1	635513	CDC	EET BUF	07/29/22 22:38
Total/NA	Prep	3550C			635362	SJM	EET BUF	07/28/22 15:24
Total/NA	Analysis	8270D		1	635498	PJQ	EET BUF	07/29/22 18:16

Lab Chronicle

Client: ARCADIS U.S. Inc
Job ID: 480-200133-1
Project/Site: GTEOSI - Seneca Falls

Client Sample ID: H05-DITCH-04
Lab Sample ID: 480-200133-5

Date Collected: 07/26/22 10:00
Matrix: Solid

Date Received: 07/27/22 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
TCLP	Leach	1311			635619	BML	EET BUF	08/01/22 08:02 - 08/02/22 08:25 [1]
TCLP	Prep	3010A			635832	NVK	EET BUF	08/02/22 11:13
TCLP	Analysis	6010C		5	636344	BMB	EET BUF	08/04/22 16:21
TCLP	Leach	1311			635619	BML	EET BUF	08/01/22 08:02 - 08/02/22 08:25 [1]
TCLP	Prep	3010A			635832	NVK	EET BUF	08/02/22 11:13
TCLP	Analysis	6010C		1	636166	BMB	EET BUF	08/03/22 15:22
TCLP	Leach	1311			635619	BML	EET BUF	08/01/22 08:02 - 08/02/22 08:25 [1]
TCLP	Prep	7470A			635843	NVK	EET BUF	08/02/22 11:44
TCLP	Analysis	7470A		1	635925	NVK	EET BUF	08/02/22 15:27
Total/NA	Analysis	Moisture		1	635192	KER	EET BUF	07/27/22 16:25

Client Sample ID: H05-DITCH-04
Lab Sample ID: 480-200133-5

Date Collected: 07/26/22 10:00
Matrix: Solid

Date Received: 07/27/22 10:00
Percent Solids: 67.1

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	5035A_L			635770	CDC	EET BUF	08/01/22 17:20
Total/NA	Analysis	8260C		1	635772	CDC	EET BUF	08/02/22 00:14
Total/NA	Prep	3550C			635362	SJM	EET BUF	07/28/22 15:24
Total/NA	Analysis	8270D		1	635498	PJQ	EET BUF	07/29/22 18:40

[1] Completion dates and times are reported or not reported per method requirements or individual lab discretion.

Laboratory References:

EET BUF = Eurofins Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

Accreditation/Certification Summary

Client: ARCADIS U.S. Inc
Job ID: 480-200133-1
Project/Site: GTEOSI - Seneca Falls

Laboratory: Eurofins Buffalo

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
New York	NELAP	10026	03-31-23

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
7470A	7470A	Solid	Mercury
Moisture		Solid	Percent Moisture
Moisture		Solid	Percent Solids

Method Summary

Client: ARCADIS U.S. Inc
Job ID: 480-200133-1
Project/Site: GTEOSI - Seneca Falls

Method	Method Description	Protocol	Laboratory
8260C	Volatile Organic Compounds by GC/MS	SW846	EET BUF
8270D	Semivolatile Organic Compounds (GC/MS)	SW846	EET BUF
6010C	Metals (ICP)	SW846	EET BUF
7470A	Mercury (CVAA)	SW846	EET BUF
Moisture	Percent Moisture	EPA	EET BUF
1311	TCLP Extraction	SW846	EET BUF
3010A	Preparation, Total Metals	SW846	EET BUF
3550C	Ultrasonic Extraction	SW846	EET BUF
5035A_L	Closed System Purge and Trap	SW846	EET BUF
7470A	Preparation, Mercury	SW846	EET BUF

Protocol References:

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EET BUF = Eurofins Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

Sample Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200133-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
480-200133-1	H02-DITCH-02	Solid	07/25/22 13:00	07/27/22 10:00
480-200133-2	H04-DITCH-05	Solid	07/26/22 12:00	07/27/22 10:00
480-200133-3	H04-DITCH-06	Solid	07/26/22 09:30	07/27/22 10:00
480-200133-4	H05-DITCH-01	Solid	07/26/22 11:30	07/27/22 10:00
480-200133-5	H05-DITCH-04	Solid	07/26/22 10:00	07/27/22 10:00

Eurofins TestAmerica, Buffalo
10 Hazelwood Drive

Amherst, NY 14228-2223
phone 716.691.2600 fax 716.691.7991

Chain of Custody Record

eurofins | Environment Testing America

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc. d/b/a Eurofins TestAmerica

Client Contact	**Project Manager: Mark Flusche**		COC No: 2
Company: Arcadis of New York, Inc.	Email: mark.flusche@arcadis.com	Site Contact: Ryan Clare	Date: 7/26/22 — 1 of 1 COCs
Address: 855 Route 146 Suite 210	Tel: 518-250-7322	Lab Contact: Schove, John R	Carrier: FedEx — TALS Project #:
Clifton Park, NY 12065	**Analysis Turnaround Time**		Sampler:
	☐ CALENDAR DAYS ☐ WORKING DAYS		**For Lab Use Only:**
	TAT if different from Below _____		Walk-in Client:
Project Name: GTEOSI - Seneca Falls	☑ 2 weeks		Lab Sampling:
Site:	☐ 1 week		Job / SDG No.:
PO #: 30112357.00055 Project #:	☐ 2 days ☐ 1 day		

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	Total VOCs (full suite)	Total SVOCs	TCLP Metals	Total Herb/Pest	Sample Specific Notes:
H02-DITCH-02	7/25/22	1300	Grab	Soil	4			X	X	X	X	HOLD - Total Herb/pest
H04-DITCH-05	7/26/22	1200	Grab	Soil	4			X	X	X	X	HOLD - Total Herb/pest
H04-DITCH-06	7/26/22	0930	Grab	Soil	4			X	X	X	X	HOLD - Total Herb/pest
H05-DITCH-01	7/26/22	1130	Grab	Soil	4			X	X	X	X	HOLD - Total Herb/Pest
H05-DITCH-04	7/26/22	1000	Grab	Soil	4			X	X	X	X	HOLD - Total Herb/pest
	/22		Grab	Soil								
	/22		Grab	Soil								
	/22		Grab	Soil								
	/22		Grab	Soil								
	/22		Grab	Soil								
	/22		Grab	Soil								
	/22		Grab	Soil								
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other								1	1	1		

480-200133 Chain of Custody

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☑ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☑ Disposal by Lab ☐ Archive for_____ Months

Special Instructions/QC Requirements & Comments: ***Contact Michelle Clayton prior to beginning analysis***

HOLD - Total Herbicides & pesticedes sample 2.7 # 1 ice

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:		Cooler Temp. (°C): Obs'd:_____ Corr'd:_____		Therm ID No.:_____
Relinquished by:	Company: Arcadis	Date/Time: 7/26/22 1600	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company: TA	Date/Time: 7/27/22 1000

Form No. CA-C-WI-002, Rev. 4.34, dated 8/3/2020

Login Sample Receipt Checklist

Client: ARCADIS U.S. Inc

Job Number: 480-200133-1

Login Number: 200133

List Source: Eurofins Buffalo

List Number: 1

Creator: Kolb, Chris M

Question	Answer	Comment
Radioactivity either was not measured or, if measured, is at or below background	True	
The cooler's custody seal, if present, is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time (Excluding tests with immediate HTs)..	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	N/A	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Sampling Company provided.	True	ARCADIS
Samples received within 48 hours of sampling.	True	
Samples requiring field filtration have been filtered in the field.	True	
Chlorine Residual checked.	N/A	

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ANALYTICAL REPORT

Eurofins Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Tel: (716)691-2600

Laboratory Job ID: 480-200133-3
Client Project/Site: GTEOSI - Seneca Falls

For:
ARCADIS U.S. Inc
855 Route 146
Suite 210
Clifton Park, New York 12065

Attn: Mark Flusche

Authorized for release by:
8/9/2022 3:22:35 PM
Judy Stone, Senior Project Manager
(484)685-0868
Judy.Stone@et.eurofinsus.com

Designee for

John Schove, Project Manager II
(716)504-9838
John.Schove@et.eurofinsus.com

LINKS

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The test results in this report meet all 2003 NELAC, 2009 TNI, and 2016 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Cover Page 1
Table of Contents 2
Definitions/Glossary 3
Case Narrative 4
Detection Summary 5
Client Sample Results 6
Surrogate Summary 11
QC Sample Results 12
QC Association Summary 16
Lab Chronicle 17
Certification Summary 19
Method Summary 20
Sample Summary 21
Chain of Custody 22
Receipt Checklists 23

Definitions/Glossary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200133-3

Qualifiers

GC Semi VOA

Qualifier	Qualifier Description
F1	MS and/or MSD recovery exceeds control limits.
F2	MS/MSD RPD exceeds control limits
S1+	Surrogate recovery exceeds control limits, high biased.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 480-200133-3

Laboratory: Eurofins Buffalo

Narrative

Job Narrative
480-200133-3

Comments
These samples were placed on hold originally per directions on the chain of custody (COC). They were activated for total pesticides and herbicides on 8/1/22.

Receipt
The samples were received on 7/27/2022 10:00 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 2.7º C.

GC Semi VOA
Method 8081B: The following samples were diluted due to the nature of the sample matrix: H02-DITCH-02 (480-200133-1) and H05-DITCH-01 (480-200133-4). As such, surrogate recoveries are below the calibration range, estimated and not representative. Elevated reporting limits (RLs) are provided.

Method 8081B: The following samples were diluted due to the nature of the sample matrix: (480-200133-C-1-A MS) and (480-200133-C-1-B MSD). As such, spike and surrogate recoveries are below the calibration range, estimated and not representative. Elevated reporting limits (RLs) are provided.

Method 8081B: The following samples were copper treated for 15 minutes as stated in method 3660B (Sulfur Removal Using Activated Copper Precipitation) and sulfur still remained in the samples: H02-DITCH-02 (480-200133-1), (480-200133-C-1-A MS) and (480-200133-C-1-B MSD).

Method 8081B: For method 8081 Pesticides, the majority of the peaks present in the sample extracts may be biphenyls indicating the presence of Aroclors. The results of the confirmed positive peak may be enhanced due to the biphenyl peaks present, and may be considered estimated for samples H04-DITCH-06 (480-200133-3) and H05-DITCH-04 (480-200133-5).

Method 8081B: The %RPD between the primary and confirmation column exceeded 40% for 4,4'-DDE, cis-Chlordane, Dieldrin, Endosulfan I and Endrin for the following sample: H05-DITCH-04 (480-200133-5). The lower values have been reported and qualified in accordance with the laboratory's SOP.

Method 8081B: The following sample was diluted due to the abundance of target analytes: H05-DITCH-04 (480-200133-5). As such, surrogate recoveries are below the calibration range, estimated and not representative. Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Organic Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Detection Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200133-3

Client Sample ID: H02-DITCH-02 — Lab Sample ID: 480-200133-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
4,4'-DDE	31	F1	21		ug/Kg	10	☼	8081B	Total/NA

Client Sample ID: H04-DITCH-05 — Lab Sample ID: 480-200133-2

No Detections.

Client Sample ID: H04-DITCH-06 — Lab Sample ID: 480-200133-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
4,4'-DDE	5.3		2.2		ug/Kg	1	☼	8081B	Total/NA

Client Sample ID: H05-DITCH-01 — Lab Sample ID: 480-200133-4

No Detections.

Client Sample ID: H05-DITCH-04 — Lab Sample ID: 480-200133-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
4,4'-DDE	49		24		ug/Kg	10	☼	8081B	Total/NA
cis-Chlordane	49		24		ug/Kg	10	☼	8081B	Total/NA
Dieldrin	67		24		ug/Kg	10	☼	8081B	Total/NA
Endosulfan I	37		24		ug/Kg	10	☼	8081B	Total/NA
Endrin	35		24		ug/Kg	10	☼	8081B	Total/NA
gamma-BHC (Lindane)	33		24		ug/Kg	10	☼	8081B	Total/NA
Heptachlor epoxide	280		24		ug/Kg	10	☼	8081B	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: H02-DITCH-02

Date Collected: 07/25/22 13:00
Date Received: 07/27/22 10:00

Lab Sample ID: 480-200133-1

Matrix: Solid
Percent Solids: 78.2

Method: 8081B - Organochlorine Pesticides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	ND		21		ug/Kg	☼	08/01/22 15:30	08/02/22 10:42	10
4,4'-DDE	**31**	**F1**	21		ug/Kg	☼	08/01/22 15:30	08/02/22 10:42	10
4,4'-DDT	ND	F1	21		ug/Kg	☼	08/01/22 15:30	08/02/22 10:42	10
Aldrin	ND		21		ug/Kg	☼	08/01/22 15:30	08/02/22 10:42	10
alpha-BHC	ND	F1	21		ug/Kg	☼	08/01/22 15:30	08/02/22 10:42	10
beta-BHC	ND	F1 F2	21		ug/Kg	☼	08/01/22 15:30	08/02/22 10:42	10
cis-Chlordane	ND		21		ug/Kg	☼	08/01/22 15:30	08/02/22 10:42	10
delta-BHC	ND	F1 F2	21		ug/Kg	☼	08/01/22 15:30	08/02/22 10:42	10
Dieldrin	ND	F1	21		ug/Kg	☼	08/01/22 15:30	08/02/22 10:42	10
Endosulfan I	ND	F1	21		ug/Kg	☼	08/01/22 15:30	08/02/22 10:42	10
Endosulfan II	ND		21		ug/Kg	☼	08/01/22 15:30	08/02/22 10:42	10
Endosulfan sulfate	ND		21		ug/Kg	☼	08/01/22 15:30	08/02/22 10:42	10
Endrin	ND	F2	21		ug/Kg	☼	08/01/22 15:30	08/02/22 10:42	10
Endrin aldehyde	ND	F1 F2	21		ug/Kg	☼	08/01/22 15:30	08/02/22 10:42	10
Endrin ketone	ND	F1	21		ug/Kg	☼	08/01/22 15:30	08/02/22 10:42	10
gamma-BHC (Lindane)	ND	F1 F2	21		ug/Kg	☼	08/01/22 15:30	08/02/22 10:42	10
Heptachlor	ND	F1	21		ug/Kg	☼	08/01/22 15:30	08/02/22 10:42	10
Heptachlor epoxide	ND		21		ug/Kg	☼	08/01/22 15:30	08/02/22 10:42	10
Methoxychlor	ND		21		ug/Kg	☼	08/01/22 15:30	08/02/22 10:42	10
Toxaphene	ND		210		ug/Kg	☼	08/01/22 15:30	08/02/22 10:42	10
trans-Chlordane	ND		21		ug/Kg	☼	08/01/22 15:30	08/02/22 10:42	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl	*121*	*S1+*	*45 - 120*	*08/01/22 15:30*	*08/02/22 10:42*	*10*
DCB Decachlorobiphenyl	*282*	*S1+*	*45 - 120*	*08/01/22 15:30*	*08/02/22 10:42*	*10*
Tetrachloro-m-xylene	*146*	*S1+*	*30 - 124*	*08/01/22 15:30*	*08/02/22 10:42*	*10*
Tetrachloro-m-xylene	*165*	*S1+*	*30 - 124*	*08/01/22 15:30*	*08/02/22 10:42*	*10*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4-D	ND		21		ug/Kg	☼	08/02/22 07:27	08/06/22 02:25	1
Silvex (2,4,5-TP)	ND		21		ug/Kg	☼	08/02/22 07:27	08/06/22 02:25	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*102*		*28 - 129*	*08/02/22 07:27*	*08/06/22 02:25*	*1*
2,4-Dichlorophenylacetic acid	*118*		*28 - 129*	*08/02/22 07:27*	*08/06/22 02:25*	*1*

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200133-3

Client Sample ID: H04-DITCH-05
Date Collected: 07/26/22 12:00
Date Received: 07/27/22 10:00

Lab Sample ID: 480-200133-2
Matrix: Solid
Percent Solids: 85.1

Method: 8081B - Organochlorine Pesticides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	ND		1.9		ug/Kg	☼	08/01/22 15:30	08/02/22 11:02	1
4,4'-DDE	ND		1.9		ug/Kg	☼	08/01/22 15:30	08/02/22 11:02	1
4,4'-DDT	ND		1.9		ug/Kg	☼	08/01/22 15:30	08/02/22 11:02	1
Aldrin	ND		1.9		ug/Kg	☼	08/01/22 15:30	08/02/22 11:02	1
alpha-BHC	ND		1.9		ug/Kg	☼	08/01/22 15:30	08/02/22 11:02	1
beta-BHC	ND		1.9		ug/Kg	☼	08/01/22 15:30	08/02/22 11:02	1
cis-Chlordane	ND		1.9		ug/Kg	☼	08/01/22 15:30	08/02/22 11:02	1
delta-BHC	ND		1.9		ug/Kg	☼	08/01/22 15:30	08/02/22 11:02	1
Dieldrin	ND		1.9		ug/Kg	☼	08/01/22 15:30	08/02/22 11:02	1
Endosulfan I	ND		1.9		ug/Kg	☼	08/01/22 15:30	08/02/22 11:02	1
Endosulfan II	ND		1.9		ug/Kg	☼	08/01/22 15:30	08/02/22 11:02	1
Endosulfan sulfate	ND		1.9		ug/Kg	☼	08/01/22 15:30	08/02/22 11:02	1
Endrin	ND		1.9		ug/Kg	☼	08/01/22 15:30	08/02/22 11:02	1
Endrin aldehyde	ND		1.9		ug/Kg	☼	08/01/22 15:30	08/02/22 11:02	1
Endrin ketone	ND		1.9		ug/Kg	☼	08/01/22 15:30	08/02/22 11:02	1
gamma-BHC (Lindane)	ND		1.9		ug/Kg	☼	08/01/22 15:30	08/02/22 11:02	1
Heptachlor	ND		1.9		ug/Kg	☼	08/01/22 15:30	08/02/22 11:02	1
Heptachlor epoxide	ND		1.9		ug/Kg	☼	08/01/22 15:30	08/02/22 11:02	1
Methoxychlor	ND		1.9		ug/Kg	☼	08/01/22 15:30	08/02/22 11:02	1
Toxaphene	ND		19		ug/Kg	☼	08/01/22 15:30	08/02/22 11:02	1
trans-Chlordane	ND		1.9		ug/Kg	☼	08/01/22 15:30	08/02/22 11:02	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl	*83*		*45 - 120*	*08/01/22 15:30*	*08/02/22 11:02*	*1*
DCB Decachlorobiphenyl	*89*		*45 - 120*	*08/01/22 15:30*	*08/02/22 11:02*	*1*
Tetrachloro-m-xylene	*93*		*30 - 124*	*08/01/22 15:30*	*08/02/22 11:02*	*1*
Tetrachloro-m-xylene	*81*		*30 - 124*	*08/01/22 15:30*	*08/02/22 11:02*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4-D	ND		20		ug/Kg	☼	08/02/22 07:27	08/06/22 02:55	1
Silvex (2,4,5-TP)	ND		20		ug/Kg	☼	08/02/22 07:27	08/06/22 02:55	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*74*		*28 - 129*	*08/02/22 07:27*	*08/06/22 02:55*	*1*
2,4-Dichlorophenylacetic acid	*74*		*28 - 129*	*08/02/22 07:27*	*08/06/22 02:55*	*1*

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200133-3

Client Sample ID: H04-DITCH-06
Date Collected: 07/26/22 09:30
Date Received: 07/27/22 10:00

Lab Sample ID: 480-200133-3
Matrix: Solid
Percent Solids: 73.8

Method: 8081B - Organochlorine Pesticides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	ND		2.2		ug/Kg	☼	08/01/22 15:30	08/02/22 11:22	1
4,4'-DDE	**5.3**		2.2		ug/Kg	☼	08/01/22 15:30	08/02/22 11:22	1
4,4'-DDT	ND		2.2		ug/Kg	☼	08/01/22 15:30	08/02/22 11:22	1
Aldrin	ND		2.2		ug/Kg	☼	08/01/22 15:30	08/02/22 11:22	1
alpha-BHC	ND		2.2		ug/Kg	☼	08/01/22 15:30	08/02/22 11:22	1
beta-BHC	ND		2.2		ug/Kg	☼	08/01/22 15:30	08/02/22 11:22	1
cis-Chlordane	ND		2.2		ug/Kg	☼	08/01/22 15:30	08/02/22 11:22	1
delta-BHC	ND		2.2		ug/Kg	☼	08/01/22 15:30	08/02/22 11:22	1
Dieldrin	ND		2.2		ug/Kg	☼	08/01/22 15:30	08/02/22 11:22	1
Endosulfan I	ND		2.2		ug/Kg	☼	08/01/22 15:30	08/02/22 11:22	1
Endosulfan II	ND		2.2		ug/Kg	☼	08/01/22 15:30	08/02/22 11:22	1
Endosulfan sulfate	ND		2.2		ug/Kg	☼	08/01/22 15:30	08/02/22 11:22	1
Endrin	ND		2.2		ug/Kg	☼	08/01/22 15:30	08/02/22 11:22	1
Endrin aldehyde	ND		2.2		ug/Kg	☼	08/01/22 15:30	08/02/22 11:22	1
Endrin ketone	ND		2.2		ug/Kg	☼	08/01/22 15:30	08/02/22 11:22	1
gamma-BHC (Lindane)	ND		2.2		ug/Kg	☼	08/01/22 15:30	08/02/22 11:22	1
Heptachlor	ND		2.2		ug/Kg	☼	08/01/22 15:30	08/02/22 11:22	1
Heptachlor epoxide	ND		2.2		ug/Kg	☼	08/01/22 15:30	08/02/22 11:22	1
Methoxychlor	ND		2.2		ug/Kg	☼	08/01/22 15:30	08/02/22 11:22	1
Toxaphene	ND		22		ug/Kg	☼	08/01/22 15:30	08/02/22 11:22	1
trans-Chlordane	ND		2.2		ug/Kg	☼	08/01/22 15:30	08/02/22 11:22	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl	*84*		*45 - 120*	*08/01/22 15:30*	*08/02/22 11:22*	*1*
DCB Decachlorobiphenyl	*92*		*45 - 120*	*08/01/22 15:30*	*08/02/22 11:22*	*1*
Tetrachloro-m-xylene	*92*		*30 - 124*	*08/01/22 15:30*	*08/02/22 11:22*	*1*
Tetrachloro-m-xylene	*77*		*30 - 124*	*08/01/22 15:30*	*08/02/22 11:22*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4-D	ND		22		ug/Kg	☼	08/02/22 07:27	08/06/22 03:25	1
Silvex (2,4,5-TP)	ND		22		ug/Kg	☼	08/02/22 07:27	08/06/22 03:25	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*81*		*28 - 129*	*08/02/22 07:27*	*08/06/22 03:25*	*1*
2,4-Dichlorophenylacetic acid	*89*		*28 - 129*	*08/02/22 07:27*	*08/06/22 03:25*	*1*

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200133-3

Client Sample ID: H05-DITCH-01
Date Collected: 07/26/22 11:30
Date Received: 07/27/22 10:00

Lab Sample ID: 480-200133-4
Matrix: Solid
Percent Solids: 80.6

Method: 8081B - Organochlorine Pesticides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	ND		21		ug/Kg	☼	08/01/22 15:30	08/02/22 11:42	10
4,4'-DDE	ND		21		ug/Kg	☼	08/01/22 15:30	08/02/22 11:42	10
4,4'-DDT	ND		21		ug/Kg	☼	08/01/22 15:30	08/02/22 11:42	10
Aldrin	ND		21		ug/Kg	☼	08/01/22 15:30	08/02/22 11:42	10
alpha-BHC	ND		21		ug/Kg	☼	08/01/22 15:30	08/02/22 11:42	10
beta-BHC	ND		21		ug/Kg	☼	08/01/22 15:30	08/02/22 11:42	10
cis-Chlordane	ND		21		ug/Kg	☼	08/01/22 15:30	08/02/22 11:42	10
delta-BHC	ND		21		ug/Kg	☼	08/01/22 15:30	08/02/22 11:42	10
Dieldrin	ND		21		ug/Kg	☼	08/01/22 15:30	08/02/22 11:42	10
Endosulfan I	ND		21		ug/Kg	☼	08/01/22 15:30	08/02/22 11:42	10
Endosulfan II	ND		21		ug/Kg	☼	08/01/22 15:30	08/02/22 11:42	10
Endosulfan sulfate	ND		21		ug/Kg	☼	08/01/22 15:30	08/02/22 11:42	10
Endrin	ND		21		ug/Kg	☼	08/01/22 15:30	08/02/22 11:42	10
Endrin aldehyde	ND		21		ug/Kg	☼	08/01/22 15:30	08/02/22 11:42	10
Endrin ketone	ND		21		ug/Kg	☼	08/01/22 15:30	08/02/22 11:42	10
gamma-BHC (Lindane)	ND		21		ug/Kg	☼	08/01/22 15:30	08/02/22 11:42	10
Heptachlor	ND		21		ug/Kg	☼	08/01/22 15:30	08/02/22 11:42	10
Heptachlor epoxide	ND		21		ug/Kg	☼	08/01/22 15:30	08/02/22 11:42	10
Methoxychlor	ND		21		ug/Kg	☼	08/01/22 15:30	08/02/22 11:42	10
Toxaphene	ND		210		ug/Kg	☼	08/01/22 15:30	08/02/22 11:42	10
trans-Chlordane	ND		21		ug/Kg	☼	08/01/22 15:30	08/02/22 11:42	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl	*120*		*45 - 120*	*08/01/22 15:30*	*08/02/22 11:42*	*10*
DCB Decachlorobiphenyl	*101*		*45 - 120*	*08/01/22 15:30*	*08/02/22 11:42*	*10*
Tetrachloro-m-xylene	*120*		*30 - 124*	*08/01/22 15:30*	*08/02/22 11:42*	*10*
Tetrachloro-m-xylene	*108*		*30 - 124*	*08/01/22 15:30*	*08/02/22 11:42*	*10*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4-D	ND		20		ug/Kg	☼	08/02/22 07:27	08/06/22 03:54	1
Silvex (2,4,5-TP)	ND		20		ug/Kg	☼	08/02/22 07:27	08/06/22 03:54	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*83*		*28 - 129*	*08/02/22 07:27*	*08/06/22 03:54*	*1*
2,4-Dichlorophenylacetic acid	*81*		*28 - 129*	*08/02/22 07:27*	*08/06/22 03:54*	*1*

Client Sample ID: H05-DITCH-04

Date Collected: 07/26/22 10:00
Date Received: 07/27/22 10:00

Lab Sample ID: 480-200133-5

Matrix: Solid
Percent Solids: 67.1

Method: 8081B - Organochlorine Pesticides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	ND		24		ug/Kg	☼	08/01/22 15:30	08/03/22 11:42	10
4,4'-DDE	**49**		24		ug/Kg	☼	08/01/22 15:30	08/03/22 11:42	10
4,4'-DDT	ND		24		ug/Kg	☼	08/01/22 15:30	08/03/22 11:42	10
Aldrin	ND		24		ug/Kg	☼	08/01/22 15:30	08/03/22 11:42	10
alpha-BHC	ND		24		ug/Kg	☼	08/01/22 15:30	08/03/22 11:42	10
beta-BHC	ND		24		ug/Kg	☼	08/01/22 15:30	08/03/22 11:42	10
cis-Chlordane	**49**		24		ug/Kg	☼	08/01/22 15:30	08/03/22 11:42	10
delta-BHC	ND		24		ug/Kg	☼	08/01/22 15:30	08/03/22 11:42	10
Dieldrin	**67**		24		ug/Kg	☼	08/01/22 15:30	08/03/22 11:42	10
Endosulfan I	**37**		24		ug/Kg	☼	08/01/22 15:30	08/03/22 11:42	10
Endosulfan II	ND		24		ug/Kg	☼	08/01/22 15:30	08/03/22 11:42	10
Endosulfan sulfate	ND		24		ug/Kg	☼	08/01/22 15:30	08/03/22 11:42	10
Endrin	**35**		24		ug/Kg	☼	08/01/22 15:30	08/03/22 11:42	10
Endrin aldehyde	ND		24		ug/Kg	☼	08/01/22 15:30	08/03/22 11:42	10
Endrin ketone	ND		24		ug/Kg	☼	08/01/22 15:30	08/03/22 11:42	10
gamma-BHC (Lindane)	**33**		24		ug/Kg	☼	08/01/22 15:30	08/03/22 11:42	10
Heptachlor	ND		24		ug/Kg	☼	08/01/22 15:30	08/03/22 11:42	10
Heptachlor epoxide	**280**		24		ug/Kg	☼	08/01/22 15:30	08/03/22 11:42	10
Methoxychlor	ND		24		ug/Kg	☼	08/01/22 15:30	08/03/22 11:42	10
Toxaphene	ND		240		ug/Kg	☼	08/01/22 15:30	08/03/22 11:42	10
trans-Chlordane	ND		24		ug/Kg	☼	08/01/22 15:30	08/03/22 11:42	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl	*135*	*S1+*	*45 - 120*	*08/01/22 15:30*	*08/03/22 11:42*	*10*
DCB Decachlorobiphenyl	*117*		*45 - 120*	*08/01/22 15:30*	*08/03/22 11:42*	*10*
Tetrachloro-m-xylene	*101*		*30 - 124*	*08/01/22 15:30*	*08/03/22 11:42*	*10*
Tetrachloro-m-xylene	*121*		*30 - 124*	*08/01/22 15:30*	*08/03/22 11:42*	*10*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4-D	ND		24		ug/Kg	☼	08/02/22 07:27	08/06/22 04:24	1
Silvex (2,4,5-TP)	ND		24		ug/Kg	☼	08/02/22 07:27	08/06/22 04:24	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*70*		*28 - 129*	*08/02/22 07:27*	*08/06/22 04:24*	*1*
2,4-Dichlorophenylacetic acid	*72*		*28 - 129*	*08/02/22 07:27*	*08/06/22 04:24*	*1*

Surrogate Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200133-3

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)			
		DCBP1	DCBP2	TCX1	TCX2
Lab Sample ID	Client Sample ID	(45-120)	(45-120)	(30-124)	(30-124)
480-200133-1	H02-DITCH-02	121 S1+	282 S1+	146 S1+	165 S1+
480-200133-1 MS	H02-DITCH-02	137 S1+	255 S1+	162 S1+	467 S1+
480-200133-1 MSD	H02-DITCH-02	119	264 S1+	151 S1+	99
480-200133-2	H04-DITCH-05	83	89	93	81
480-200133-3	H04-DITCH-06	84	92	92	77
480-200133-4	H05-DITCH-01	120	101	120	108
480-200133-5	H05-DITCH-04	135 S1+	117	101	121
LCS 480-635748/2-A	Lab Control Sample	104	106	99	83
MB 480-635748/1-A	Method Blank	100	100	97	78

Surrogate Legend

DCBP = DCB Decachlorobiphenyl

TCX = Tetrachloro-m-xylene

Method: 8151A - Herbicides (GC)

Matrix: Solid

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)	
		DCPAA1	DCPAA2
Lab Sample ID	Client Sample ID	(28-129)	(28-129)
480-200133-1	H02-DITCH-02	102	118
480-200133-2	H04-DITCH-05	74	74
480-200133-3	H04-DITCH-06	81	89
480-200133-4	H05-DITCH-01	83	81
480-200133-5	H05-DITCH-04	70	72
LCS 480-635783/2-A	Lab Control Sample	73	62
MB 480-635783/1-A	Method Blank	81	64

Surrogate Legend

DCPAA = 2,4-Dichlorophenylacetic acid

Method: 8081B - Organochlorine Pesticides (GC)

Lab Sample ID: MB 480-635748/1-A
Matrix: Solid
Analysis Batch: 635785

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 635748

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	ND		1.7		ug/Kg		08/01/22 15:30	08/02/22 09:24	1
4,4'-DDE	ND		1.7		ug/Kg		08/01/22 15:30	08/02/22 09:24	1
4,4'-DDT	ND		1.7		ug/Kg		08/01/22 15:30	08/02/22 09:24	1
Aldrin	ND		1.7		ug/Kg		08/01/22 15:30	08/02/22 09:24	1
alpha-BHC	ND		1.7		ug/Kg		08/01/22 15:30	08/02/22 09:24	1
beta-BHC	ND		1.7		ug/Kg		08/01/22 15:30	08/02/22 09:24	1
cis-Chlordane	ND		1.7		ug/Kg		08/01/22 15:30	08/02/22 09:24	1
delta-BHC	ND		1.7		ug/Kg		08/01/22 15:30	08/02/22 09:24	1
Dieldrin	ND		1.7		ug/Kg		08/01/22 15:30	08/02/22 09:24	1
Endosulfan I	ND		1.7		ug/Kg		08/01/22 15:30	08/02/22 09:24	1
Endosulfan II	ND		1.7		ug/Kg		08/01/22 15:30	08/02/22 09:24	1
Endosulfan sulfate	ND		1.7		ug/Kg		08/01/22 15:30	08/02/22 09:24	1
Endrin	ND		1.7		ug/Kg		08/01/22 15:30	08/02/22 09:24	1
Endrin aldehyde	ND		1.7		ug/Kg		08/01/22 15:30	08/02/22 09:24	1
Endrin ketone	ND		1.7		ug/Kg		08/01/22 15:30	08/02/22 09:24	1
gamma-BHC (Lindane)	ND		1.7		ug/Kg		08/01/22 15:30	08/02/22 09:24	1
Heptachlor	ND		1.7		ug/Kg		08/01/22 15:30	08/02/22 09:24	1
Heptachlor epoxide	ND		1.7		ug/Kg		08/01/22 15:30	08/02/22 09:24	1
Methoxychlor	ND		1.7		ug/Kg		08/01/22 15:30	08/02/22 09:24	1
Toxaphene	ND		17		ug/Kg		08/01/22 15:30	08/02/22 09:24	1
trans-Chlordane	ND		1.7		ug/Kg		08/01/22 15:30	08/02/22 09:24	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl	*100*		*45 - 120*	*08/01/22 15:30*	*08/02/22 09:24*	*1*
DCB Decachlorobiphenyl	*100*		*45 - 120*	*08/01/22 15:30*	*08/02/22 09:24*	*1*
Tetrachloro-m-xylene	*97*		*30 - 124*	*08/01/22 15:30*	*08/02/22 09:24*	*1*
Tetrachloro-m-xylene	*78*		*30 - 124*	*08/01/22 15:30*	*08/02/22 09:24*	*1*

Lab Sample ID: LCS 480-635748/2-A
Matrix: Solid
Analysis Batch: 635785

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 635748

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
4,4'-DDD	16.5	16.7		ug/Kg		101	56 - 120
4,4'-DDE	16.5	15.9		ug/Kg		96	44 - 120
4,4'-DDT	16.5	16.5		ug/Kg		100	38 - 120
Aldrin	16.5	14.5		ug/Kg		88	38 - 120
alpha-BHC	16.5	15.1		ug/Kg		91	39 - 120
beta-BHC	16.5	15.3		ug/Kg		92	40 - 120
cis-Chlordane	16.5	12.2		ug/Kg		74	47 - 120
delta-BHC	16.5	16.2		ug/Kg		98	45 - 120
Dieldrin	16.5	15.1		ug/Kg		91	58 - 120
Endosulfan I	16.5	17.0		ug/Kg		103	49 - 120
Endosulfan II	16.5	16.1		ug/Kg		98	55 - 120
Endosulfan sulfate	16.5	17.6		ug/Kg		107	49 - 124
Endrin	16.5	15.1		ug/Kg		91	58 - 120
Endrin aldehyde	16.5	16.4		ug/Kg		99	37 - 121
Endrin ketone	16.5	16.6		ug/Kg		101	46 - 123

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: LCS 480-635748/2-A
Matrix: Solid
Analysis Batch: 635785

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 635748

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
gamma-BHC (Lindane)	16.5	14.9		ug/Kg		90	50 - 120
Heptachlor	16.5	16.6		ug/Kg		100	50 - 120
Heptachlor epoxide	16.5	17.0		ug/Kg		103	50 - 120
Methoxychlor	16.5	17.3		ug/Kg		105	58 - 133
trans-Chlordane	16.5	15.8		ug/Kg		96	48 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
DCB Decachlorobiphenyl	*104*		*45 - 120*
DCB Decachlorobiphenyl	*106*		*45 - 120*
Tetrachloro-m-xylene	*99*		*30 - 124*
Tetrachloro-m-xylene	*83*		*30 - 124*

Lab Sample ID: 480-200133-1 MS
Matrix: Solid
Analysis Batch: 635785

Client Sample ID: H02-DITCH-02
Prep Type: Total/NA
Prep Batch: 635748

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
4,4'-DDD	ND		21.0	22.1		ug/Kg	☼	105	37 - 126
4,4'-DDE	36	F1	21.0	34.7	F1	ug/Kg	☼	-8	34 - 120
4,4'-DDT	ND	F1	21.0	36.7	F1	ug/Kg	☼	175	43 - 123
Aldrin	ND	F2	21.0	21.8		ug/Kg	☼	103	37 - 125
alpha-BHC	ND		21.0	27.0	F1	ug/Kg	☼	128	39 - 120
beta-BHC	ND	F1 F2	21.0	21.7	F1	ug/Kg	☼	-0.7	36 - 120
cis-Chlordane	ND		21.0	ND		ug/Kg	☼	84	35 - 120
delta-BHC	ND	F1 F2	21.0	45.0	F1	ug/Kg	☼	152	34 - 120
Dieldrin	ND	F1	21.0	49.0	F1	ug/Kg	☼	177	45 - 120
Endosulfan I	ND		21.0	26.5	F1	ug/Kg	☼	126	39 - 120
Endosulfan II	ND		21.0	ND		ug/Kg	☼	70	34 - 126
Endosulfan sulfate	ND		21.0	ND		ug/Kg	☼	68	27 - 130
Endrin	ND	F2	21.0	ND		ug/Kg	☼	49	47 - 121
Endrin aldehyde	ND	F1 F2	21.0	26.9	F1	ug/Kg	☼	128	33 - 123
Endrin ketone	ND	F1	21.0	31.3	F1	ug/Kg	☼	149	43 - 126
gamma-BHC (Lindane)	ND	F1 F2	21.0	38.3	F1	ug/Kg	☼	182	50 - 120
Heptachlor	ND	F1	21.0	51.6	F1	ug/Kg	☼	164	42 - 120
Heptachlor epoxide	ND		21.0	27.7		ug/Kg	☼	87	40 - 120
Methoxychlor	ND		21.0	34.6		ug/Kg	☼	73	44 - 150
trans-Chlordane	ND		21.0	ND		ug/Kg	☼	86	31 - 120

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
DCB Decachlorobiphenyl	*137*	*S1+*	*45 - 120*
DCB Decachlorobiphenyl	*255*	*S1+*	*45 - 120*
Tetrachloro-m-xylene	*162*	*S1+*	*30 - 124*
Tetrachloro-m-xylene	*467*	*S1+*	*30 - 124*

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: 480-200133-1 MSD
Matrix: Solid
Analysis Batch: 635785

Client Sample ID: H02-DITCH-02
Prep Type: Total/NA
Prep Batch: 635748

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
4,4'-DDD	ND		20.8	22.3		ug/Kg	☼	107	37 - 126	1	21
4,4'-DDE	36	F1	20.8	41.6	F1	ug/Kg	☼	25	34 - 120	18	18
4,4'-DDT	ND	F1	20.8	36.9	F1	ug/Kg	☼	178	43 - 123	1	25
Aldrin	ND		20.8	ND		ug/Kg	☼	96	37 - 125	1	12
alpha-BHC	ND		20.8	24.9		ug/Kg	☼	119	39 - 120	8	15
beta-BHC	ND	F1 F2	20.8	ND	F2	ug/Kg	☼	55	36 - 120	50	19
cis-Chlordane	ND		20.8	ND		ug/Kg	☼	86	35 - 120	2	23
delta-BHC	ND	F1 F2	20.8	38.6	F1 F2	ug/Kg	☼	20	34 - 120	58	14
Dieldrin	ND	F1	20.8	52.6	F1	ug/Kg	☼	197	45 - 120	7	12
Endosulfan I	ND		20.8	29.4	F1	ug/Kg	☼	141	39 - 120	10	18
Endosulfan II	ND		20.8	21.5		ug/Kg	☼	74	34 - 126	4	26
Endosulfan sulfate	ND		20.8	ND		ug/Kg	☼	74	27 - 130	7	35
Endrin	ND	F2	20.8	24.0	F2	ug/Kg	☼	76	47 - 121	26	20
Endrin aldehyde	ND	F1 F2	20.8	ND	F2	ug/Kg	☼	66	33 - 123	65	47
Endrin ketone	ND	F1	20.8	30.9	F1	ug/Kg	☼	148	43 - 126	1	37
gamma-BHC (Lindane)	ND	F1 F2	20.8	52.4	F1 F2	ug/Kg	☼	252	50 - 120	31	12
Heptachlor	ND	F1	20.8	54.9	F1	ug/Kg	☼	181	42 - 120	6	22
Heptachlor epoxide	ND		20.8	26.9		ug/Kg	☼	84	40 - 120	3	15
Methoxychlor	ND		20.8	37.9		ug/Kg	☼	89	44 - 150	9	24
trans-Chlordane	ND		20.8	ND		ug/Kg	☼	78	31 - 120	11	15

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
DCB Decachlorobiphenyl	*119*		*45 - 120*
DCB Decachlorobiphenyl	*264*	*S1+*	*45 - 120*
Tetrachloro-m-xylene	*151*	*S1+*	*30 - 124*
Tetrachloro-m-xylene	*99*		*30 - 124*

Method: 8151A - Herbicides (GC)

Lab Sample ID: MB 480-635783/1-A
Matrix: Solid
Analysis Batch: 636351

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 635783

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4-D	ND		16		ug/Kg		08/02/22 07:27	08/05/22 23:57	1
Silvex (2,4,5-TP)	ND		16		ug/Kg		08/02/22 07:27	08/05/22 23:57	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*81*		*28 - 129*	*08/02/22 07:27*	*08/05/22 23:57*	*1*
2,4-Dichlorophenylacetic acid	*64*		*28 - 129*	*08/02/22 07:27*	*08/05/22 23:57*	*1*

Lab Sample ID: LCS 480-635783/2-A
Matrix: Solid
Analysis Batch: 636351

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 635783

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
2,4-D	66.1	44.5		ug/Kg		67	40 - 120
Silvex (2,4,5-TP)	66.1	41.1		ug/Kg		62	39 - 125

Method: 8151A - Herbicides (GC) (Continued)

Lab Sample ID: LCS 480-635783/2-A
Matrix: Solid
Analysis Batch: 636351

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 635783

Surrogate	LCS %Recovery	LCS Qualifier	Limits
2,4-Dichlorophenylacetic acid	73		28 - 129
2,4-Dichlorophenylacetic acid	62		28 - 129

QC Association Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200133-3

GC Semi VOA

Prep Batch: 635748

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200133-1	H02-DITCH-02	Total/NA	Solid	3550C	
480-200133-2	H04-DITCH-05	Total/NA	Solid	3550C	
480-200133-3	H04-DITCH-06	Total/NA	Solid	3550C	
480-200133-4	H05-DITCH-01	Total/NA	Solid	3550C	
480-200133-5	H05-DITCH-04	Total/NA	Solid	3550C	
MB 480-635748/1-A	Method Blank	Total/NA	Solid	3550C	
LCS 480-635748/2-A	Lab Control Sample	Total/NA	Solid	3550C	
480-200133-1 MS	H02-DITCH-02	Total/NA	Solid	3550C	
480-200133-1 MSD	H02-DITCH-02	Total/NA	Solid	3550C	

Prep Batch: 635783

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200133-1	H02-DITCH-02	Total/NA	Solid	8151A	
480-200133-2	H04-DITCH-05	Total/NA	Solid	8151A	
480-200133-3	H04-DITCH-06	Total/NA	Solid	8151A	
480-200133-4	H05-DITCH-01	Total/NA	Solid	8151A	
480-200133-5	H05-DITCH-04	Total/NA	Solid	8151A	
MB 480-635783/1-A	Method Blank	Total/NA	Solid	8151A	
LCS 480-635783/2-A	Lab Control Sample	Total/NA	Solid	8151A	

Analysis Batch: 635785

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200133-1	H02-DITCH-02	Total/NA	Solid	8081B	635748
480-200133-2	H04-DITCH-05	Total/NA	Solid	8081B	635748
480-200133-3	H04-DITCH-06	Total/NA	Solid	8081B	635748
480-200133-4	H05-DITCH-01	Total/NA	Solid	8081B	635748
MB 480-635748/1-A	Method Blank	Total/NA	Solid	8081B	635748
LCS 480-635748/2-A	Lab Control Sample	Total/NA	Solid	8081B	635748
480-200133-1 MS	H02-DITCH-02	Total/NA	Solid	8081B	635748
480-200133-1 MSD	H02-DITCH-02	Total/NA	Solid	8081B	635748

Analysis Batch: 635954

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200133-5	H05-DITCH-04	Total/NA	Solid	8081B	635748

Analysis Batch: 636351

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200133-1	H02-DITCH-02	Total/NA	Solid	8151A	635783
480-200133-2	H04-DITCH-05	Total/NA	Solid	8151A	635783
480-200133-3	H04-DITCH-06	Total/NA	Solid	8151A	635783
480-200133-4	H05-DITCH-01	Total/NA	Solid	8151A	635783
480-200133-5	H05-DITCH-04	Total/NA	Solid	8151A	635783
MB 480-635783/1-A	Method Blank	Total/NA	Solid	8151A	635783
LCS 480-635783/2-A	Lab Control Sample	Total/NA	Solid	8151A	635783

Lab Chronicle

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200133-3

Client Sample ID: H02-DITCH-02
Lab Sample ID: 480-200133-1
Date Collected: 07/25/22 13:00
Matrix: Solid
Date Received: 07/27/22 10:00
Percent Solids: 78.2

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			635748	08/01/22 15:30	SJM	EETNE BUF
Total/NA	Analysis	8081B		10	635785	08/02/22 10:42	JLS	EETNE BUF
Total/NA	Prep	8151A			635783	08/02/22 07:27	SMP	EETNE BUF
Total/NA	Analysis	8151A		1	636351	08/06/22 02:25	MAN	EETNE BUF

Client Sample ID: H04-DITCH-05
Lab Sample ID: 480-200133-2
Date Collected: 07/26/22 12:00
Matrix: Solid
Date Received: 07/27/22 10:00
Percent Solids: 85.1

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			635748	08/01/22 15:30	SJM	EETNE BUF
Total/NA	Analysis	8081B		1	635785	08/02/22 11:02	JLS	EETNE BUF
Total/NA	Prep	8151A			635783	08/02/22 07:27	SMP	EETNE BUF
Total/NA	Analysis	8151A		1	636351	08/06/22 02:55	MAN	EETNE BUF

Client Sample ID: H04-DITCH-06
Lab Sample ID: 480-200133-3
Date Collected: 07/26/22 09:30
Matrix: Solid
Date Received: 07/27/22 10:00
Percent Solids: 73.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			635748	08/01/22 15:30	SJM	EETNE BUF
Total/NA	Analysis	8081B		1	635785	08/02/22 11:22	JLS	EETNE BUF
Total/NA	Prep	8151A			635783	08/02/22 07:27	SMP	EETNE BUF
Total/NA	Analysis	8151A		1	636351	08/06/22 03:25	MAN	EETNE BUF

Client Sample ID: H05-DITCH-01
Lab Sample ID: 480-200133-4
Date Collected: 07/26/22 11:30
Matrix: Solid
Date Received: 07/27/22 10:00
Percent Solids: 80.6

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			635748	08/01/22 15:30	SJM	EETNE BUF
Total/NA	Analysis	8081B		10	635785	08/02/22 11:42	JLS	EETNE BUF
Total/NA	Prep	8151A			635783	08/02/22 07:27	SMP	EETNE BUF
Total/NA	Analysis	8151A		1	636351	08/06/22 03:54	MAN	EETNE BUF

Client Sample ID: H05-DITCH-04
Lab Sample ID: 480-200133-5
Date Collected: 07/26/22 10:00
Matrix: Solid
Date Received: 07/27/22 10:00
Percent Solids: 67.1

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			635748	08/01/22 15:30	SJM	EETNE BUF
Total/NA	Analysis	8081B		10	635954	08/03/22 11:42	JLS	EETNE BUF
Total/NA	Prep	8151A			635783	08/02/22 07:27	SMP	EETNE BUF
Total/NA	Analysis	8151A		1	636351	08/06/22 04:24	MAN	EETNE BUF

Lab Chronicle

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200133-3

Laboratory References:

EETNE BUF = Eurofins Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

Accreditation/Certification Summary

Client: ARCADIS U.S. Inc
Job ID: 480-200133-3
Project/Site: GTEOSI - Seneca Falls

Laboratory: Eurofins Buffalo

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
New York	NELAP	10026	03-31-23

Method Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200133-3

Method	Method Description	Protocol	Laboratory
8081B	Organochlorine Pesticides (GC)	SW846	EETNE BUF
8151A	Herbicides (GC)	SW846	EETNE BUF
3550C	Ultrasonic Extraction	SW846	EETNE BUF
8151A	Extraction (Herbicides)	SW846	EETNE BUF

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EETNE BUF = Eurofins Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

Sample Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200133-3

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
480-200133-1	H02-DITCH-02	Solid	07/25/22 13:00	07/27/22 10:00
480-200133-2	H04-DITCH-05	Solid	07/26/22 12:00	07/27/22 10:00
480-200133-3	H04-DITCH-06	Solid	07/26/22 09:30	07/27/22 10:00
480-200133-4	H05-DITCH-01	Solid	07/26/22 11:30	07/27/22 10:00
480-200133-5	H05-DITCH-04	Solid	07/26/22 10:00	07/27/22 10:00

Eurofins TestAmerica, Buffalo
10 Hazelwood Drive

Amherst, NY 14228-2223
phone 716.691.2600 fax 716.691.7991

Chain of Custody Record

eurofins | Environment Testing America

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc. d/b/a Eurofins TestAmerica

Client Contact	**Project Manager: Mark Flusche**		COC No: 2
Company: Arcadis of New York, Inc.	Email: mark.flusche@arcadis.com	Site Contact: Ryan Clare	Date: 7/26/22 — 1 of 1 COCs
Address: 855 Route 146 Suite 210	Tel: 518-250-7322	Lab Contact: Schove, John R	Carrier: FedEx — TALS Project #:
Clifton Park, NY 12065	**Analysis Turnaround Time**		Sampler:
	☐ CALENDAR DAYS ☐ WORKING DAYS		**For Lab Use Only:**
	TAT if different from Below _____		Walk-in Client:
Project Name: GTEOSI - Seneca Falls	☑ 2 weeks		Lab Sampling:
Site:	☐ 1 week		Job / SDG No.:
PO #: 30112357.00055 Project #:	☐ 2 days ☐ 1 day		

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	Total VOCs (full suite)	Total SVOCs	TCLP Metals	Total Herb/Pest	Sample Specific Notes:
H02-DITCH-02	7/25/22	1300	Grab	Soil	4			X	X	X	X	HOLD - Total Herb/pest
H04-DITCH-05	7/26/22	1200	Grab	Soil	4			X	X	X	X	HOLD - Total Herb/pest
H04-DITCH-06	7/26/22	0930	Grab	Soil	4			X	X	X	X	HOLD - Total Herb/pest
H05-DITCH-01	7/26/22	1130	Grab	Soil	4			X	X	X	X	HOLD - Total Herb/pest
H05-DITCH-04	7/26/22	1000	Grab	Soil	4			X	X	X	X	HOLD - Total Herb/pest
	/22		Grab	Soil								
	/22		Grab	Soil								
	/22		Grab	Soil								
	/22		Grab	Soil								
	/22		Grab	Soil								
	/22		Grab	Soil								
	/22		Grab	Soil								
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other								1	1	1		

480-200133 Chain of Custody

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☑ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☑ Disposal by Lab ☐ Archive for_____ Months

Special Instructions/QC Requirements & Comments: ***Contact Michelle Clayton prior to beginning analysis***

HOLD - Total Herbicides & pesticedes sample 2.7 # ICE

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:		Cooler Temp. (°C): Obs'd:_____ Corr'd:_____		Therm ID No.:_____
Relinquished by: [signature]	Company: Arcadis	Date/Time: 7/26/22 1600	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by: [signature]	Company: TAL B	Date/Time: 7/27/22 1000

Form No. CA-C-WI-002, Rev. 4.34, dated 8/3/2020

8/9/2022

Login Sample Receipt Checklist

Client: ARCADIS U.S. Inc

Job Number: 480-200133-3

Login Number: 200133
List Number: 1
Creator: Kolb, Chris M

List Source: Eurofins Buffalo

Question	Answer	Comment
Radioactivity either was not measured or, if measured, is at or below background	True	
The cooler's custody seal, if present, is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time (Excluding tests with immediate HTs)..	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	N/A	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Sampling Company provided.	True	ARCADIS
Samples received within 48 hours of sampling.	True	
Samples requiring field filtration have been filtered in the field.	True	
Chlorine Residual checked.	N/A	

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ANALYTICAL REPORT

Eurofins Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Tel: (716)691-2600

Laboratory Job ID: 480-200014-3
Client Project/Site: GTEOSI - Seneca Falls

For:
ARCADIS U.S. Inc
855 Route 146
Suite 210
Clifton Park, New York 12065

Attn: Mark Flusche

Authorized for release by:
8/4/2022 3:36:22 PM
Judy Stone, Senior Project Manager
(484)685-0868
Judy.Stone@et.eurofinsus.com

Designee for

John Schove, Project Manager II
(716)504-9838
John.Schove@et.eurofinsus.com

The test results in this report meet all 2003 NELAC, 2009 TNI, and 2016 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

LINKS

Review your project results through my EOL

Have a Question? Ask The Expert

Visit us at: www.eurofinsus.com/Env

Table of Contents

Cover Page 1
Table of Contents 2
Definitions/Glossary 3
Case Narrative 4
Detection Summary 5
Client Sample Results 6
Surrogate Summary 8
QC Sample Results 9
QC Association Summary 13
Lab Chronicle 15
Certification Summary 16
Method Summary 17
Sample Summary 18
Chain of Custody 19
Receipt Checklists 21

Definitions/Glossary

Client: ARCADIS U.S. Inc
Job ID: 480-200014-3
Project/Site: GTEOSI - Seneca Falls

Qualifiers

GC Semi VOA

Qualifier	Qualifier Description
S1-	Surrogate recovery exceeds control limits, low biased.
S1+	Surrogate recovery exceeds control limits, high biased.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 480-200014-3

Laboratory: Eurofins Buffalo

Narrative

Job Narrative
480-200014-3

Comments
No additional comments.

Receipt
The samples were received on 7/22/2022 9:30 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperatures of the 2 coolers at receipt time were 4.0º C and 4.6º C.

GC Semi VOA
Method 8151A: Surrogate recoveries for the following samples were outside control limits: H067-EX3-COMP (480-200014-6), H067-EX4-COMP (480-200014-16), H067-EX4-COMP (480-200014-16[MSD]), (LB 480-634721/1-G) and (LB2 480-634779/1-G). This is routine for TCLP herbicides due to the pH effects created during the leaching process, inhibiting the herbicide derivatization of the free acid components.

Method 8151A: The continuing calibration verification (CCV) associated with batch 480-635969 recovered above the upper control limit for 2,4-D. The samples associated with this CCV were non-detects for the affected analyte; therefore, the data have been reported. The associated samples are impacted: H067-EX3-COMP (480-200014-6) and H067-EX4-COMP (480-200014-16).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Organic Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Detection Summary

Client: ARCADIS U.S. Inc
Job ID: 480-200014-3
Project/Site: GTEOSI - Seneca Falls

Client Sample ID: H067-EX3-COMP
Lab Sample ID: 480-200014-6

No Detections.

Client Sample ID: H067-EX4-COMP
Lab Sample ID: 480-200014-16

No Detections.

This Detection Summary does not include radiochemical test results.

Client: ARCADIS U.S. Inc
Job ID: 480-200014-3
Project/Site: GTEOSI - Seneca Falls

Client Sample ID: H067-EX3-COMP
Lab Sample ID: 480-200014-6
Date Collected: 07/20/22 11:30
Matrix: Solid
Date Received: 07/22/22 09:30

Method: 8081B - Organochlorine Pesticides (GC) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
gamma-BHC (Lindane)	ND		0.00020		mg/L		08/01/22 15:07	08/02/22 13:08	1
Chlordane (technical)	ND		0.0020		mg/L		08/01/22 15:07	08/02/22 13:08	1
Endrin	ND		0.00020		mg/L		08/01/22 15:07	08/02/22 13:08	1
Heptachlor	ND		0.00020		mg/L		08/01/22 15:07	08/02/22 13:08	1
Heptachlor epoxide	ND		0.00020		mg/L		08/01/22 15:07	08/02/22 13:08	1
Methoxychlor	ND		0.00020		mg/L		08/01/22 15:07	08/02/22 13:08	1
Toxaphene	ND		0.0020		mg/L		08/01/22 15:07	08/02/22 13:08	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl	*86*		*20 - 120*	*08/01/22 15:07*	*08/02/22 13:08*	*1*
DCB Decachlorobiphenyl	*87*		*20 - 120*	*08/01/22 15:07*	*08/02/22 13:08*	*1*
Tetrachloro-m-xylene	*78*		*44 - 120*	*08/01/22 15:07*	*08/02/22 13:08*	*1*
Tetrachloro-m-xylene	*76*		*44 - 120*	*08/01/22 15:07*	*08/02/22 13:08*	*1*

Method: 8151 - TCLP Herbicides - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silvex (2,4,5-TP)	ND		0.0022		mg/L		08/02/22 09:06	08/03/22 23:06	1
2,4-D	ND		0.0022		mg/L		08/02/22 09:06	08/03/22 23:06	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*15*	*S1-*	*48 - 132*	*08/02/22 09:06*	*08/03/22 23:06*	*1*
2,4-Dichlorophenylacetic acid	*28*	*S1-*	*48 - 132*	*08/02/22 09:06*	*08/03/22 23:06*	*1*

Client: ARCADIS U.S. Inc
Job ID: 480-200014-3
Project/Site: GTEOSI - Seneca Falls

Client Sample ID: H067-EX4-COMP
Lab Sample ID: 480-200014-16
Date Collected: 07/21/22 11:30
Matrix: Solid
Date Received: 07/22/22 09:30

Method: 8081B - Organochlorine Pesticides (GC) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
gamma-BHC (Lindane)	ND		0.00020		mg/L		08/01/22 15:07	08/02/22 11:11	1
Chlordane (technical)	ND		0.0020		mg/L		08/01/22 15:07	08/02/22 11:11	1
Endrin	ND		0.00020		mg/L		08/01/22 15:07	08/02/22 11:11	1
Heptachlor	ND		0.00020		mg/L		08/01/22 15:07	08/02/22 11:11	1
Heptachlor epoxide	ND		0.00020		mg/L		08/01/22 15:07	08/02/22 11:11	1
Methoxychlor	ND		0.00020		mg/L		08/01/22 15:07	08/02/22 11:11	1
Toxaphene	ND		0.0020		mg/L		08/01/22 15:07	08/02/22 11:11	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl	*84*		*20 - 120*	*08/01/22 15:07*	*08/02/22 11:11*	*1*
DCB Decachlorobiphenyl	*84*		*20 - 120*	*08/01/22 15:07*	*08/02/22 11:11*	*1*
Tetrachloro-m-xylene	*74*		*44 - 120*	*08/01/22 15:07*	*08/02/22 11:11*	*1*
Tetrachloro-m-xylene	*75*		*44 - 120*	*08/01/22 15:07*	*08/02/22 11:11*	*1*

Method: 8151 - TCLP Herbicides - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silvex (2,4,5-TP)	ND		0.0021		mg/L		08/02/22 09:06	08/03/22 20:38	1
2,4-D	ND		0.0021		mg/L		08/02/22 09:06	08/03/22 20:38	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*47*	*S1-*	*48 - 132*	*08/02/22 09:06*	*08/03/22 20:38*	*1*
2,4-Dichlorophenylacetic acid	*16*	*S1-*	*48 - 132*	*08/02/22 09:06*	*08/03/22 20:38*	*1*

Surrogate Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200014-3

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid — **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCBP1	DCBP2	TCX1	TCX2
Lab Sample ID	Client Sample ID	(20-120)	(20-120)	(44-120)	(44-120)
LCS 480-635741/2-A	Lab Control Sample	53	54	74	68
MB 480-635741/1-A	Method Blank	49	49	76	67

Surrogate Legend

DCBP = DCB Decachlorobiphenyl

TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid — **Prep Type: TCLP**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCBP1	DCBP2	TCX1	TCX2
Lab Sample ID	Client Sample ID	(20-120)	(20-120)	(44-120)	(44-120)
480-200014-6	H067-EX3-COMP	86	87	78	76
480-200014-16	H067-EX4-COMP	84	84	74	75
480-200014-16 MS	H067-EX4-COMP	82	80	85	72
480-200014-16 MSD	H067-EX4-COMP	89	86	77	72
LB 480-634721/1-F	Method Blank	83	84	88	69
LB2 480-634779/1-F	Method Blank	78	79	74	72

Surrogate Legend

DCBP = DCB Decachlorobiphenyl

TCX = Tetrachloro-m-xylene

Method: 8151 - TCLP Herbicides

Matrix: Solid — **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCPAA1	DCPAA2
Lab Sample ID	Client Sample ID	(48-132)	(48-132)
LCS 480-635801/2-A	Lab Control Sample	120	80
MB 480-635801/1-A	Method Blank	103	84

Surrogate Legend

DCPAA = 2,4-Dichlorophenylacetic acid

Method: 8151 - TCLP Herbicides

Matrix: Solid — **Prep Type: TCLP**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCPAA1	DCPAA2
Lab Sample ID	Client Sample ID	(48-132)	(48-132)
480-200014-6	H067-EX3-COMP	15 S1-	28 S1-
480-200014-16	H067-EX4-COMP	47 S1-	16 S1-
480-200014-16 MS	H067-EX4-COMP	84	48
480-200014-16 MSD	H067-EX4-COMP	138 S1+	46 S1-
LB 480-634721/1-G	Method Blank	20 S1-	31 S1-
LB2 480-634779/1-G	Method Blank	27 S1-	28 S1-

Surrogate Legend

DCPAA = 2,4-Dichlorophenylacetic acid

Method: 8081B - Organochlorine Pesticides (GC)

Lab Sample ID: MB 480-635741/1-A
Matrix: Solid
Analysis Batch: 635787

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 635741

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
gamma-BHC (Lindane)	ND		0.000050		mg/L		08/01/22 15:07	08/02/22 09:53	1
Chlordane (technical)	ND		0.00050		mg/L		08/01/22 15:07	08/02/22 09:53	1
Endrin	ND		0.000050		mg/L		08/01/22 15:07	08/02/22 09:53	1
Heptachlor	ND		0.000050		mg/L		08/01/22 15:07	08/02/22 09:53	1
Heptachlor epoxide	ND		0.000050		mg/L		08/01/22 15:07	08/02/22 09:53	1
Methoxychlor	ND		0.000050		mg/L		08/01/22 15:07	08/02/22 09:53	1
Toxaphene	ND		0.00050		mg/L		08/01/22 15:07	08/02/22 09:53	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl	*49*		*20 - 120*	*08/01/22 15:07*	*08/02/22 09:53*	*1*
DCB Decachlorobiphenyl	*49*		*20 - 120*	*08/01/22 15:07*	*08/02/22 09:53*	*1*
Tetrachloro-m-xylene	*76*		*44 - 120*	*08/01/22 15:07*	*08/02/22 09:53*	*1*
Tetrachloro-m-xylene	*67*		*44 - 120*	*08/01/22 15:07*	*08/02/22 09:53*	*1*

Lab Sample ID: LCS 480-635741/2-A
Matrix: Solid
Analysis Batch: 635787

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 635741

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
gamma-BHC (Lindane)	0.000500	0.000454		mg/L		91	56 - 120
Endrin	0.000500	0.000449		mg/L		90	65 - 135
Heptachlor	0.000500	0.000446		mg/L		89	58 - 120
Heptachlor epoxide	0.000500	0.000475		mg/L		95	65 - 125
Methoxychlor	0.000500	0.000551		mg/L		110	50 - 150

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
DCB Decachlorobiphenyl	*53*		*20 - 120*
DCB Decachlorobiphenyl	*54*		*20 - 120*
Tetrachloro-m-xylene	*74*		*44 - 120*
Tetrachloro-m-xylene	*68*		*44 - 120*

Lab Sample ID: LB 480-634721/1-F
Matrix: Solid
Analysis Batch: 635787

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 635741

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
gamma-BHC (Lindane)	ND		0.00020		mg/L		08/01/22 15:07	08/02/22 11:30	1
Chlordane (technical)	ND		0.0020		mg/L		08/01/22 15:07	08/02/22 11:30	1
Endrin	ND		0.00020		mg/L		08/01/22 15:07	08/02/22 11:30	1
Heptachlor	ND		0.00020		mg/L		08/01/22 15:07	08/02/22 11:30	1
Heptachlor epoxide	ND		0.00020		mg/L		08/01/22 15:07	08/02/22 11:30	1
Methoxychlor	ND		0.00020		mg/L		08/01/22 15:07	08/02/22 11:30	1
Toxaphene	ND		0.0020		mg/L		08/01/22 15:07	08/02/22 11:30	1

Surrogate	*LB %Recovery*	*LB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl	*83*		*20 - 120*	*08/01/22 15:07*	*08/02/22 11:30*	*1*
DCB Decachlorobiphenyl	*84*		*20 - 120*	*08/01/22 15:07*	*08/02/22 11:30*	*1*

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: LB 480-634721/1-F
Matrix: Solid
Analysis Batch: 635787

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 635741

Surrogate	LB %Recovery	LB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Tetrachloro-m-xylene	88		44 - 120	08/01/22 15:07	08/02/22 11:30	1
Tetrachloro-m-xylene	69		44 - 120	08/01/22 15:07	08/02/22 11:30	1

Lab Sample ID: LB2 480-634779/1-F
Matrix: Solid
Analysis Batch: 635787

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 635741

Analyte	LB2 Result	LB2 Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
gamma-BHC (Lindane)	ND		0.00020		mg/L		08/01/22 15:07	08/02/22 11:50	1
Chlordane (technical)	ND		0.0020		mg/L		08/01/22 15:07	08/02/22 11:50	1
Endrin	ND		0.00020		mg/L		08/01/22 15:07	08/02/22 11:50	1
Heptachlor	ND		0.00020		mg/L		08/01/22 15:07	08/02/22 11:50	1
Heptachlor epoxide	ND		0.00020		mg/L		08/01/22 15:07	08/02/22 11:50	1
Methoxychlor	ND		0.00020		mg/L		08/01/22 15:07	08/02/22 11:50	1
Toxaphene	ND		0.0020		mg/L		08/01/22 15:07	08/02/22 11:50	1

Surrogate	LB2 %Recovery	LB2 Qualifier	Limits	Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl	78		20 - 120	08/01/22 15:07	08/02/22 11:50	1
DCB Decachlorobiphenyl	79		20 - 120	08/01/22 15:07	08/02/22 11:50	1
Tetrachloro-m-xylene	74		44 - 120	08/01/22 15:07	08/02/22 11:50	1
Tetrachloro-m-xylene	72		44 - 120	08/01/22 15:07	08/02/22 11:50	1

Lab Sample ID: 480-200014-16 MS
Matrix: Solid
Analysis Batch: 635787

Client Sample ID: H067-EX4-COMP
Prep Type: TCLP
Prep Batch: 635741

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
gamma-BHC (Lindane)	ND		0.00200	0.00177		mg/L		88	50 - 120
Endrin	ND		0.00200	0.00187		mg/L		93	54 - 135
Heptachlor	ND		0.00200	0.00188		mg/L		94	56 - 120
Heptachlor epoxide	ND		0.00200	0.00192		mg/L		96	58 - 125
Methoxychlor	ND		0.00200	0.00242		mg/L		121	40 - 150

Surrogate	MS %Recovery	MS Qualifier	Limits
DCB Decachlorobiphenyl	82		20 - 120
DCB Decachlorobiphenyl	80		20 - 120
Tetrachloro-m-xylene	85		44 - 120
Tetrachloro-m-xylene	72		44 - 120

Lab Sample ID: 480-200014-16 MSD
Matrix: Solid
Analysis Batch: 635787

Client Sample ID: H067-EX4-COMP
Prep Type: TCLP
Prep Batch: 635741

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
gamma-BHC (Lindane)	ND		0.00200	0.00194		mg/L		97	50 - 120	9	24
Endrin	ND		0.00200	0.00194		mg/L		97	54 - 135	4	24
Heptachlor	ND		0.00200	0.00196		mg/L		98	56 - 120	4	25
Heptachlor epoxide	ND		0.00200	0.00204		mg/L		102	58 - 125	6	23

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: 480-200014-16 MSD
Matrix: Solid
Analysis Batch: 635787

Client Sample ID: H067-EX4-COMP
Prep Type: TCLP
Prep Batch: 635741

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Methoxychlor	ND		0.00200	0.00235		mg/L		117	40 - 150	3	26

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
DCB Decachlorobiphenyl	*89*		*20 - 120*
DCB Decachlorobiphenyl	*86*		*20 - 120*
Tetrachloro-m-xylene	*77*		*44 - 120*
Tetrachloro-m-xylene	*72*		*44 - 120*

Method: 8151 - TCLP Herbicides

Lab Sample ID: MB 480-635801/1-A
Matrix: Solid
Analysis Batch: 635969

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 635801

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silvex (2,4,5-TP)	ND		0.00050		mg/L		08/02/22 09:06	08/03/22 14:12	1
2,4-D	ND		0.00050		mg/L		08/02/22 09:06	08/03/22 14:12	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*103*		*48 - 132*	*08/02/22 09:06*	*08/03/22 14:12*	*1*
2,4-Dichlorophenylacetic acid	*84*		*48 - 132*	*08/02/22 09:06*	*08/03/22 14:12*	*1*

Lab Sample ID: LCS 480-635801/2-A
Matrix: Solid
Analysis Batch: 635969

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 635801

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Silvex (2,4,5-TP)	0.00200	0.00174		mg/L		87	49 - 150
2,4-D	0.00200	0.00180		mg/L		90	36 - 150

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2,4-Dichlorophenylacetic acid	*120*		*48 - 132*
2,4-Dichlorophenylacetic acid	*80*		*48 - 132*

Lab Sample ID: LB 480-634721/1-G
Matrix: Solid
Analysis Batch: 635969

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 635801

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silvex (2,4,5-TP)	ND		0.0020		mg/L		08/02/22 09:06	08/03/22 21:08	1
2,4-D	ND		0.0020		mg/L		08/02/22 09:06	08/03/22 21:08	1

Surrogate	*LB %Recovery*	*LB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*20*	*S1-*	*48 - 132*	*08/02/22 09:06*	*08/03/22 21:08*	*1*
2,4-Dichlorophenylacetic acid	*31*	*S1-*	*48 - 132*	*08/02/22 09:06*	*08/03/22 21:08*	*1*

Method: 8151 - TCLP Herbicides (Continued)

Lab Sample ID: LB2 480-634779/1-G
Matrix: Solid
Analysis Batch: 635969

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 635801

Analyte	LB2 Result	LB2 Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silvex (2,4,5-TP)	ND		0.0020		mg/L		08/02/22 09:06	08/03/22 21:37	1
2,4-D	ND		0.0020		mg/L		08/02/22 09:06	08/03/22 21:37	1

Surrogate	*LB2 %Recovery*	*LB2 Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*27*	*S1-*	*48 - 132*	*08/02/22 09:06*	*08/03/22 21:37*	*1*
2,4-Dichlorophenylacetic acid	*28*	*S1-*	*48 - 132*	*08/02/22 09:06*	*08/03/22 21:37*	*1*

Lab Sample ID: 480-200014-16 MS
Matrix: Solid
Analysis Batch: 635969

Client Sample ID: H067-EX4-COMP
Prep Type: TCLP
Prep Batch: 635801

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Silvex (2,4,5-TP)	ND		0.00870	0.00456		mg/L		52	25 - 146
2,4-D	ND		0.00870	0.00643		mg/L		74	31 - 150

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
2,4-Dichlorophenylacetic acid	*84*		*48 - 132*
2,4-Dichlorophenylacetic acid	*48*		*48 - 132*

Lab Sample ID: 480-200014-16 MSD
Matrix: Solid
Analysis Batch: 635969

Client Sample ID: H067-EX4-COMP
Prep Type: TCLP
Prep Batch: 635801

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Silvex (2,4,5-TP)	ND		0.00800	0.00282		mg/L		35	25 - 146	47	50
2,4-D	ND		0.00800	0.00780		mg/L		98	31 - 150	19	50

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
2,4-Dichlorophenylacetic acid	*138*	*S1+*	*48 - 132*
2,4-Dichlorophenylacetic acid	*46*	*S1-*	*48 - 132*

GC Semi VOA

Leach Batch: 634721

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200014-6	H067-EX3-COMP	TCLP	Solid	1311	
LB 480-634721/1-F	Method Blank	TCLP	Solid	1311	
LB 480-634721/1-G	Method Blank	TCLP	Solid	1311	

Leach Batch: 634779

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200014-16	H067-EX4-COMP	TCLP	Solid	1311	
LB2 480-634779/1-F	Method Blank	TCLP	Solid	1311	
LB2 480-634779/1-G	Method Blank	TCLP	Solid	1311	
480-200014-16 MS	H067-EX4-COMP	TCLP	Solid	1311	
480-200014-16 MSD	H067-EX4-COMP	TCLP	Solid	1311	

Prep Batch: 635741

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200014-6	H067-EX3-COMP	TCLP	Solid	3510C	634721
480-200014-16	H067-EX4-COMP	TCLP	Solid	3510C	634779
LB 480-634721/1-F	Method Blank	TCLP	Solid	3510C	634721
LB2 480-634779/1-F	Method Blank	TCLP	Solid	3510C	634779
MB 480-635741/1-A	Method Blank	Total/NA	Solid	3510C	
LCS 480-635741/2-A	Lab Control Sample	Total/NA	Solid	3510C	
480-200014-16 MS	H067-EX4-COMP	TCLP	Solid	3510C	634779
480-200014-16 MSD	H067-EX4-COMP	TCLP	Solid	3510C	634779

Analysis Batch: 635787

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200014-6	H067-EX3-COMP	TCLP	Solid	8081B	635741
480-200014-16	H067-EX4-COMP	TCLP	Solid	8081B	635741
LB 480-634721/1-F	Method Blank	TCLP	Solid	8081B	635741
LB2 480-634779/1-F	Method Blank	TCLP	Solid	8081B	635741
MB 480-635741/1-A	Method Blank	Total/NA	Solid	8081B	635741
LCS 480-635741/2-A	Lab Control Sample	Total/NA	Solid	8081B	635741
480-200014-16 MS	H067-EX4-COMP	TCLP	Solid	8081B	635741
480-200014-16 MSD	H067-EX4-COMP	TCLP	Solid	8081B	635741

Prep Batch: 635801

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200014-6	H067-EX3-COMP	TCLP	Solid	8151A	634721
480-200014-16	H067-EX4-COMP	TCLP	Solid	8151A	634779
LB 480-634721/1-G	Method Blank	TCLP	Solid	8151A	634721
LB2 480-634779/1-G	Method Blank	TCLP	Solid	8151A	634779
MB 480-635801/1-A	Method Blank	Total/NA	Solid	8151A	
LCS 480-635801/2-A	Lab Control Sample	Total/NA	Solid	8151A	
480-200014-16 MS	H067-EX4-COMP	TCLP	Solid	8151A	634779
480-200014-16 MSD	H067-EX4-COMP	TCLP	Solid	8151A	634779

Analysis Batch: 635969

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200014-6	H067-EX3-COMP	TCLP	Solid	8151	635801
480-200014-16	H067-EX4-COMP	TCLP	Solid	8151	635801
LB 480-634721/1-G	Method Blank	TCLP	Solid	8151	635801
LB2 480-634779/1-G	Method Blank	TCLP	Solid	8151	635801

GC Semi VOA (Continued)

Analysis Batch: 635969 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 480-635801/1-A	Method Blank	Total/NA	Solid	8151	635801
LCS 480-635801/2-A	Lab Control Sample	Total/NA	Solid	8151	635801
480-200014-16 MS	H067-EX4-COMP	TCLP	Solid	8151	635801
480-200014-16 MSD	H067-EX4-COMP	TCLP	Solid	8151	635801

Lab Chronicle

Client: ARCADIS U.S. Inc
Job ID: 480-200014-3
Project/Site: GTEOSI - Seneca Falls

Client Sample ID: H067-EX3-COMP
Lab Sample ID: 480-200014-6

Date Collected: 07/20/22 11:30
Matrix: Solid
Date Received: 07/22/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
TCLP	Leach	1311			634721	07/25/22 09:37	BML	TAL BUF
TCLP	Prep	3510C			635741	08/01/22 15:07	CMC	TAL BUF
TCLP	Analysis	8081B		1	635787	08/02/22 13:08	JLS	TAL BUF
TCLP	Leach	1311			634721	07/25/22 09:37	BML	TAL BUF
TCLP	Prep	8151A			635801	08/02/22 09:06	JMP	TAL BUF
TCLP	Analysis	8151		1	635969	08/03/22 23:06	MAN	TAL BUF

Client Sample ID: H067-EX4-COMP
Lab Sample ID: 480-200014-16

Date Collected: 07/21/22 11:30
Matrix: Solid
Date Received: 07/22/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
TCLP	Leach	1311			634779	07/25/22 13:45	BML	TAL BUF
TCLP	Prep	3510C			635741	08/01/22 15:07	CMC	TAL BUF
TCLP	Analysis	8081B		1	635787	08/02/22 11:11	JLS	TAL BUF
TCLP	Leach	1311			634779	07/25/22 13:45	BML	TAL BUF
TCLP	Prep	8151A			635801	08/02/22 09:06	JMP	TAL BUF
TCLP	Analysis	8151		1	635969	08/03/22 20:38	MAN	TAL BUF

Laboratory References:

TAL BUF = Eurofins Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

Accreditation/Certification Summary

Client: ARCADIS U.S. Inc
Job ID: 480-200014-3
Project/Site: GTEOSI - Seneca Falls

Laboratory: Eurofins Buffalo

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
New York	NELAP	10026	03-31-23

Method Summary

Client: ARCADIS U.S. Inc
Job ID: 480-200014-3
Project/Site: GTEOSI - Seneca Falls

Method	Method Description	Protocol	Laboratory
8081B	Organochlorine Pesticides (GC)	SW846	TAL BUF
8151	TCLP Herbicides	SW846	TAL BUF
1311	TCLP Extraction	SW846	TAL BUF
3510C	Liquid-Liquid Extraction (Separatory Funnel)	SW846	TAL BUF
8151A	Extraction (Herbicides)	SW846	TAL BUF

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL BUF = Eurofins Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

Sample Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200014-3

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
480-200014-6	H067-EX3-COMP	Solid	07/20/22 11:30	07/22/22 09:30
480-200014-16	H067-EX4-COMP	Solid	07/21/22 11:30	07/22/22 09:30

Eurofins TestAmerica, Buffalo
10 Hazelwood Drive

Amherst, NY 14228-2223
phone 716.691.2600 fax 716.691.7991

Chain of Custody Record

Syracuse #225

eurofins | Environment Testing America

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Test America Laboratories, Inc. d/b/a Eurofins TestAmerica

Client Contact	**Project Manager: Mark Flusche**	COC No: 4
Company: Arcadis of New York, Inc.	Email: mark.flusche@arcadis.com	____ of ____ COCs
Address: 855 Route 146 Suite 210	Tel: 518-250-7322	Site Contact: Ryan Clare / Lab Contact: Schove, John R / Date: / Carrier: FedEx / TALS Project #: / Sampler:
Clifton Park, NY 12065	**Analysis Turnaround Time** ☐ CALENDAR DAYS ☐ WORKING DAYS	For Lab Use Only:
	TAT if different from Below ____ ☑ 2 weeks ☐ 1 week ☐ 2 days ☐ 1 day	
Project Name: GTEOSI - Seneca Falls		
Site:		
PO #: 30112357.00055 Project #:		

480-200014 Chain of Custody

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	TCLP VOCs	TCLP SVOCs	TCLP Metals	PCBs	Pesticides/herbicides	HOLD at Lab	Total VOCs	Total SVOCs	Sample Specific Notes:
H067-EX3-01	7/20/22	0920	G	Soil	3					X			X	X	X	HOLD
H067-EX3-02	7/20/22	0930	G	Soil	3					X			X	X	X	HOLD
H067-EX3-03	7/20/22	1000	G	Soil	3					X			X	X	X	HOLD
H067-EX3-04	7/20/22	1015	G	Soil	3					X			✓	X	X	HOLD
H067-EX3-05	7/20/22	1110	G	Soil	3					X			✓	X	X	HOLD
H067-EX3-COMP	7/20/22	1130	C	Soil	5			X	X	X	X	X				
H067-EX4-01	7/20/22	1230	G	Soil	3					X			✓	X	X	HOLD
H067-EX4-02	7/20/22	1330	G	Soil	3					X			✓	X	X	HOLD
H067-EX4-03	7/20/22	1410	G	Soil	3					X			✓	X	X	HOLD
H067-EX4-04	7/21/22	0730	G	Soil	3					X			✓	X	X	HOLD
H067-EX4-05	7/21/22	0810	G	Soil	3					X			✓	X	X	HOLD
H067-EX4-06	7/21/22	0830	G	Soil	3					X			✓	X	X	HOLD
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other								1	1	1	1					

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☑ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☑ Disposal by Lab ☐ Archive for ____ Months

Special Instructions/QC Requirements & Comments:

4.10 4.6#1 ICE

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:		Cooler Temp. (°C): Obs'd:	Corr'd:	Therm ID No.:
Relinquished by:	Company: Arcadis	Date/Time: 7/21/22 1502	Received by:	Company: ES-SYR	Date/Time: 7/21/22 1502
Relinquished by: R English	Company: Syr 7-21-22	Date/Time: 1800	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company: TA	Date/Time: 7/22/22 930

Form No. CA-C-WI-002, Rev. 4.34, dated 8/3/2020

Eurofins TestAmerica, Buffalo
10 Hazelwood Drive

Amherst, NY 14228-2223
phone 716.691.2600 fax 716.691.7991

Chain of Custody Record

Syracuse #225 — eurofins | Environment Testing America

TestAmerica Laboratories, Inc. d/b/a Eurofins TestAmerica

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact	**Project Manager: Mark Flusche**		COC No: 4
Company: Arcadis of New York, Inc.	Email: mark.flusche@arcadis.com	Site Contact: Ryan Clare	Date:	____ of ____ COCs
Address: 855 Route 146 Suite 210	Tel: 518-250-7322	Lab Contact: Schove, John R	Carrier: FedEx	TALS Project #:
Clifton Park, NY 12065	**Analysis Turnaround Time**			Sampler:
	☐ CALENDAR DAYS ☐ WORKING DAYS			**For Lab Use Only:**
	TAT if different from Below ____			Walk-in Client:
	☑ 2 weeks			Lab Sampling:
Project Name: GTEOSI - Seneca Falls	☐ 1 week			
Site:	☐ 2 days			Job / SDG No.:
PO #: 30112357.00055 Project #:	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	TCLP VOCs	TCLP SVOCs	TCLP Metals	PCBs	Pesticides / Herbicides	HOLD at Lab	Total VOCs	Total SVOCs	Sample Specific Notes:
HO67 - EX4 - 07	7/21 /22	0900	G	Soil	3					X			X	X	X	HOLD
HO67 - EX4 - 08	7/21 /22	0930	G	Soil	3					X			X	X	X	HOLD
HO67 - EX4 - 09	7/21 /22	1000	G	Soil	3					X			X	X	X	HOLD
HO67 - EX4 - comp	7/21 /22	1130	C	Soil	10	Y	X	X	X	X	X	X				MS/MSD here
HO67 - EX5 - 03	7/21 /22	1210	G	Soil	3					X			X	X	X	HOLD
HO67 - EX5 - 04	7/21 /22	1220	G	Soil	3					X			X	X	X	HOLD
HO67 - EX5 - 05	7/21 /22	1300	G	Soil	3					X			X	X	X	HOLD
	/22			Soil												
	/22			Soil												
	/22			Soil												
	/22			Soil												
	/22			Soil												
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other								1	1	1	1					

Rec'd 7-21-22

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☑ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☑ Disposal by Lab ☐ Archive for ____ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:		Cooler Temp. (°C): Obs'd:	Corr'd:	Therm ID No.:
Relinquished by:	Company: Arcadis	Date/Time: 7/22/22 1502	Received by:	Company: ES-SYR	Date/Time: 7/22/22 1502
Relinquished by:	Company: Sya 7-21-22	Date/Time: 1805	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by: PSL	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.34, dated 8/3/2020

Login Sample Receipt Checklist

Client: ARCADIS U.S. Inc

Job Number: 480-200014-3

Login Number: 200014

List Source: Eurofins Buffalo

List Number: 1

Creator: Kolb, Chris M

Question	Answer	Comment
Radioactivity either was not measured or, if measured, is at or below background	True	
The cooler's custody seal, if present, is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time (Excluding tests with immediate HTs)..	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	N/A	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Sampling Company provided.	True	ARCADIS
Samples received within 48 hours of sampling.	True	
Samples requiring field filtration have been filtered in the field.	True	
Chlorine Residual checked.	N/A	

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ANALYTICAL REPORT

PREPARED FOR

Attn: Mark Flusche
ARCADIS U.S. Inc
855 Route 146
Suite 210
Clifton Park, New York 12065

Generated 12/13/2022 2:48:22 PM Revision 1

JOB DESCRIPTION

GTEOSI - Seneca Falls

JOB NUMBER

480-200053-1

Eurofins Buffalo
10 Hazelwood Drive
Amherst NY 14228-2298

See page two for job notes and contact information.

Job Notes

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory. This report is confidential and is intended for the sole use of Eurofins Environment Testing Northeast, LLC Buffalo and its client. All questions regarding this report should be directed to the Eurofins Environment Testing Northeast, LLC Buffalo Project Manager or designee who has signed this report.

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Authorization



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Revision 1

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Table of Contents

Cover Page 1
Table of Contents 3
Definitions/Glossary 4
Case Narrative 5
Detection Summary 6
Client Sample Results 7
Surrogate Summary 10
QC Sample Results 12
QC Association Summary 18
Lab Chronicle 20
Certification Summary 21
Method Summary 22
Sample Summary 23
Chain of Custody 24
Receipt Checklists 25

Definitions/Glossary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200053-1

Qualifiers

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 480-200053-1

Laboratory: Eurofins Buffalo

Narrative

Job Narrative
480-200053-1

Revision (1)
The client requested that the report be revised and a separate report be issed for each page of the chain of custody form.

Receipt
The samples were received on 7/23/2022 11:30 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 2.8º C.

GC/MS VOA
Method 8260C: The following samples were diluted due to the nature of the TCLP matrix: H067-EX5-COMP (480-200053-3) and (LB 480-634921/1-A). Elevated reporting limits (RLs) are provided.

Method 8260C: The continuing calibration verification (CCV) associated with batch 480-635184 recovered above the upper control limit for Tetrachloroethene. The samples associated with this CCV were non-detects for the affected analyte; therefore, the data have been reported. The associated sample is impacted: H067-EX5-COMP (480-200053-3).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

GC/MS Semi VOA
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

GC Semi VOA
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Metals
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Organic Prep
Method 3510C: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 480-634916 and 480-635624.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200053-1

Client Sample ID: H067-EX5-COMP

Lab Sample ID: 480-200053-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Cadmium	0.13		0.0020		mg/L	1		6010C	TCLP

This Detection Summary does not include radiochemical test results.

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200053-1

Client Sample ID: H067-EX5-COMP
Date Collected: 07/22/22 07:40
Date Received: 07/23/22 11:30

Lab Sample ID: 480-200053-3
Matrix: Solid

Method: SW846 8260C - Volatile Organic Compounds by GC/MS - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	ND		0.010		mg/L			07/28/22 05:08	10
1,2-Dichloroethane	ND		0.010		mg/L			07/28/22 05:08	10
2-Butanone (MEK)	ND		0.050		mg/L			07/28/22 05:08	10
Benzene	ND		0.010		mg/L			07/28/22 05:08	10
Carbon tetrachloride	ND		0.010		mg/L			07/28/22 05:08	10
Chlorobenzene	ND		0.010		mg/L			07/28/22 05:08	10
Chloroform	ND		0.010		mg/L			07/28/22 05:08	10
Tetrachloroethene	ND		0.010		mg/L			07/28/22 05:08	10
Trichloroethene	ND		0.010		mg/L			07/28/22 05:08	10
Vinyl chloride	ND		0.010		mg/L			07/28/22 05:08	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*102*		*77 - 120*		*07/28/22 05:08*	*10*
4-Bromofluorobenzene (Surr)	*103*		*73 - 120*		*07/28/22 05:08*	*10*
Dibromofluoromethane (Surr)	*109*		*75 - 123*		*07/28/22 05:08*	*10*
Toluene-d8 (Surr)	*97*		*80 - 120*		*07/28/22 05:08*	*10*

Method: SW846 8270D - Semivolatile Organic Compounds (GC/MS) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dichlorobenzene	ND		0.040		mg/L		08/01/22 08:40	08/02/22 19:59	1
2,4-Dinitrotoluene	ND		0.020		mg/L		08/01/22 08:40	08/02/22 19:59	1
2,4,5-Trichlorophenol	ND		0.020		mg/L		08/01/22 08:40	08/02/22 19:59	1
2,4,6-Trichlorophenol	ND		0.020		mg/L		08/01/22 08:40	08/02/22 19:59	1
2-Methylphenol	ND		0.020		mg/L		08/01/22 08:40	08/02/22 19:59	1
3-Methylphenol	ND		0.040		mg/L		08/01/22 08:40	08/02/22 19:59	1
4-Methylphenol	ND		0.040		mg/L		08/01/22 08:40	08/02/22 19:59	1
Hexachlorobenzene	ND		0.020		mg/L		08/01/22 08:40	08/02/22 19:59	1
Hexachlorobutadiene	ND		0.020		mg/L		08/01/22 08:40	08/02/22 19:59	1
Hexachloroethane	ND		0.020		mg/L		08/01/22 08:40	08/02/22 19:59	1
Nitrobenzene	ND		0.020		mg/L		08/01/22 08:40	08/02/22 19:59	1
Pentachlorophenol	ND		0.040		mg/L		08/01/22 08:40	08/02/22 19:59	1
Pyridine	ND		0.10		mg/L		08/01/22 08:40	08/02/22 19:59	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*71*		*41 - 120*	*08/01/22 08:40*	*08/02/22 19:59*	*1*
2-Fluorobiphenyl (Surr)	*79*		*48 - 120*	*08/01/22 08:40*	*08/02/22 19:59*	*1*
2-Fluorophenol (Surr)	*49*		*35 - 120*	*08/01/22 08:40*	*08/02/22 19:59*	*1*
Nitrobenzene-d5 (Surr)	*83*		*46 - 120*	*08/01/22 08:40*	*08/02/22 19:59*	*1*
p-Terphenyl-d14 (Surr)	*91*		*60 - 148*	*08/01/22 08:40*	*08/02/22 19:59*	*1*
Phenol-d5 (Surr)	*36*		*22 - 120*	*08/01/22 08:40*	*08/02/22 19:59*	*1*

Method: SW846 6010C - Metals (ICP) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.015		mg/L		07/27/22 10:21	07/28/22 15:46	1
Barium	ND		1.0		mg/L		07/27/22 10:21	07/28/22 15:46	1
Cadmium	**0.13**		0.0020		mg/L		07/27/22 10:21	07/28/22 15:46	1
Chromium	ND		0.020		mg/L		07/27/22 10:21	07/28/22 15:46	1
Lead	ND		0.020		mg/L		07/27/22 10:21	07/28/22 15:46	1
Selenium	ND		0.025		mg/L		07/27/22 10:21	07/28/22 15:46	1
Silver	ND		0.0060		mg/L		07/27/22 10:21	07/28/22 15:46	1

Client Sample Results

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200053-1

Client Sample ID: H067-EX5-COMP
Date Collected: 07/22/22 07:40
Date Received: 07/23/22 11:30

Lab Sample ID: 480-200053-3
Matrix: Solid

Method: SW846 7470A - Mercury (CVAA) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00020		mg/L		07/27/22 11:24	07/27/22 15:52	1

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200053-1

Client Sample ID: H067-EX5-COMP
Date Collected: 07/22/22 07:40
Date Received: 07/23/22 11:30

Lab Sample ID: 480-200053-3
Matrix: Solid
Percent Solids: 74.8

Method: SW846 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.32		mg/Kg	☼	07/26/22 07:06	07/26/22 17:28	1
PCB-1221	ND		0.32		mg/Kg	☼	07/26/22 07:06	07/26/22 17:28	1
PCB-1232	ND		0.32		mg/Kg	☼	07/26/22 07:06	07/26/22 17:28	1
PCB-1242	ND		0.32		mg/Kg	☼	07/26/22 07:06	07/26/22 17:28	1
PCB-1248	ND		0.32		mg/Kg	☼	07/26/22 07:06	07/26/22 17:28	1
PCB-1254	ND		0.32		mg/Kg	☼	07/26/22 07:06	07/26/22 17:28	1
PCB-1260	ND		0.32		mg/Kg	☼	07/26/22 07:06	07/26/22 17:28	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*103*		*60 - 154*	*07/26/22 07:06*	*07/26/22 17:28*	*1*
Tetrachloro-m-xylene	*121*		*60 - 154*	*07/26/22 07:06*	*07/26/22 17:28*	*1*
DCB Decachlorobiphenyl	*98*		*65 - 174*	*07/26/22 07:06*	*07/26/22 17:28*	*1*
DCB Decachlorobiphenyl	*102*		*65 - 174*	*07/26/22 07:06*	*07/26/22 17:28*	*1*

Surrogate Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200053-1

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Solid — **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(77-120)	(73-120)	(75-123)	(80-120)
LCS 480-635184/6	Lab Control Sample	103	109	108	104
MB 480-635184/8	Method Blank	104	99	108	99

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Solid — **Prep Type: TCLP**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(77-120)	(73-120)	(75-123)	(80-120)
480-200053-3	H067-EX5-COMP	102	103	109	97
LB 480-634921/1-A	Method Blank	105	106	109	101

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Solid — **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	TPHd14	PHL
Lab Sample ID	Client Sample ID	(41-120)	(48-120)	(35-120)	(46-120)	(60-148)	(22-120)
LCS 480-635624/2-A	Lab Control Sample	88	84	51	80	95	41
LCSD 480-635624/3-A	Lab Control Sample Dup	87	78	44	72	91	34
MB 480-635624/1-A	Method Blank	72	83	50	86	101	38

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
TPHd14 = p-Terphenyl-d14 (Surr)
PHL = Phenol-d5 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Solid — **Prep Type: TCLP**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	TPHd14	PHL
Lab Sample ID	Client Sample ID	(41-120)	(48-120)	(35-120)	(46-120)	(60-148)	(22-120)
480-200053-3	H067-EX5-COMP	71	79	49	83	91	36
LB 480-634916/1-H	Method Blank	76	76	45	75	102	34

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)

Surrogate Summary

Client: ARCADIS U.S. Inc
Job ID: 480-200053-1
Project/Site: GTEOSI - Seneca Falls

FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
TPHd14 = p-Terphenyl-d14 (Surr)
PHL = Phenol-d5 (Surr)

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		TCX1	TCX2	DCBP1	DCBP2
Lab Sample ID	Client Sample ID	(60-154)	(60-154)	(65-174)	(65-174)
480-200053-3	H067-EX5-COMP	103	121	98	102
LCS 480-634833/2-A	Lab Control Sample	118	139	117	124
MB 480-634833/1-A	Method Blank	107	124	105	111

Surrogate Legend

TCX = Tetrachloro-m-xylene
DCBP = DCB Decachlorobiphenyl

Method: 8260C - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 480-635184/8
Matrix: Solid
Analysis Batch: 635184

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	ND		0.0010		mg/L			07/28/22 02:48	1
1,2-Dichloroethane	ND		0.0010		mg/L			07/28/22 02:48	1
2-Butanone (MEK)	ND		0.0050		mg/L			07/28/22 02:48	1
Benzene	ND		0.0010		mg/L			07/28/22 02:48	1
Carbon tetrachloride	ND		0.0010		mg/L			07/28/22 02:48	1
Chlorobenzene	ND		0.0010		mg/L			07/28/22 02:48	1
Chloroform	ND		0.0010		mg/L			07/28/22 02:48	1
Tetrachloroethene	ND		0.0010		mg/L			07/28/22 02:48	1
Trichloroethene	ND		0.0010		mg/L			07/28/22 02:48	1
Vinyl chloride	ND		0.0010		mg/L			07/28/22 02:48	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*104*		*77 - 120*		*07/28/22 02:48*	*1*
4-Bromofluorobenzene (Surr)	*99*		*73 - 120*		*07/28/22 02:48*	*1*
Dibromofluoromethane (Surr)	*108*		*75 - 123*		*07/28/22 02:48*	*1*
Toluene-d8 (Surr)	*99*		*80 - 120*		*07/28/22 02:48*	*1*

Lab Sample ID: LCS 480-635184/6
Matrix: Solid
Analysis Batch: 635184

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
1,1-Dichloroethene	0.0250	0.0294		mg/L		117	66 - 127
1,2-Dichloroethane	0.0250	0.0260		mg/L		104	75 - 120
2-Butanone (MEK)	0.125	0.110		mg/L		88	57 - 140
Benzene	0.0250	0.0274		mg/L		110	71 - 124
Carbon tetrachloride	0.0250	0.0264		mg/L		106	72 - 134
Chlorobenzene	0.0250	0.0275		mg/L		110	80 - 120
Chloroform	0.0250	0.0272		mg/L		109	73 - 127
Tetrachloroethene	0.0250	0.0287		mg/L		115	74 - 122
Trichloroethene	0.0250	0.0284		mg/L		113	74 - 123
Vinyl chloride	0.0250	0.0245		mg/L		98	65 - 133

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*103*		*77 - 120*
4-Bromofluorobenzene (Surr)	*109*		*73 - 120*
Dibromofluoromethane (Surr)	*108*		*75 - 123*
Toluene-d8 (Surr)	*104*		*80 - 120*

Lab Sample ID: LB 480-634921/1-A
Matrix: Solid
Analysis Batch: 635184

Client Sample ID: Method Blank
Prep Type: TCLP

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	ND		0.010		mg/L			07/28/22 03:11	10
1,2-Dichloroethane	ND		0.010		mg/L			07/28/22 03:11	10
2-Butanone (MEK)	ND		0.050		mg/L			07/28/22 03:11	10
Benzene	ND		0.010		mg/L			07/28/22 03:11	10

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LB 480-634921/1-A
Matrix: Solid
Analysis Batch: 635184

Client Sample ID: Method Blank
Prep Type: TCLP

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon tetrachloride	ND		0.010		mg/L			07/28/22 03:11	10
Chlorobenzene	ND		0.010		mg/L			07/28/22 03:11	10
Chloroform	ND		0.010		mg/L			07/28/22 03:11	10
Tetrachloroethene	ND		0.010		mg/L			07/28/22 03:11	10
Trichloroethene	ND		0.010		mg/L			07/28/22 03:11	10
Vinyl chloride	ND		0.010		mg/L			07/28/22 03:11	10

Surrogate	*LB %Recovery*	*LB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*105*		*77 - 120*		*07/28/22 03:11*	*10*
4-Bromofluorobenzene (Surr)	*106*		*73 - 120*		*07/28/22 03:11*	*10*
Dibromofluoromethane (Surr)	*109*		*75 - 123*		*07/28/22 03:11*	*10*
Toluene-d8 (Surr)	*101*		*80 - 120*		*07/28/22 03:11*	*10*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 480-635624/1-A
Matrix: Solid
Analysis Batch: 635864

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 635624

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dichlorobenzene	ND		0.010		mg/L		08/01/22 08:40	08/02/22 16:46	1
2,4-Dinitrotoluene	ND		0.0050		mg/L		08/01/22 08:40	08/02/22 16:46	1
2,4,5-Trichlorophenol	ND		0.0050		mg/L		08/01/22 08:40	08/02/22 16:46	1
2,4,6-Trichlorophenol	ND		0.0050		mg/L		08/01/22 08:40	08/02/22 16:46	1
2-Methylphenol	ND		0.0050		mg/L		08/01/22 08:40	08/02/22 16:46	1
3-Methylphenol	ND		0.010		mg/L		08/01/22 08:40	08/02/22 16:46	1
4-Methylphenol	ND		0.010		mg/L		08/01/22 08:40	08/02/22 16:46	1
Hexachlorobenzene	ND		0.0050		mg/L		08/01/22 08:40	08/02/22 16:46	1
Hexachlorobutadiene	ND		0.0050		mg/L		08/01/22 08:40	08/02/22 16:46	1
Hexachloroethane	ND		0.0050		mg/L		08/01/22 08:40	08/02/22 16:46	1
Nitrobenzene	ND		0.0050		mg/L		08/01/22 08:40	08/02/22 16:46	1
Pentachlorophenol	ND		0.010		mg/L		08/01/22 08:40	08/02/22 16:46	1
Pyridine	ND		0.025		mg/L		08/01/22 08:40	08/02/22 16:46	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*72*		*41 - 120*	*08/01/22 08:40*	*08/02/22 16:46*	*1*
2-Fluorobiphenyl (Surr)	*83*		*48 - 120*	*08/01/22 08:40*	*08/02/22 16:46*	*1*
2-Fluorophenol (Surr)	*50*		*35 - 120*	*08/01/22 08:40*	*08/02/22 16:46*	*1*
Nitrobenzene-d5 (Surr)	*86*		*46 - 120*	*08/01/22 08:40*	*08/02/22 16:46*	*1*
p-Terphenyl-d14 (Surr)	*101*		*60 - 148*	*08/01/22 08:40*	*08/02/22 16:46*	*1*
Phenol-d5 (Surr)	*38*		*22 - 120*	*08/01/22 08:40*	*08/02/22 16:46*	*1*

Lab Sample ID: LCS 480-635624/2-A
Matrix: Solid
Analysis Batch: 635864

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 635624

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
1,4-Dichlorobenzene	0.0500	0.0299		mg/L		60	51 - 120

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 480-635624/2-A
Matrix: Solid
Analysis Batch: 635864

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 635624

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
2,4-Dinitrotoluene			0.0500	0.0475		mg/L		95	69 - 120		
2,4,5-Trichlorophenol			0.0500	0.0431		mg/L		86	65 - 126		
2,4,6-Trichlorophenol			0.0500	0.0455		mg/L		91	64 - 120		
2-Methylphenol			0.0500	0.0398		mg/L		80	39 - 120		
3-Methylphenol			0.0500	0.0407		mg/L		81	39 - 120		
4-Methylphenol			0.0500	0.0407		mg/L		81	29 - 131		
Hexachlorobenzene			0.0500	0.0431		mg/L		86	61 - 120		
Hexachlorobutadiene			0.0500	0.0244		mg/L		49	35 - 120		
Hexachloroethane			0.0500	0.0271		mg/L		54	43 - 120		
Nitrobenzene			0.0500	0.0421		mg/L		84	53 - 123		
Pentachlorophenol			0.100	0.0900		mg/L		90	29 - 136		
Pyridine			0.100	0.0511		mg/L		51	10 - 120		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*88*		*41 - 120*
2-Fluorobiphenyl (Surr)	*84*		*48 - 120*
2-Fluorophenol (Surr)	*51*		*35 - 120*
Nitrobenzene-d5 (Surr)	*80*		*46 - 120*
p-Terphenyl-d14 (Surr)	*95*		*60 - 148*
Phenol-d5 (Surr)	*41*		*22 - 120*

Lab Sample ID: LCSD 480-635624/3-A
Matrix: Solid
Analysis Batch: 635864

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 635624

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
1,4-Dichlorobenzene			0.0500	0.0268		mg/L		54	51 - 120	11	36
2,4-Dinitrotoluene			0.0500	0.0455		mg/L		91	69 - 120	4	20
2,4,5-Trichlorophenol			0.0500	0.0403		mg/L		81	65 - 126	7	18
2,4,6-Trichlorophenol			0.0500	0.0413		mg/L		83	64 - 120	10	19
2-Methylphenol			0.0500	0.0370		mg/L		74	39 - 120	7	27
3-Methylphenol			0.0500	0.0368		mg/L		74	39 - 120	10	30
4-Methylphenol			0.0500	0.0368		mg/L		74	29 - 131	10	24
Hexachlorobenzene			0.0500	0.0426		mg/L		85	61 - 120	1	15
Hexachlorobutadiene			0.0500	0.0224		mg/L		45	35 - 120	9	44
Hexachloroethane			0.0500	0.0240		mg/L		48	43 - 120	12	46
Nitrobenzene			0.0500	0.0383		mg/L		77	53 - 123	9	24
Pentachlorophenol			0.100	0.0853		mg/L		85	29 - 136	5	37
Pyridine			0.100	0.0457		mg/L		46	10 - 120	11	49

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*87*		*41 - 120*
2-Fluorobiphenyl (Surr)	*78*		*48 - 120*
2-Fluorophenol (Surr)	*44*		*35 - 120*
Nitrobenzene-d5 (Surr)	*72*		*46 - 120*
p-Terphenyl-d14 (Surr)	*91*		*60 - 148*
Phenol-d5 (Surr)	*34*		*22 - 120*

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LB 480-634916/1-H
Matrix: Solid
Analysis Batch: 635864

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 635624

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dichlorobenzene	ND		0.042		mg/L		08/01/22 08:40	08/02/22 17:58	1
2,4-Dinitrotoluene	ND		0.021		mg/L		08/01/22 08:40	08/02/22 17:58	1
2,4,5-Trichlorophenol	ND		0.021		mg/L		08/01/22 08:40	08/02/22 17:58	1
2,4,6-Trichlorophenol	ND		0.021		mg/L		08/01/22 08:40	08/02/22 17:58	1
2-Methylphenol	ND		0.021		mg/L		08/01/22 08:40	08/02/22 17:58	1
3-Methylphenol	ND		0.042		mg/L		08/01/22 08:40	08/02/22 17:58	1
4-Methylphenol	ND		0.042		mg/L		08/01/22 08:40	08/02/22 17:58	1
Hexachlorobenzene	ND		0.021		mg/L		08/01/22 08:40	08/02/22 17:58	1
Hexachlorobutadiene	ND		0.021		mg/L		08/01/22 08:40	08/02/22 17:58	1
Hexachloroethane	ND		0.021		mg/L		08/01/22 08:40	08/02/22 17:58	1
Nitrobenzene	ND		0.021		mg/L		08/01/22 08:40	08/02/22 17:58	1
Pentachlorophenol	ND		0.042		mg/L		08/01/22 08:40	08/02/22 17:58	1
Pyridine	ND		0.10		mg/L		08/01/22 08:40	08/02/22 17:58	1

Surrogate	*LB %Recovery*	*LB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*76*		*41 - 120*	*08/01/22 08:40*	*08/02/22 17:58*	*1*
2-Fluorobiphenyl (Surr)	*76*		*48 - 120*	*08/01/22 08:40*	*08/02/22 17:58*	*1*
2-Fluorophenol (Surr)	*45*		*35 - 120*	*08/01/22 08:40*	*08/02/22 17:58*	*1*
Nitrobenzene-d5 (Surr)	*75*		*46 - 120*	*08/01/22 08:40*	*08/02/22 17:58*	*1*
p-Terphenyl-d14 (Surr)	*102*		*60 - 148*	*08/01/22 08:40*	*08/02/22 17:58*	*1*
Phenol-d5 (Surr)	*34*		*22 - 120*	*08/01/22 08:40*	*08/02/22 17:58*	*1*

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 480-634833/1-A
Matrix: Solid
Analysis Batch: 634935

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 634833

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.19		mg/Kg		07/26/22 07:06	07/26/22 16:21	1
PCB-1221	ND		0.19		mg/Kg		07/26/22 07:06	07/26/22 16:21	1
PCB-1232	ND		0.19		mg/Kg		07/26/22 07:06	07/26/22 16:21	1
PCB-1242	ND		0.19		mg/Kg		07/26/22 07:06	07/26/22 16:21	1
PCB-1248	ND		0.19		mg/Kg		07/26/22 07:06	07/26/22 16:21	1
PCB-1254	ND		0.19		mg/Kg		07/26/22 07:06	07/26/22 16:21	1
PCB-1260	ND		0.19		mg/Kg		07/26/22 07:06	07/26/22 16:21	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*107*		*60 - 154*	*07/26/22 07:06*	*07/26/22 16:21*	*1*
Tetrachloro-m-xylene	*124*		*60 - 154*	*07/26/22 07:06*	*07/26/22 16:21*	*1*
DCB Decachlorobiphenyl	*105*		*65 - 174*	*07/26/22 07:06*	*07/26/22 16:21*	*1*
DCB Decachlorobiphenyl	*111*		*65 - 174*	*07/26/22 07:06*	*07/26/22 16:21*	*1*

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

Lab Sample ID: LCS 480-634833/2-A
Matrix: Solid
Analysis Batch: 634935

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 634833

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
PCB-1016			1.81	2.14		mg/Kg		118	51 - 185		
PCB-1260			1.81	2.17		mg/Kg		120	61 - 184		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Tetrachloro-m-xylene	*118*		*60 - 154*
Tetrachloro-m-xylene	*139*		*60 - 154*
DCB Decachlorobiphenyl	*117*		*65 - 174*
DCB Decachlorobiphenyl	*124*		*65 - 174*

Method: 6010C - Metals (ICP)

Lab Sample ID: MB 480-635072/2-A
Matrix: Solid
Analysis Batch: 635460

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 635072

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.015		mg/L		07/27/22 10:21	07/28/22 14:59	1
Barium	ND		1.0		mg/L		07/27/22 10:21	07/28/22 14:59	1
Cadmium	ND		0.0020		mg/L		07/27/22 10:21	07/28/22 14:59	1
Chromium	ND		0.020		mg/L		07/27/22 10:21	07/28/22 14:59	1
Lead	ND		0.020		mg/L		07/27/22 10:21	07/28/22 14:59	1
Selenium	ND		0.025		mg/L		07/27/22 10:21	07/28/22 14:59	1
Silver	ND		0.0060		mg/L		07/27/22 10:21	07/28/22 14:59	1

Lab Sample ID: LCS 480-635072/3-A
Matrix: Solid
Analysis Batch: 635460

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 635072

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Arsenic			1.00	1.07		mg/L		107	80 - 120		
Barium			1.00	0.981	J	mg/L		98	80 - 120		
Cadmium			1.00	1.01		mg/L		101	80 - 120		
Chromium			1.00	0.989		mg/L		99	80 - 120		
Lead			1.00	0.996		mg/L		100	80 - 120		
Selenium			1.00	1.07		mg/L		107	80 - 120		
Silver			1.00	1.05		mg/L		105	80 - 120		

Lab Sample ID: LB 480-634916/1-D
Matrix: Solid
Analysis Batch: 635460

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 635072

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.015		mg/L		07/27/22 10:21	07/28/22 14:55	1
Barium	ND		1.0		mg/L		07/27/22 10:21	07/28/22 14:55	1
Cadmium	ND		0.0020		mg/L		07/27/22 10:21	07/28/22 14:55	1
Chromium	ND		0.020		mg/L		07/27/22 10:21	07/28/22 14:55	1
Lead	ND		0.020		mg/L		07/27/22 10:21	07/28/22 14:55	1
Selenium	ND		0.025		mg/L		07/27/22 10:21	07/28/22 14:55	1
Silver	ND		0.0060		mg/L		07/27/22 10:21	07/28/22 14:55	1

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 480-635084/2-A
Matrix: Solid
Analysis Batch: 635187

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 635084

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00020		mg/L		07/27/22 11:24	07/27/22 15:39	1

Lab Sample ID: LCS 480-635084/3-A
Matrix: Solid
Analysis Batch: 635187

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 635084

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Mercury			0.00678	0.00628		mg/L		93	80 - 120		

Lab Sample ID: LB 480-634916/1-E
Matrix: Solid
Analysis Batch: 635187

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 635084

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00020		mg/L		07/27/22 11:24	07/27/22 15:38	1

QC Association Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200053-1

GC/MS VOA

Leach Batch: 634921

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200053-3	H067-EX5-COMP	TCLP	Solid	1311	
LB 480-634921/1-A	Method Blank	TCLP	Solid	1311	

Analysis Batch: 635184

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200053-3	H067-EX5-COMP	TCLP	Solid	8260C	634921
LB 480-634921/1-A	Method Blank	TCLP	Solid	8260C	634921
MB 480-635184/8	Method Blank	Total/NA	Solid	8260C	
LCS 480-635184/6	Lab Control Sample	Total/NA	Solid	8260C	

GC/MS Semi VOA

Leach Batch: 634916

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200053-3	H067-EX5-COMP	TCLP	Solid	1311	
LB 480-634916/1-H	Method Blank	TCLP	Solid	1311	

Prep Batch: 635624

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200053-3	H067-EX5-COMP	TCLP	Solid	3510C	634916
LB 480-634916/1-H	Method Blank	TCLP	Solid	3510C	634916
MB 480-635624/1-A	Method Blank	Total/NA	Solid	3510C	
LCS 480-635624/2-A	Lab Control Sample	Total/NA	Solid	3510C	
LCSD 480-635624/3-A	Lab Control Sample Dup	Total/NA	Solid	3510C	

Analysis Batch: 635864

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200053-3	H067-EX5-COMP	TCLP	Solid	8270D	635624
LB 480-634916/1-H	Method Blank	TCLP	Solid	8270D	635624
MB 480-635624/1-A	Method Blank	Total/NA	Solid	8270D	635624
LCS 480-635624/2-A	Lab Control Sample	Total/NA	Solid	8270D	635624
LCSD 480-635624/3-A	Lab Control Sample Dup	Total/NA	Solid	8270D	635624

GC Semi VOA

Prep Batch: 634833

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200053-3	H067-EX5-COMP	Total/NA	Solid	3550C	
MB 480-634833/1-A	Method Blank	Total/NA	Solid	3550C	
LCS 480-634833/2-A	Lab Control Sample	Total/NA	Solid	3550C	

Analysis Batch: 634935

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200053-3	H067-EX5-COMP	Total/NA	Solid	8082A	634833
MB 480-634833/1-A	Method Blank	Total/NA	Solid	8082A	634833
LCS 480-634833/2-A	Lab Control Sample	Total/NA	Solid	8082A	634833

Metals

Leach Batch: 634916

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200053-3	H067-EX5-COMP	TCLP	Solid	1311	

Metals (Continued)

Leach Batch: 634916 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LB 480-634916/1-D	Method Blank	TCLP	Solid	1311	
LB 480-634916/1-E	Method Blank	TCLP	Solid	1311	

Prep Batch: 635072

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200053-3	H067-EX5-COMP	TCLP	Solid	3010A	634916
LB 480-634916/1-D	Method Blank	TCLP	Solid	3010A	634916
MB 480-635072/2-A	Method Blank	Total/NA	Solid	3010A	
LCS 480-635072/3-A	Lab Control Sample	Total/NA	Solid	3010A	

Prep Batch: 635084

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200053-3	H067-EX5-COMP	TCLP	Solid	7470A	634916
LB 480-634916/1-E	Method Blank	TCLP	Solid	7470A	634916
MB 480-635084/2-A	Method Blank	Total/NA	Solid	7470A	
LCS 480-635084/3-A	Lab Control Sample	Total/NA	Solid	7470A	

Analysis Batch: 635187

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200053-3	H067-EX5-COMP	TCLP	Solid	7470A	635084
LB 480-634916/1-E	Method Blank	TCLP	Solid	7470A	635084
MB 480-635084/2-A	Method Blank	Total/NA	Solid	7470A	635084
LCS 480-635084/3-A	Lab Control Sample	Total/NA	Solid	7470A	635084

Analysis Batch: 635460

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200053-3	H067-EX5-COMP	TCLP	Solid	6010C	635072
LB 480-634916/1-D	Method Blank	TCLP	Solid	6010C	635072
MB 480-635072/2-A	Method Blank	Total/NA	Solid	6010C	635072
LCS 480-635072/3-A	Lab Control Sample	Total/NA	Solid	6010C	635072

General Chemistry

Analysis Batch: 635764

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200053-3	H067-EX5-COMP	Total/NA	Solid	Moisture	

Lab Chronicle

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200053-1

Client Sample ID: H067-EX5-COMP

Lab Sample ID: 480-200053-3

Date Collected: 07/22/22 07:40

Matrix: Solid

Date Received: 07/23/22 11:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
TCLP	Leach	1311			634921	BML	EET BUF	07/26/22 12:46 - 07/27/22 11:35 [1]
TCLP	Analysis	8260C		10	635184	AXK	EET BUF	07/28/22 05:08
TCLP	Leach	1311			634916	BML	EET BUF	07/26/22 12:24 - 07/27/22 10:17 [1]
TCLP	Prep	3510C			635624	MS	EET BUF	08/01/22 08:40
TCLP	Analysis	8270D		1	635864	PJQ	EET BUF	08/02/22 19:59
TCLP	Leach	1311			634916	BML	EET BUF	07/26/22 12:24 - 07/27/22 10:17 [1]
TCLP	Prep	3010A			635072	NVK	EET BUF	07/27/22 10:21
TCLP	Analysis	6010C		1	635460	LMH	EET BUF	07/28/22 15:46
TCLP	Leach	1311			634916	BML	EET BUF	07/26/22 12:24 - 07/27/22 10:17 [1]
TCLP	Prep	7470A			635084	NVK	EET BUF	07/27/22 11:24
TCLP	Analysis	7470A		1	635187	NVK	EET BUF	07/27/22 15:52
Total/NA	Analysis	Moisture		1	635764	DSC	EET BUF	08/01/22 16:50

Client Sample ID: H067-EX5-COMP

Lab Sample ID: 480-200053-3

Date Collected: 07/22/22 07:40

Matrix: Solid

Date Received: 07/23/22 11:30

Percent Solids: 74.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	3550C			634833	SMP	EET BUF	07/26/22 07:06
Total/NA	Analysis	8082A		1	634935	W1T	EET BUF	07/26/22 17:28

[1] Completion dates and times are reported or not reported per method requirements or individual lab discretion.

Laboratory References:

EET BUF = Eurofins Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

Accreditation/Certification Summary

Client: ARCADIS U.S. Inc
Job ID: 480-200053-1
Project/Site: GTEOSI - Seneca Falls

Laboratory: Eurofins Buffalo

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
New York	NELAP	10026	09-05-22

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
7470A	7470A	Solid	Mercury
Moisture		Solid	Percent Moisture
Moisture		Solid	Percent Solids

Method Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200053-1

Method	Method Description	Protocol	Laboratory
8260C	Volatile Organic Compounds by GC/MS	SW846	EET BUF
8270D	Semivolatile Organic Compounds (GC/MS)	SW846	EET BUF
8082A	Polychlorinated Biphenyls (PCBs) by Gas Chromatography	SW846	EET BUF
6010C	Metals (ICP)	SW846	EET BUF
7470A	Mercury (CVAA)	SW846	EET BUF
Moisture	Percent Moisture	EPA	EET BUF
1311	TCLP Extraction	SW846	EET BUF
3010A	Preparation, Total Metals	SW846	EET BUF
3510C	Liquid-Liquid Extraction (Separatory Funnel)	SW846	EET BUF
3550C	Ultrasonic Extraction	SW846	EET BUF
5030C	Purge and Trap	SW846	EET BUF
7470A	Preparation, Mercury	SW846	EET BUF

Protocol References:

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EET BUF = Eurofins Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

Sample Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200053-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
480-200053-3	H067-EX5-COMP	Solid	07/22/22 07:40	07/23/22 11:30

Eurofins TestAmerica, Buffalo
10 Hazelwood Drive

Amherst, NY 14228-2223
phone 716.691.2600 fax 716.691.7991

Chain of Custody Record

eurofins | Environment Testing America

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc. d/b/a Eurofins TestAmerica

Client Contact	Project Manager: Mark Flusche	Site Contact: Ryan Clare	Date:	COC No: 4
Company: Arcadis of New York, Inc.	Email: mark.flusche@arcadis.com	Lab Contact: Schove, John R	Carrier: FedEx	1 of 3 COCs
Address: 855 Route 146 Suite 210	Tel: 518-250-7322			TALS Project #:
Clifton Park, NY 12065	Analysis Turnaround Time			Sampler: Kaitlyn Fleming
	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
	TAT if different from Below _____			Walk-in Client:
Project Name: GTEOSI - Seneca Falls	☑ 2 weeks			Lab Sampling:
Site:	☐ 1 week			
PO #: 30112357.00055 Project #:	☐ 2 days			Job / SDG No.:
	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS/MSD (Y/N)	TCLP VOCs	TCLP SVOCs	TCLP Metals	PCBs	Pesticides/Herbicides	HOLD at Lab	Total VOCs	Total SVOCs	Sample Specific Notes:
H067-EX5-01	7/22/22	0720	G	Soil	3					X			X	X	X	HOLD
H067-EX5-02	7/22/22	0700	G	Soil	3					X			X	X	X	HOLD
H067-EX5-comp	7/22/22	0740	C	Soil	5			X	X	X	X	X				
H067-EX6-01	7/22/22	0930	G	Soil	3					X			X	X	X	HOLD
H067-EX6-02	7/22/22	0640	G	Soil	3					X			X	X	X	HOLD
H067-EX6-03	7/22/22	0800	G	Soil	3					X			X	X	X	HOLD
	/22			Soil												
	/22			Soil												
	/22			Soil												
	/22			Soil												
	/22			Soil												
	/22			Soil												
								1	1	1	1					

480-200053 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☑ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☑ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:

Temp 2.8 # 1XC=

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: _____ Corr'd: _____ Therm ID No.: _____

Relinquished by: Kaitlyn Fleming	Company: Arcadis	Date/Time: 7/22/22 1200	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company: TA	Date/Time: 7/23/22 1130

Form No. CA-C-WI-002, Rev. 4.34, dated 8/3/2020

12/13/2022 (Rev. 1)

Login Sample Receipt Checklist

Client: ARCADIS U.S. Inc

Job Number: 480-200053-1

Login Number: 200053
List Number: 1
Creator: Kolb, Chris M

List Source: Eurofins Buffalo

Question	Answer	Comment
Radioactivity either was not measured or, if measured, is at or below background	True	
The cooler's custody seal, if present, is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time (Excluding tests with immediate HTs)..	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	N/A	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Sampling Company provided.	True	ARCADIS
Samples received within 48 hours of sampling.	True	
Samples requiring field filtration have been filtered in the field.	True	
Chlorine Residual checked.	N/A	

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ANALYTICAL REPORT

Eurofins Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Tel: (716)691-2600

Laboratory Job ID: 480-200053-3
Client Project/Site: GTEOSI - Seneca Falls

For:
ARCADIS U.S. Inc
855 Route 146
Suite 210
Clifton Park, New York 12065

Attn: Mark Flusche

Authorized for release by:
8/8/2022 5:22:03 PM
Judy Stone, Senior Project Manager
(484)685-0868
Judy.Stone@et.eurofinsus.com

Designee for

John Schove, Project Manager II
(716)504-9838
John.Schove@et.eurofinsus.com

LINKS

Review your project results through my EOL

Have a Question? Ask The Expert

Visit us at: www.eurofinsus.com/Env

The test results in this report meet all 2003 NELAC, 2009 TNI, and 2016 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Cover Page 1
Table of Contents 2
Definitions/Glossary 3
Case Narrative 4
Detection Summary 5
Client Sample Results 6
Surrogate Summary 7
QC Sample Results 8
QC Association Summary 11
Lab Chronicle 12
Certification Summary 13
Method Summary 14
Sample Summary 15
Chain of Custody 16
Receipt Checklists 19

Definitions/Glossary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200053-3

Qualifiers

GC Semi VOA

Qualifier	Qualifier Description
S1-	Surrogate recovery exceeds control limits, low biased.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 480-200053-3

Laboratory: Eurofins Buffalo

Narrative

Job Narrative
480-200053-3

Comments
The sample was originally put on hold for TCLP pesticides and herbicides and activated on 8/1/22.

Receipt
The sample was received on 7/23/2022 11:30 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 2.8º C.

GC Semi VOA
Method 8151A: Surrogate recoveries for the following samples were outside control limits: H067-EX5-COMP (480-200053-3) and (LB 480-635828/1-D). This is routine for TCLP herbicides, due to the pH effects created during the leaching process, inhibiting the herbicide derivatization of the free acid components.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Organic Prep
Method 8151A: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate/sample duplicate (MS/MSD/DUP) associated with preparation batch 480-635828 and 480-635998.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200053-3

Client Sample ID: H067-EX5-COMP

Lab Sample ID: 480-200053-3

No Detections.

This Detection Summary does not include radiochemical test results.

Eurofins Buffalo

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200053-3

Client Sample ID: H067-EX5-COMP
Date Collected: 07/22/22 07:40
Date Received: 07/23/22 11:30

Lab Sample ID: 480-200053-3
Matrix: Solid

Method: 8081B - Organochlorine Pesticides (GC) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
gamma-BHC (Lindane)	ND		0.00020		mg/L		08/03/22 10:02	08/03/22 15:48	1
Chlordane (technical)	ND		0.0020		mg/L		08/03/22 10:02	08/03/22 15:48	1
Endrin	ND		0.00020		mg/L		08/03/22 10:02	08/03/22 15:48	1
Heptachlor	ND		0.00020		mg/L		08/03/22 10:02	08/03/22 15:48	1
Heptachlor epoxide	ND		0.00020		mg/L		08/03/22 10:02	08/03/22 15:48	1
Methoxychlor	ND		0.00020		mg/L		08/03/22 10:02	08/03/22 15:48	1
Toxaphene	ND		0.0020		mg/L		08/03/22 10:02	08/03/22 15:48	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl	*82*		*20 - 120*	*08/03/22 10:02*	*08/03/22 15:48*	*1*
DCB Decachlorobiphenyl	*89*		*20 - 120*	*08/03/22 10:02*	*08/03/22 15:48*	*1*
Tetrachloro-m-xylene	*96*		*44 - 120*	*08/03/22 10:02*	*08/03/22 15:48*	*1*
Tetrachloro-m-xylene	*73*		*44 - 120*	*08/03/22 10:02*	*08/03/22 15:48*	*1*

Method: 8151 - TCLP Herbicides - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silvex (2,4,5-TP)	ND		0.0020		mg/L		08/03/22 10:08	08/04/22 19:41	1
2,4-D	ND		0.0020		mg/L		08/03/22 10:08	08/04/22 19:41	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*26*	*S1-*	*48 - 132*	*08/03/22 10:08*	*08/04/22 19:41*	*1*
2,4-Dichlorophenylacetic acid	*24*	*S1-*	*48 - 132*	*08/03/22 10:08*	*08/04/22 19:41*	*1*

Surrogate Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200053-3

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCBP1	DCBP2	TCX1	TCX2
Lab Sample ID	Client Sample ID	(20-120)	(20-120)	(44-120)	(44-120)
LCS 480-635997/2-A	Lab Control Sample	54	59	98	77
LCSD 480-635997/3-A	Lab Control Sample Dup	56	59	85	65
MB 480-635997/1-A	Method Blank	54	56	71	56

Surrogate Legend

DCBP = DCB Decachlorobiphenyl
TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid **Prep Type: TCLP**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCBP1	DCBP2	TCX1	TCX2
Lab Sample ID	Client Sample ID	(20-120)	(20-120)	(44-120)	(44-120)
480-200053-3	H067-EX5-COMP	82	89	96	73
LB 480-635828/1-C	Method Blank	69	77	94	72

Surrogate Legend

DCBP = DCB Decachlorobiphenyl
TCX = Tetrachloro-m-xylene

Method: 8151 - TCLP Herbicides

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCPAA1	DCPAA2
Lab Sample ID	Client Sample ID	(48-132)	(48-132)
LCS 480-635998/2-A	Lab Control Sample	111	76
LCSD 480-635998/3-A	Lab Control Sample Dup	106	75
MB 480-635998/1-A	Method Blank	99	82

Surrogate Legend

DCPAA = 2,4-Dichlorophenylacetic acid

Method: 8151 - TCLP Herbicides

Matrix: Solid **Prep Type: TCLP**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCPAA1	DCPAA2
Lab Sample ID	Client Sample ID	(48-132)	(48-132)
480-200053-3	H067-EX5-COMP	26 S1-	24 S1-
LB 480-635828/1-D	Method Blank	27 S1-	28 S1-

Surrogate Legend

DCPAA = 2,4-Dichlorophenylacetic acid

Method: 8081B - Organochlorine Pesticides (GC)

Lab Sample ID: MB 480-635997/1-A
Matrix: Solid
Analysis Batch: 635954

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 635997

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
gamma-BHC (Lindane)	ND		0.000050		mg/L		08/03/22 10:02	08/03/22 14:10	1
Chlordane (technical)	ND		0.00050		mg/L		08/03/22 10:02	08/03/22 14:10	1
Endrin	ND		0.000050		mg/L		08/03/22 10:02	08/03/22 14:10	1
Heptachlor	ND		0.000050		mg/L		08/03/22 10:02	08/03/22 14:10	1
Heptachlor epoxide	ND		0.000050		mg/L		08/03/22 10:02	08/03/22 14:10	1
Methoxychlor	ND		0.000050		mg/L		08/03/22 10:02	08/03/22 14:10	1
Toxaphene	ND		0.00050		mg/L		08/03/22 10:02	08/03/22 14:10	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl	*54*		*20 - 120*	*08/03/22 10:02*	*08/03/22 14:10*	*1*
DCB Decachlorobiphenyl	*56*		*20 - 120*	*08/03/22 10:02*	*08/03/22 14:10*	*1*
Tetrachloro-m-xylene	*71*		*44 - 120*	*08/03/22 10:02*	*08/03/22 14:10*	*1*
Tetrachloro-m-xylene	*56*		*44 - 120*	*08/03/22 10:02*	*08/03/22 14:10*	*1*

Lab Sample ID: LCS 480-635997/2-A
Matrix: Solid
Analysis Batch: 635954

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 635997

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
gamma-BHC (Lindane)			0.000500	0.000461		mg/L		92	56 - 120		
Endrin			0.000500	0.000477		mg/L		95	65 - 135		
Heptachlor			0.000500	0.000473		mg/L		95	58 - 120		
Heptachlor epoxide			0.000500	0.000530		mg/L		106	65 - 125		
Methoxychlor			0.000500	0.000531		mg/L		106	50 - 150		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
DCB Decachlorobiphenyl	*54*		*20 - 120*
DCB Decachlorobiphenyl	*59*		*20 - 120*
Tetrachloro-m-xylene	*98*		*44 - 120*
Tetrachloro-m-xylene	*77*		*44 - 120*

Lab Sample ID: LCSD 480-635997/3-A
Matrix: Solid
Analysis Batch: 635954

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 635997

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
gamma-BHC (Lindane)			0.000500	0.000435		mg/L		87	56 - 120	6	24
Endrin			0.000500	0.000479		mg/L		96	65 - 135	1	24
Heptachlor			0.000500	0.000446		mg/L		89	58 - 120	6	25
Heptachlor epoxide			0.000500	0.000528		mg/L		106	65 - 125	0	23
Methoxychlor			0.000500	0.000543		mg/L		109	50 - 150	2	26

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
DCB Decachlorobiphenyl	*56*		*20 - 120*
DCB Decachlorobiphenyl	*59*		*20 - 120*
Tetrachloro-m-xylene	*85*		*44 - 120*
Tetrachloro-m-xylene	*65*		*44 - 120*

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: LB 480-635828/1-C
Matrix: Solid
Analysis Batch: 635954

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 635997

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
gamma-BHC (Lindane)	ND		0.00020		mg/L		08/03/22 10:02	08/03/22 15:29	1
Chlordane (technical)	ND		0.0020		mg/L		08/03/22 10:02	08/03/22 15:29	1
Endrin	ND		0.00020		mg/L		08/03/22 10:02	08/03/22 15:29	1
Heptachlor	ND		0.00020		mg/L		08/03/22 10:02	08/03/22 15:29	1
Heptachlor epoxide	ND		0.00020		mg/L		08/03/22 10:02	08/03/22 15:29	1
Methoxychlor	ND		0.00020		mg/L		08/03/22 10:02	08/03/22 15:29	1
Toxaphene	ND		0.0020		mg/L		08/03/22 10:02	08/03/22 15:29	1

Surrogate	*LB %Recovery*	*LB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl	*69*		*20 - 120*	*08/03/22 10:02*	*08/03/22 15:29*	*1*
DCB Decachlorobiphenyl	*77*		*20 - 120*	*08/03/22 10:02*	*08/03/22 15:29*	*1*
Tetrachloro-m-xylene	*94*		*44 - 120*	*08/03/22 10:02*	*08/03/22 15:29*	*1*
Tetrachloro-m-xylene	*72*		*44 - 120*	*08/03/22 10:02*	*08/03/22 15:29*	*1*

Method: 8151 - TCLP Herbicides

Lab Sample ID: MB 480-635998/1-A
Matrix: Solid
Analysis Batch: 636179

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 635998

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silvex (2,4,5-TP)	ND		0.00050		mg/L		08/03/22 10:08	08/04/22 13:15	1
2,4-D	ND		0.00050		mg/L		08/03/22 10:08	08/04/22 13:15	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*99*		*48 - 132*	*08/03/22 10:08*	*08/04/22 13:15*	*1*
2,4-Dichlorophenylacetic acid	*82*		*48 - 132*	*08/03/22 10:08*	*08/04/22 13:15*	*1*

Lab Sample ID: LCS 480-635998/2-A
Matrix: Solid
Analysis Batch: 636179

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 635998

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Silvex (2,4,5-TP)			0.00200	0.00150		mg/L		75	49 - 150		
2,4-D			0.00200	0.00164		mg/L		82	36 - 150		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2,4-Dichlorophenylacetic acid	*111*		*48 - 132*
2,4-Dichlorophenylacetic acid	*76*		*48 - 132*

Lab Sample ID: LCSD 480-635998/3-A
Matrix: Solid
Analysis Batch: 636179

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 635998

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Silvex (2,4,5-TP)			0.00200	0.00145		mg/L		73	49 - 150	3	50
2,4-D			0.00200	0.00167		mg/L		84	36 - 150	2	50

Method: 8151 - TCLP Herbicides (Continued)

Lab Sample ID: LCSD 480-635998/3-A
Matrix: Solid
Analysis Batch: 636179

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 635998

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
2,4-Dichlorophenylacetic acid	*106*		*48 - 132*
2,4-Dichlorophenylacetic acid	*75*		*48 - 132*

Lab Sample ID: LB 480-635828/1-D
Matrix: Solid
Analysis Batch: 636179

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 635998

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silvex (2,4,5-TP)	ND		0.0020		mg/L		08/03/22 10:08	08/04/22 19:12	1
2,4-D	ND		0.0020		mg/L		08/03/22 10:08	08/04/22 19:12	1

Surrogate	*LB %Recovery*	*LB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*27*	*S1-*	*48 - 132*	*08/03/22 10:08*	*08/04/22 19:12*	*1*
2,4-Dichlorophenylacetic acid	*28*	*S1-*	*48 - 132*	*08/03/22 10:08*	*08/04/22 19:12*	*1*

QC Association Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200053-3

GC Semi VOA

Leach Batch: 635828

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200053-3	H067-EX5-COMP	TCLP	Solid	1311	
LB 480-635828/1-C	Method Blank	TCLP	Solid	1311	
LB 480-635828/1-D	Method Blank	TCLP	Solid	1311	

Analysis Batch: 635954

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200053-3	H067-EX5-COMP	TCLP	Solid	8081B	635997
LB 480-635828/1-C	Method Blank	TCLP	Solid	8081B	635997
MB 480-635997/1-A	Method Blank	Total/NA	Solid	8081B	635997
LCS 480-635997/2-A	Lab Control Sample	Total/NA	Solid	8081B	635997
LCSD 480-635997/3-A	Lab Control Sample Dup	Total/NA	Solid	8081B	635997

Prep Batch: 635997

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200053-3	H067-EX5-COMP	TCLP	Solid	3510C	635828
LB 480-635828/1-C	Method Blank	TCLP	Solid	3510C	635828
MB 480-635997/1-A	Method Blank	Total/NA	Solid	3510C	
LCS 480-635997/2-A	Lab Control Sample	Total/NA	Solid	3510C	
LCSD 480-635997/3-A	Lab Control Sample Dup	Total/NA	Solid	3510C	

Prep Batch: 635998

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200053-3	H067-EX5-COMP	TCLP	Solid	8151A	635828
LB 480-635828/1-D	Method Blank	TCLP	Solid	8151A	635828
MB 480-635998/1-A	Method Blank	Total/NA	Solid	8151A	
LCS 480-635998/2-A	Lab Control Sample	Total/NA	Solid	8151A	
LCSD 480-635998/3-A	Lab Control Sample Dup	Total/NA	Solid	8151A	

Analysis Batch: 636179

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200053-3	H067-EX5-COMP	TCLP	Solid	8151	635998
LB 480-635828/1-D	Method Blank	TCLP	Solid	8151	635998
MB 480-635998/1-A	Method Blank	Total/NA	Solid	8151	635998
LCS 480-635998/2-A	Lab Control Sample	Total/NA	Solid	8151	635998
LCSD 480-635998/3-A	Lab Control Sample Dup	Total/NA	Solid	8151	635998

Lab Chronicle

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200053-3

Client Sample ID: H067-EX5-COMP

Date Collected: 07/22/22 07:40
Date Received: 07/23/22 11:30

Lab Sample ID: 480-200053-3

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
TCLP	Leach	1311			635828	08/02/22 10:35	BML	EETNE BUF
TCLP	Prep	3510C			635997	08/03/22 10:02	MS	EETNE BUF
TCLP	Analysis	8081B		1	635954	08/03/22 15:48	JLS	EETNE BUF
TCLP	Leach	1311			635828	08/02/22 10:35	BML	EETNE BUF
TCLP	Prep	8151A			635998	08/03/22 10:08	JMP	EETNE BUF
TCLP	Analysis	8151		1	636179	08/04/22 19:41	MAN	EETNE BUF

Laboratory References:

EETNE BUF = Eurofins Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

Accreditation/Certification Summary

Client: ARCADIS U.S. Inc
Job ID: 480-200053-3
Project/Site: GTEOSI - Seneca Falls

Laboratory: Eurofins Buffalo

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
New York	NELAP	10026	03-31-23

Method Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200053-3

Method	Method Description	Protocol	Laboratory
8081B	Organochlorine Pesticides (GC)	SW846	EETNE BUF
8151	TCLP Herbicides	SW846	EETNE BUF
1311	TCLP Extraction	SW846	EETNE BUF
3510C	Liquid-Liquid Extraction (Separatory Funnel)	SW846	EETNE BUF
8151A	Extraction (Herbicides)	SW846	EETNE BUF

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EETNE BUF = Eurofins Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

Sample Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200053-3

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
480-200053-3	H067-EX5-COMP	Solid	07/22/22 07:40	07/23/22 11:30

Eurofins TestAmerica, Buffalo
10 Hazelwood Drive

Amherst, NY 14228-2223
phone 716.691.2600 fax 716.691.7991

Chain of Custody Record

eurofins | Environment Testing America

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc. d/b/a Eurofins TestAmerica

Client Contact	Project Manager: Mark Flusche	Site Contact: Ryan Clare	Date:	COC No: 4
Company: Arcadis of New York, Inc.	Email: mark.flusche@arcadis.com	Lab Contact: Schove, John R	Carrier: FedEx	1 of 3 COCs
Address: 855 Route 146 Suite 210	Tel: 518-250-7322			TALS Project #:
Clifton Park, NY 12065	Analysis Turnaround Time			Sampler: Kaitlyn Fleming
	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
	TAT if different from Below _____			Walk-in Client:
Project Name: GTEOSI - Seneca Falls	☑ 2 weeks			Lab Sampling:
Site:	☐ 1 week			
PO #: 30112357.00055 Project #:	☐ 2 days			Job / SDG No.:
	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS/MSD (Y/N)	TCLP VOCs	TCLP SVOCs	TCLP Metals	PCBs	Pesticides/Herbicides	HOLD at Lab	Total VOCs	Total SVOCs	Sample Specific Notes:
HO67-EX5-01	7/22/22	0720	G	Soil	3					X			X	X	X	HOLD
HO67-EX5-02	7/22/22	0700	G	Soil	3					X			X	X	X	HOLD
HO67-EX5-comp	7/22/22	0740	C	Soil	5			X	X	X	X	X				
HO67-EX6-01	7/22/22	0930	G	Soil	3					X			X	X	X	HOLD
HO67-EX6-02	7/22/22	0640	G	Soil	3					X			X	X	X	HOLD
HO67-EX6-03	7/22/22	0800	G	Soil	3					X			X	X	X	HOLD
	/22			Soil												
	/22			Soil												
	/22			Soil												
	/22			Soil												
	/22			Soil												
	/22			Soil												
								1	1	1	1					

480-200053 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☑ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☑ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:

Temp 2.8 # ICE

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd:_____ Corr'd:_____ Therm ID No.:_____

Relinquished by: Kaitlyn Fleming	Company: Arcadis	Date/Time: 7/22/22 1200	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company: TA	Date/Time: 7/23/22 1130

Eurofins TestAmerica, Buffalo
10 Hazelwood Drive

Amherst, NY 14228-2223
phone 716.691.2600 fax 716.691.7991

Chain of Custody Record

eurofins | Environment Testing America

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc. d/b/a Eurofins TestAmerica

Client Contact	Project Manager: Mark Flusche	Site Contact: Ryan Clare	Date:	COC No: 3
Company: Arcadis of New York, Inc.	Email: mark.flusche@arcadis.com	Lab Contact: Schove, John R	Carrier: FedEx	2 of 3 COCs
Address: 855 Route 146 Suite 210	Tel: 518-250-7322			TALS Project #:
Clifton Park, NY 12065	Analysis Turnaround Time			Sampler: Kaitlyn Fleming
	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
	TAT if different from Below _____			Walk-in Client:
Project Name: GTEOSI - Seneca Falls	☑ 2 weeks			Lab Sampling:
Site:	☐ 1 week			
PO #: 30112357.00055 Project #:	☐ 2 days			Job / SDG No.:
	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	Total Cadmium	Sample Specific Notes:
H067-EX5-01	7/22/22	0720	G	Soil	1			X	
H067-EX5-02	7/22/22	0700	G	Soil	1			X	
H067-EX6-01	7/22/22	0930	G	Soil	1			X	
H067-EX6-02	7/22/22	0640	G	Soil	1			X	
H067-EX6-03	7/22/22	0800	G	Soil	1			X	
~~H067-~~	/22			Soil					
~~[illegible]~~	/22			Soil					
~~H067-~~	/22			Soil					
	/22			Soil					
	/22			Soil					
	/22			Soil					
	/22			Soil					
								1	

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☑ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☑ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd:_____ Corr'd:_____ Therm ID No.:_____

Relinquished by: Kaitlyn Fleming	Company: Arcadis	Date/Time: 7/22/22 1200	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by: See PS1	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.34, dated 8/3/2020

Eurofins TestAmerica, Buffalo
10 Hazelwood Drive

Amherst, NY 14228-2223
phone 716.691.2600 fax 716.691.7991

Chain of Custody Record

eurofins | Environment Testing America

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc. d/b/a Eurofins TestAmerica

Client Contact	Project Manager: Mark Flusche	Site Contact: Ryan Clare	Date:	COC No:
Company: Arcadis of New York, Inc.	Email: mark.flusche@arcadis.com	Lab Contact: Schove, John R	Carrier: FedEx	3 of 3 COCs
Address: 855 Route 146 Suite 210	Tel: 518-250-7322			TALS Project #:
Clifton Park, NY 12065	**Analysis Turnaround Time**			Sampler: Kaitlyn Fleming
	☐ CALENDAR DAYS ☐ WORKING DAYS			**For Lab Use Only:**
	TAT if different from Below _____			Walk-in Client:
Project Name: GTEOSI - Seneca Falls	☑ 2 weeks			Lab Sampling:
Site:	☐ 1 week			
PO #: 30112357.00055 Project #:	☐ 2 days			Job / SDG No.:
	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	TAGM (30 TAGM compounds only)	Sample Specific Notes:
A067-EX5-01	7/22/22	0720	Grab	Soil	3			X	
[redacted]	[redacted]	[redacted]	Grab	Soil	[redacted]			[redacted]	
	/22		Grab	Soil					
	/22		Grab	Soil					
	/22		Grab	Soil					
	/22		Grab	Soil					
	/22		Grab	Soil					
	/22		Grab	Soil					
	/22		Grab	Soil					
	/22		Grab	Soil					
	/22		Grab	Soil					
	/22		Grab	Soil					

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____ 1

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☑ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☑ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: _____ Corr'd: _____ Therm ID No.: _____

	Company	Date/Time		Company	Date/Time
Relinquished by: Kaitlyn Fleming	Arcadis	7/22/22 1200	Received by:		
Relinquished by:			Received by:		
Relinquished by:			Received in Laboratory by: See PSL		

Login Sample Receipt Checklist

Client: ARCADIS U.S. Inc

Job Number: 480-200053-3

Login Number: 200053
List Number: 1
Creator: Kolb, Chris M

List Source: Eurofins Buffalo

Question	Answer	Comment
Radioactivity either was not measured or, if measured, is at or below background	True	
The cooler's custody seal, if present, is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time (Excluding tests with immediate HTs)..	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	N/A	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Sampling Company provided.	True	ARCADIS
Samples received within 48 hours of sampling.	True	
Samples requiring field filtration have been filtered in the field.	True	
Chlorine Residual checked.	N/A	

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ANALYTICAL REPORT

Eurofins Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Tel: (716)691-2600

Laboratory Job ID: 480-200132-1
Client Project/Site: GTEOSI - Seneca Falls

For:
ARCADIS U.S. Inc
855 Route 146
Suite 210
Clifton Park, New York 12065

Attn: Mark Flusche

Authorized for release by:
8/10/2022 12:21:23 PM
Wyatt Watson, Project Management Assistant I
Wyatt.Watson@et.eurofinsus.com

Designee for

John Schove, Project Manager II
(716)504-9838
John.Schove@et.eurofinsus.com

LINKS

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The test results in this report meet all 2003 NELAC, 2009 TNI, and 2016 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Cover Page 1
Table of Contents 2
Definitions/Glossary 3
Case Narrative 4
Detection Summary 5
Client Sample Results 6
Surrogate Summary 15
QC Sample Results 17
QC Association Summary 25
Lab Chronicle 28
Certification Summary 30
Method Summary 31
Sample Summary 32
Chain of Custody 33
Receipt Checklists 34

Definitions/Glossary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200132-1

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
*+	LCS and/or LCSD is outside acceptance limits, high biased.

GC/MS Semi VOA

Qualifier	Qualifier Description
*-	LCS and/or LCSD is outside acceptance limits, low biased.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
S1-	Surrogate recovery exceeds control limits, low biased.

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 480-200132-1

Laboratory: Eurofins Buffalo

Narrative

Job Narrative
480-200132-1

Comments
No additional comments.

Receipt
The samples were received on 7/27/2022 10:00 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 3.1º C.

GC/MS VOA
Method 8260C: Due to the co-elution of Ethyl Acetate with 2-Butanone in the full spike solution, 2-Butanone exceeded control limits in the laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) associated with batch 480-635531 . The following samples are impacted: H067-EX6-COMP (480-200132-3), H067-EX7-COMP (480-200132-7) and DUP-02-20220725 (480-200132-8).

Method 8260C: The following samples were diluted due to the nature of the TCLP matrix: H067-EX6-COMP (480-200132-3), H067-EX7-COMP (480-200132-7), DUP-02-20220725 (480-200132-8) and (LB 480-635235/1-A). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

GC/MS Semi VOA
Method 8270D: The associated samples were re-extracted and re-analyzed due to a low recovering surrogate in the batch Method Blank (MB). The re-extracted batch has 1,4-Dichlorobenzene recovering below the lower control limit in the LCSD. However, there is no additional volume available for a further re-extraction and re-analysis. Therefore, both sets of data are being reported. H067-EX6-COMP (480-200132-3), H067-EX7-COMP (480-200132-7) and DUP-02-20220725 (480-200132-8)

Method 8270D: The associated samples were re-extracted and re-analyzed due to a low recovering surrogate in the batch Method Blank (MB). The re-extracted batch has 1,4-Dichlorobenzene recovering below the lower control limit in the LCSD. However, there is no additional volume available for a further re-extraction and re-analysis. Therefore, both sets of data are being reported. H067-EX6-COMP (480-200132-3), H067-EX7-COMP (480-200132-7) and DUP-02-20220725 (480-200132-8)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

GC Semi VOA
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Metals
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Organic Prep
Method 1311: Sample difficult to filter, limited volume
H067-EX7-COMP (480-200132-7)

Method 3510C: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate/sample duplicate (MS/MSD/DUP) associated with preparation batch 480-635233, 480-635233 and 480-636139.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200132-1

Client Sample ID: H067-EX6-COMP — Lab Sample ID: 480-200132-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Cadmium	0.082		0.0020		mg/L	1		6010C	TCLP

Client Sample ID: H067-EX7-COMP — Lab Sample ID: 480-200132-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Cadmium	0.12		0.0020		mg/L	1		6010C	TCLP

Client Sample ID: DUP-02-20220725 — Lab Sample ID: 480-200132-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Cadmium	0.070		0.0020		mg/L	1		6010C	TCLP

This Detection Summary does not include radiochemical test results.

Client Sample ID: H067-EX6-COMP

Date Collected: 07/25/22 10:30
Date Received: 07/27/22 10:00

Lab Sample ID: 480-200132-3

Matrix: Solid

Method: 8260C - Volatile Organic Compounds by GC/MS - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	ND		0.010		mg/L			07/30/22 04:18	10
1,2-Dichloroethane	ND		0.010		mg/L			07/30/22 04:18	10
2-Butanone (MEK)	ND	*+	0.050		mg/L			07/30/22 04:18	10
Benzene	ND		0.010		mg/L			07/30/22 04:18	10
Carbon tetrachloride	ND		0.010		mg/L			07/30/22 04:18	10
Chlorobenzene	ND		0.010		mg/L			07/30/22 04:18	10
Chloroform	ND		0.010		mg/L			07/30/22 04:18	10
Tetrachloroethene	ND		0.010		mg/L			07/30/22 04:18	10
Trichloroethene	ND		0.010		mg/L			07/30/22 04:18	10
Vinyl chloride	ND		0.010		mg/L			07/30/22 04:18	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*108*		*77 - 120*		*07/30/22 04:18*	*10*
4-Bromofluorobenzene (Surr)	*88*		*73 - 120*		*07/30/22 04:18*	*10*
Dibromofluoromethane (Surr)	*98*		*75 - 123*		*07/30/22 04:18*	*10*
Toluene-d8 (Surr)	*97*		*80 - 120*		*07/30/22 04:18*	*10*

Method: 8270D - Semivolatile Organic Compounds (GC/MS) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dichlorobenzene	ND		0.040		mg/L		07/29/22 14:25	08/03/22 03:39	1
2,4-Dinitrotoluene	ND		0.020		mg/L		07/29/22 14:25	08/03/22 03:39	1
2,4,5-Trichlorophenol	ND		0.020		mg/L		07/29/22 14:25	08/03/22 03:39	1
2,4,6-Trichlorophenol	ND		0.020		mg/L		07/29/22 14:25	08/03/22 03:39	1
2-Methylphenol	ND		0.020		mg/L		07/29/22 14:25	08/03/22 03:39	1
3-Methylphenol	ND		0.040		mg/L		07/29/22 14:25	08/03/22 03:39	1
4-Methylphenol	ND		0.040		mg/L		07/29/22 14:25	08/03/22 03:39	1
Hexachlorobenzene	ND		0.020		mg/L		07/29/22 14:25	08/03/22 03:39	1
Hexachlorobutadiene	ND		0.020		mg/L		07/29/22 14:25	08/03/22 03:39	1
Hexachloroethane	ND		0.020		mg/L		07/29/22 14:25	08/03/22 03:39	1
Nitrobenzene	ND		0.020		mg/L		07/29/22 14:25	08/03/22 03:39	1
Pentachlorophenol	ND		0.040		mg/L		07/29/22 14:25	08/03/22 03:39	1
Pyridine	ND		0.10		mg/L		07/29/22 14:25	08/03/22 03:39	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*68*		*41 - 120*	*07/29/22 14:25*	*08/03/22 03:39*	*1*
2-Fluorobiphenyl (Surr)	*72*		*48 - 120*	*07/29/22 14:25*	*08/03/22 03:39*	*1*
2-Fluorophenol (Surr)	*41*		*35 - 120*	*07/29/22 14:25*	*08/03/22 03:39*	*1*
Nitrobenzene-d5 (Surr)	*71*		*46 - 120*	*07/29/22 14:25*	*08/03/22 03:39*	*1*
p-Terphenyl-d14 (Surr)	*105*		*60 - 148*	*07/29/22 14:25*	*08/03/22 03:39*	*1*
Phenol-d5 (Surr)	*32*		*22 - 120*	*07/29/22 14:25*	*08/03/22 03:39*	*1*

Method: 8270D - Semivolatile Organic Compounds (GC/MS) - TCLP - RE

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dichlorobenzene	ND	*-	0.040		mg/L		08/04/22 09:50	08/08/22 18:13	1
2,4-Dinitrotoluene	ND		0.020		mg/L		08/04/22 09:50	08/08/22 18:13	1
2,4,5-Trichlorophenol	ND		0.020		mg/L		08/04/22 09:50	08/08/22 18:13	1
2,4,6-Trichlorophenol	ND		0.020		mg/L		08/04/22 09:50	08/08/22 18:13	1
2-Methylphenol	ND		0.020		mg/L		08/04/22 09:50	08/08/22 18:13	1
3-Methylphenol	ND		0.040		mg/L		08/04/22 09:50	08/08/22 18:13	1
4-Methylphenol	ND		0.040		mg/L		08/04/22 09:50	08/08/22 18:13	1

Client Sample ID: H067-EX6-COMP
Date Collected: 07/25/22 10:30
Date Received: 07/27/22 10:00

Lab Sample ID: 480-200132-3
Matrix: Solid

Method: 8270D - Semivolatile Organic Compounds (GC/MS) - TCLP - RE (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hexachlorobenzene	ND		0.020		mg/L		08/04/22 09:50	08/08/22 18:13	1
Hexachlorobutadiene	ND		0.020		mg/L		08/04/22 09:50	08/08/22 18:13	1
Hexachloroethane	ND		0.020		mg/L		08/04/22 09:50	08/08/22 18:13	1
Nitrobenzene	ND		0.020		mg/L		08/04/22 09:50	08/08/22 18:13	1
Pentachlorophenol	ND		0.040		mg/L		08/04/22 09:50	08/08/22 18:13	1
Pyridine	ND		0.10		mg/L		08/04/22 09:50	08/08/22 18:13	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*81*		*41 - 120*	*08/04/22 09:50*	*08/08/22 18:13*	*1*
2-Fluorobiphenyl (Surr)	*79*		*48 - 120*	*08/04/22 09:50*	*08/08/22 18:13*	*1*
2-Fluorophenol (Surr)	*53*		*35 - 120*	*08/04/22 09:50*	*08/08/22 18:13*	*1*
Nitrobenzene-d5 (Surr)	*83*		*46 - 120*	*08/04/22 09:50*	*08/08/22 18:13*	*1*
p-Terphenyl-d14 (Surr)	*92*		*60 - 148*	*08/04/22 09:50*	*08/08/22 18:13*	*1*
Phenol-d5 (Surr)	*38*		*22 - 120*	*08/04/22 09:50*	*08/08/22 18:13*	*1*

Method: 6010C - Metals (ICP) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.015		mg/L		07/29/22 11:27	07/29/22 22:12	1
Barium	ND		1.0		mg/L		07/29/22 11:27	07/29/22 22:12	1
Cadmium	**0.082**		0.0020		mg/L		07/29/22 11:27	07/29/22 22:12	1
Chromium	ND		0.020		mg/L		07/29/22 11:27	07/29/22 22:12	1
Lead	ND		0.020		mg/L		07/29/22 11:27	07/29/22 22:12	1
Selenium	ND		0.025		mg/L		07/29/22 11:27	07/29/22 22:12	1
Silver	ND		0.0060		mg/L		07/29/22 11:27	07/29/22 22:12	1

Method: 7470A - Mercury (CVAA) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00020		mg/L		07/29/22 12:55	07/29/22 16:10	1

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200132-1

Client Sample ID: H067-EX6-COMP
Date Collected: 07/25/22 10:30
Date Received: 07/27/22 10:00

Lab Sample ID: 480-200132-3
Matrix: Solid
Percent Solids: 80.3

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.26		mg/Kg	☼	07/27/22 15:41	07/28/22 18:54	1
PCB-1221	ND		0.26		mg/Kg	☼	07/27/22 15:41	07/28/22 18:54	1
PCB-1232	ND		0.26		mg/Kg	☼	07/27/22 15:41	07/28/22 18:54	1
PCB-1242	ND		0.26		mg/Kg	☼	07/27/22 15:41	07/28/22 18:54	1
PCB-1248	ND		0.26		mg/Kg	☼	07/27/22 15:41	07/28/22 18:54	1
PCB-1254	ND		0.26		mg/Kg	☼	07/27/22 15:41	07/28/22 18:54	1
PCB-1260	ND		0.26		mg/Kg	☼	07/27/22 15:41	07/28/22 18:54	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*87*		*60 - 154*	*07/27/22 15:41*	*07/28/22 18:54*	*1*
Tetrachloro-m-xylene	*106*		*60 - 154*	*07/27/22 15:41*	*07/28/22 18:54*	*1*
DCB Decachlorobiphenyl	*78*		*65 - 174*	*07/27/22 15:41*	*07/28/22 18:54*	*1*
DCB Decachlorobiphenyl	*94*		*65 - 174*	*07/27/22 15:41*	*07/28/22 18:54*	*1*

Client Sample ID: H067-EX7-COMP

Date Collected: 07/25/22 12:30
Date Received: 07/27/22 10:00

Lab Sample ID: 480-200132-7

Matrix: Solid

Method: 8260C - Volatile Organic Compounds by GC/MS - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	ND		0.010		mg/L			07/30/22 04:41	10
1,2-Dichloroethane	ND		0.010		mg/L			07/30/22 04:41	10
2-Butanone (MEK)	ND	*+	0.050		mg/L			07/30/22 04:41	10
Benzene	ND		0.010		mg/L			07/30/22 04:41	10
Carbon tetrachloride	ND		0.010		mg/L			07/30/22 04:41	10
Chlorobenzene	ND		0.010		mg/L			07/30/22 04:41	10
Chloroform	ND		0.010		mg/L			07/30/22 04:41	10
Tetrachloroethene	ND		0.010		mg/L			07/30/22 04:41	10
Trichloroethene	ND		0.010		mg/L			07/30/22 04:41	10
Vinyl chloride	ND		0.010		mg/L			07/30/22 04:41	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*110*		*77 - 120*		*07/30/22 04:41*	*10*
4-Bromofluorobenzene (Surr)	*91*		*73 - 120*		*07/30/22 04:41*	*10*
Dibromofluoromethane (Surr)	*98*		*75 - 123*		*07/30/22 04:41*	*10*
Toluene-d8 (Surr)	*100*		*80 - 120*		*07/30/22 04:41*	*10*

Method: 8270D - Semivolatile Organic Compounds (GC/MS) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dichlorobenzene	ND		0.040		mg/L		07/29/22 14:25	08/03/22 04:03	1
2,4-Dinitrotoluene	ND		0.020		mg/L		07/29/22 14:25	08/03/22 04:03	1
2,4,5-Trichlorophenol	ND		0.020		mg/L		07/29/22 14:25	08/03/22 04:03	1
2,4,6-Trichlorophenol	ND		0.020		mg/L		07/29/22 14:25	08/03/22 04:03	1
2-Methylphenol	ND		0.020		mg/L		07/29/22 14:25	08/03/22 04:03	1
3-Methylphenol	ND		0.040		mg/L		07/29/22 14:25	08/03/22 04:03	1
4-Methylphenol	ND		0.040		mg/L		07/29/22 14:25	08/03/22 04:03	1
Hexachlorobenzene	ND		0.020		mg/L		07/29/22 14:25	08/03/22 04:03	1
Hexachlorobutadiene	ND		0.020		mg/L		07/29/22 14:25	08/03/22 04:03	1
Hexachloroethane	ND		0.020		mg/L		07/29/22 14:25	08/03/22 04:03	1
Nitrobenzene	ND		0.020		mg/L		07/29/22 14:25	08/03/22 04:03	1
Pentachlorophenol	ND		0.040		mg/L		07/29/22 14:25	08/03/22 04:03	1
Pyridine	ND		0.10		mg/L		07/29/22 14:25	08/03/22 04:03	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*75*		*41 - 120*	*07/29/22 14:25*	*08/03/22 04:03*	*1*
2-Fluorobiphenyl (Surr)	*75*		*48 - 120*	*07/29/22 14:25*	*08/03/22 04:03*	*1*
2-Fluorophenol (Surr)	*43*		*35 - 120*	*07/29/22 14:25*	*08/03/22 04:03*	*1*
Nitrobenzene-d5 (Surr)	*76*		*46 - 120*	*07/29/22 14:25*	*08/03/22 04:03*	*1*
p-Terphenyl-d14 (Surr)	*114*		*60 - 148*	*07/29/22 14:25*	*08/03/22 04:03*	*1*
Phenol-d5 (Surr)	*33*		*22 - 120*	*07/29/22 14:25*	*08/03/22 04:03*	*1*

Method: 8270D - Semivolatile Organic Compounds (GC/MS) - TCLP - RE

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dichlorobenzene	ND	*-	0.048		mg/L		08/04/22 09:50	08/08/22 18:38	1
2,4-Dinitrotoluene	ND		0.024		mg/L		08/04/22 09:50	08/08/22 18:38	1
2,4,5-Trichlorophenol	ND		0.024		mg/L		08/04/22 09:50	08/08/22 18:38	1
2,4,6-Trichlorophenol	ND		0.024		mg/L		08/04/22 09:50	08/08/22 18:38	1
2-Methylphenol	ND		0.024		mg/L		08/04/22 09:50	08/08/22 18:38	1
3-Methylphenol	ND		0.048		mg/L		08/04/22 09:50	08/08/22 18:38	1
4-Methylphenol	ND		0.048		mg/L		08/04/22 09:50	08/08/22 18:38	1

Client Sample ID: H067-EX7-COMP
Date Collected: 07/25/22 12:30
Date Received: 07/27/22 10:00

Lab Sample ID: 480-200132-7
Matrix: Solid

Method: 8270D - Semivolatile Organic Compounds (GC/MS) - TCLP - RE (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hexachlorobenzene	ND		0.024		mg/L		08/04/22 09:50	08/08/22 18:38	1
Hexachlorobutadiene	ND		0.024		mg/L		08/04/22 09:50	08/08/22 18:38	1
Hexachloroethane	ND		0.024		mg/L		08/04/22 09:50	08/08/22 18:38	1
Nitrobenzene	ND		0.024		mg/L		08/04/22 09:50	08/08/22 18:38	1
Pentachlorophenol	ND		0.048		mg/L		08/04/22 09:50	08/08/22 18:38	1
Pyridine	ND		0.12		mg/L		08/04/22 09:50	08/08/22 18:38	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*76*		*41 - 120*	*08/04/22 09:50*	*08/08/22 18:38*	*1*
2-Fluorobiphenyl (Surr)	*77*		*48 - 120*	*08/04/22 09:50*	*08/08/22 18:38*	*1*
2-Fluorophenol (Surr)	*51*		*35 - 120*	*08/04/22 09:50*	*08/08/22 18:38*	*1*
Nitrobenzene-d5 (Surr)	*81*		*46 - 120*	*08/04/22 09:50*	*08/08/22 18:38*	*1*
p-Terphenyl-d14 (Surr)	*92*		*60 - 148*	*08/04/22 09:50*	*08/08/22 18:38*	*1*
Phenol-d5 (Surr)	*36*		*22 - 120*	*08/04/22 09:50*	*08/08/22 18:38*	*1*

Method: 6010C - Metals (ICP) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.015		mg/L		07/29/22 11:27	07/29/22 22:28	1
Barium	ND		1.0		mg/L		07/29/22 11:27	07/29/22 22:28	1
Cadmium	**0.12**		0.0020		mg/L		07/29/22 11:27	07/29/22 22:28	1
Chromium	ND		0.020		mg/L		07/29/22 11:27	07/29/22 22:28	1
Lead	ND		0.020		mg/L		07/29/22 11:27	07/29/22 22:28	1
Selenium	ND		0.025		mg/L		07/29/22 11:27	07/29/22 22:28	1
Silver	ND		0.0060		mg/L		07/29/22 11:27	07/29/22 22:28	1

Method: 7470A - Mercury (CVAA) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00020		mg/L		07/29/22 12:55	07/29/22 16:11	1

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200132-1

Client Sample ID: H067-EX7-COMP
Date Collected: 07/25/22 12:30
Date Received: 07/27/22 10:00

Lab Sample ID: 480-200132-7
Matrix: Solid
Percent Solids: 73.5

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.24		mg/Kg	☼	07/27/22 15:41	07/28/22 19:07	1
PCB-1221	ND		0.24		mg/Kg	☼	07/27/22 15:41	07/28/22 19:07	1
PCB-1232	ND		0.24		mg/Kg	☼	07/27/22 15:41	07/28/22 19:07	1
PCB-1242	ND		0.24		mg/Kg	☼	07/27/22 15:41	07/28/22 19:07	1
PCB-1248	ND		0.24		mg/Kg	☼	07/27/22 15:41	07/28/22 19:07	1
PCB-1254	ND		0.24		mg/Kg	☼	07/27/22 15:41	07/28/22 19:07	1
PCB-1260	ND		0.24		mg/Kg	☼	07/27/22 15:41	07/28/22 19:07	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*87*		*60 - 154*	*07/27/22 15:41*	*07/28/22 19:07*	*1*
Tetrachloro-m-xylene	*106*		*60 - 154*	*07/27/22 15:41*	*07/28/22 19:07*	*1*
DCB Decachlorobiphenyl	*79*		*65 - 174*	*07/27/22 15:41*	*07/28/22 19:07*	*1*
DCB Decachlorobiphenyl	*95*		*65 - 174*	*07/27/22 15:41*	*07/28/22 19:07*	*1*

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200132-1

Client Sample ID: DUP-02-20220725
Date Collected: 07/25/22 13:00
Date Received: 07/27/22 10:00

Lab Sample ID: 480-200132-8
Matrix: Solid

Method: 8260C - Volatile Organic Compounds by GC/MS - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	ND		0.010		mg/L			07/30/22 05:05	10
1,2-Dichloroethane	ND		0.010		mg/L			07/30/22 05:05	10
2-Butanone (MEK)	ND	*+	0.050		mg/L			07/30/22 05:05	10
Benzene	ND		0.010		mg/L			07/30/22 05:05	10
Carbon tetrachloride	ND		0.010		mg/L			07/30/22 05:05	10
Chlorobenzene	ND		0.010		mg/L			07/30/22 05:05	10
Chloroform	ND		0.010		mg/L			07/30/22 05:05	10
Tetrachloroethene	ND		0.010		mg/L			07/30/22 05:05	10
Trichloroethene	ND		0.010		mg/L			07/30/22 05:05	10
Vinyl chloride	ND		0.010		mg/L			07/30/22 05:05	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*108*		*77 - 120*		*07/30/22 05:05*	*10*
4-Bromofluorobenzene (Surr)	*88*		*73 - 120*		*07/30/22 05:05*	*10*
Dibromofluoromethane (Surr)	*99*		*75 - 123*		*07/30/22 05:05*	*10*
Toluene-d8 (Surr)	*98*		*80 - 120*		*07/30/22 05:05*	*10*

Method: 8270D - Semivolatile Organic Compounds (GC/MS) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dichlorobenzene	ND		0.040		mg/L		07/29/22 14:25	08/03/22 04:27	1
2,4-Dinitrotoluene	ND		0.020		mg/L		07/29/22 14:25	08/03/22 04:27	1
2,4,5-Trichlorophenol	ND		0.020		mg/L		07/29/22 14:25	08/03/22 04:27	1
2,4,6-Trichlorophenol	ND		0.020		mg/L		07/29/22 14:25	08/03/22 04:27	1
2-Methylphenol	ND		0.020		mg/L		07/29/22 14:25	08/03/22 04:27	1
3-Methylphenol	ND		0.040		mg/L		07/29/22 14:25	08/03/22 04:27	1
4-Methylphenol	ND		0.040		mg/L		07/29/22 14:25	08/03/22 04:27	1
Hexachlorobenzene	ND		0.020		mg/L		07/29/22 14:25	08/03/22 04:27	1
Hexachlorobutadiene	ND		0.020		mg/L		07/29/22 14:25	08/03/22 04:27	1
Hexachloroethane	ND		0.020		mg/L		07/29/22 14:25	08/03/22 04:27	1
Nitrobenzene	ND		0.020		mg/L		07/29/22 14:25	08/03/22 04:27	1
Pentachlorophenol	ND		0.040		mg/L		07/29/22 14:25	08/03/22 04:27	1
Pyridine	ND		0.10		mg/L		07/29/22 14:25	08/03/22 04:27	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*70*		*41 - 120*	*07/29/22 14:25*	*08/03/22 04:27*	*1*
2-Fluorobiphenyl (Surr)	*74*		*48 - 120*	*07/29/22 14:25*	*08/03/22 04:27*	*1*
2-Fluorophenol (Surr)	*44*		*35 - 120*	*07/29/22 14:25*	*08/03/22 04:27*	*1*
Nitrobenzene-d5 (Surr)	*70*		*46 - 120*	*07/29/22 14:25*	*08/03/22 04:27*	*1*
p-Terphenyl-d14 (Surr)	*96*		*60 - 148*	*07/29/22 14:25*	*08/03/22 04:27*	*1*
Phenol-d5 (Surr)	*32*		*22 - 120*	*07/29/22 14:25*	*08/03/22 04:27*	*1*

Method: 8270D - Semivolatile Organic Compounds (GC/MS) - TCLP - RE

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dichlorobenzene	ND	*-	0.040		mg/L		08/04/22 09:50	08/08/22 19:03	1
2,4-Dinitrotoluene	ND		0.020		mg/L		08/04/22 09:50	08/08/22 19:03	1
2,4,5-Trichlorophenol	ND		0.020		mg/L		08/04/22 09:50	08/08/22 19:03	1
2,4,6-Trichlorophenol	ND		0.020		mg/L		08/04/22 09:50	08/08/22 19:03	1
2-Methylphenol	ND		0.020		mg/L		08/04/22 09:50	08/08/22 19:03	1
3-Methylphenol	ND		0.040		mg/L		08/04/22 09:50	08/08/22 19:03	1
4-Methylphenol	ND		0.040		mg/L		08/04/22 09:50	08/08/22 19:03	1

Client Sample ID: DUP-02-20220725
Date Collected: 07/25/22 13:00
Date Received: 07/27/22 10:00

Lab Sample ID: 480-200132-8
Matrix: Solid

Method: 8270D - Semivolatile Organic Compounds (GC/MS) - TCLP - RE (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hexachlorobenzene	ND		0.020		mg/L		08/04/22 09:50	08/08/22 19:03	1
Hexachlorobutadiene	ND		0.020		mg/L		08/04/22 09:50	08/08/22 19:03	1
Hexachloroethane	ND		0.020		mg/L		08/04/22 09:50	08/08/22 19:03	1
Nitrobenzene	ND		0.020		mg/L		08/04/22 09:50	08/08/22 19:03	1
Pentachlorophenol	ND		0.040		mg/L		08/04/22 09:50	08/08/22 19:03	1
Pyridine	ND		0.10		mg/L		08/04/22 09:50	08/08/22 19:03	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*88*		*41 - 120*	*08/04/22 09:50*	*08/08/22 19:03*	*1*
2-Fluorobiphenyl (Surr)	*90*		*48 - 120*	*08/04/22 09:50*	*08/08/22 19:03*	*1*
2-Fluorophenol (Surr)	*55*		*35 - 120*	*08/04/22 09:50*	*08/08/22 19:03*	*1*
Nitrobenzene-d5 (Surr)	*89*		*46 - 120*	*08/04/22 09:50*	*08/08/22 19:03*	*1*
p-Terphenyl-d14 (Surr)	*106*		*60 - 148*	*08/04/22 09:50*	*08/08/22 19:03*	*1*
Phenol-d5 (Surr)	*41*		*22 - 120*	*08/04/22 09:50*	*08/08/22 19:03*	*1*

Method: 6010C - Metals (ICP) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.015		mg/L		07/29/22 11:27	07/29/22 22:32	1
Barium	ND		1.0		mg/L		07/29/22 11:27	07/29/22 22:32	1
Cadmium	**0.070**		0.0020		mg/L		07/29/22 11:27	07/29/22 22:32	1
Chromium	ND		0.020		mg/L		07/29/22 11:27	07/29/22 22:32	1
Lead	ND		0.020		mg/L		07/29/22 11:27	07/29/22 22:32	1
Selenium	ND		0.025		mg/L		07/29/22 11:27	07/29/22 22:32	1
Silver	ND		0.0060		mg/L		07/29/22 11:27	07/29/22 22:32	1

Method: 7470A - Mercury (CVAA) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00020		mg/L		07/29/22 12:55	07/29/22 16:12	1

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200132-1

Client Sample ID: DUP-02-20220725
Date Collected: 07/25/22 13:00
Date Received: 07/27/22 10:00

Lab Sample ID: 480-200132-8
Matrix: Solid
Percent Solids: 78.0

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.24		mg/Kg	☼	07/27/22 15:41	07/28/22 19:20	1
PCB-1221	ND		0.24		mg/Kg	☼	07/27/22 15:41	07/28/22 19:20	1
PCB-1232	ND		0.24		mg/Kg	☼	07/27/22 15:41	07/28/22 19:20	1
PCB-1242	ND		0.24		mg/Kg	☼	07/27/22 15:41	07/28/22 19:20	1
PCB-1248	ND		0.24		mg/Kg	☼	07/27/22 15:41	07/28/22 19:20	1
PCB-1254	ND		0.24		mg/Kg	☼	07/27/22 15:41	07/28/22 19:20	1
PCB-1260	ND		0.24		mg/Kg	☼	07/27/22 15:41	07/28/22 19:20	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*84*		*60 - 154*	*07/27/22 15:41*	*07/28/22 19:20*	*1*
Tetrachloro-m-xylene	*106*		*60 - 154*	*07/27/22 15:41*	*07/28/22 19:20*	*1*
DCB Decachlorobiphenyl	*79*		*65 - 174*	*07/27/22 15:41*	*07/28/22 19:20*	*1*
DCB Decachlorobiphenyl	*94*		*65 - 174*	*07/27/22 15:41*	*07/28/22 19:20*	*1*

Surrogate Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200132-1

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(77-120)	(73-120)	(75-123)	(80-120)
LCS 480-635531/6	Lab Control Sample	105	96	99	98
LCSD 480-635531/31	Lab Control Sample Dup	103	95	99	96
MB 480-635531/8	Method Blank	108	92	97	99

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Solid **Prep Type: TCLP**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(77-120)	(73-120)	(75-123)	(80-120)
480-200132-3	H067-EX6-COMP	108	88	98	97
480-200132-7	H067-EX7-COMP	110	91	98	100
480-200132-8	DUP-02-20220725	108	88	99	98
LB 480-635235/1-A	Method Blank	108	91	97	97

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	TPHd14	PHL
Lab Sample ID	Client Sample ID	(41-120)	(48-120)	(35-120)	(46-120)	(60-148)	(22-120)
LCS 480-635530/2-A	Lab Control Sample	91	76	39	70	97	32
LCS 480-636139/2-A	Lab Control Sample	96	86	55	88	105	44
LCSD 480-635530/3-A	Lab Control Sample Dup	95	86	45	80	106	36
LCSD 480-636139/3-A	Lab Control Sample Dup	82	79	53	81	96	41
MB 480-635530/1-A	Method Blank	48	58	32 S1-	56	86	25
MB 480-636139/1-A	Method Blank	74	76	47	78	101	37

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
TPHd14 = p-Terphenyl-d14 (Surr)
PHL = Phenol-d5 (Surr)

Surrogate Summary

Client: ARCADIS U.S. Inc
Job ID: 480-200132-1
Project/Site: GTEOSI - Seneca Falls

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Solid **Prep Type: TCLP**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	TPHd14	PHL
Lab Sample ID	Client Sample ID	(41-120)	(48-120)	(35-120)	(46-120)	(60-148)	(22-120)
480-200132-3	H067-EX6-COMP	68	72	41	71	105	32
480-200132-3 - RE	H067-EX6-COMP	81	79	53	83	92	38
480-200132-7	H067-EX7-COMP	75	75	43	76	114	33
480-200132-7 - RE	H067-EX7-COMP	76	77	51	81	92	36
480-200132-8	DUP-02-20220725	70	74	44	70	96	32
480-200132-8 - RE	DUP-02-20220725	88	90	55	89	106	41
LB 480-635233/1-F	Method Blank	75	68	39	68	110	30
LB 480-635233/1-I	Method Blank	79	76	54	82	101	39

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
TPHd14 = p-Terphenyl-d14 (Surr)
PHL = Phenol-d5 (Surr)

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		TCX1	TCX2	DCBP1	DCBP2
Lab Sample ID	Client Sample ID	(60-154)	(60-154)	(65-174)	(65-174)
480-200132-3	H067-EX6-COMP	87	106	78	94
480-200132-7	H067-EX7-COMP	87	106	79	95
480-200132-8	DUP-02-20220725	84	106	79	94
LCS 480-635172/2-A	Lab Control Sample	97	117	92	102
MB 480-635172/1-A	Method Blank	81	98	79	90

Surrogate Legend

TCX = Tetrachloro-m-xylene
DCBP = DCB Decachlorobiphenyl

Method: 8260C - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 480-635531/8
Matrix: Solid
Analysis Batch: 635531

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	ND		0.0010		mg/L			07/30/22 00:22	1
1,2-Dichloroethane	ND		0.0010		mg/L			07/30/22 00:22	1
2-Butanone (MEK)	ND		0.0050		mg/L			07/30/22 00:22	1
Benzene	ND		0.0010		mg/L			07/30/22 00:22	1
Carbon tetrachloride	ND		0.0010		mg/L			07/30/22 00:22	1
Chlorobenzene	ND		0.0010		mg/L			07/30/22 00:22	1
Chloroform	ND		0.0010		mg/L			07/30/22 00:22	1
Tetrachloroethene	ND		0.0010		mg/L			07/30/22 00:22	1
Trichloroethene	ND		0.0010		mg/L			07/30/22 00:22	1
Vinyl chloride	ND		0.0010		mg/L			07/30/22 00:22	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*108*		*77 - 120*		*07/30/22 00:22*	*1*
4-Bromofluorobenzene (Surr)	*92*		*73 - 120*		*07/30/22 00:22*	*1*
Dibromofluoromethane (Surr)	*97*		*75 - 123*		*07/30/22 00:22*	*1*
Toluene-d8 (Surr)	*99*		*80 - 120*		*07/30/22 00:22*	*1*

Lab Sample ID: LCS 480-635531/6
Matrix: Solid
Analysis Batch: 635531

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
1,1-Dichloroethene			0.0250	0.0211		mg/L		85	66 - 127		
1,2-Dichloroethane			0.0250	0.0246		mg/L		98	75 - 120		
2-Butanone (MEK)			0.125	0.234	*+	mg/L		187	57 - 140		
Benzene			0.0250	0.0226		mg/L		90	71 - 124		
Carbon tetrachloride			0.0250	0.0203		mg/L		81	72 - 134		
Chlorobenzene			0.0250	0.0224		mg/L		90	80 - 120		
Chloroform			0.0250	0.0228		mg/L		91	73 - 127		
Tetrachloroethene			0.0250	0.0226		mg/L		90	74 - 122		
Trichloroethene			0.0250	0.0220		mg/L		88	74 - 123		
Vinyl chloride			0.0250	0.0170		mg/L		68	65 - 133		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*105*		*77 - 120*
4-Bromofluorobenzene (Surr)	*96*		*73 - 120*
Dibromofluoromethane (Surr)	*99*		*75 - 123*
Toluene-d8 (Surr)	*98*		*80 - 120*

Lab Sample ID: LCSD 480-635531/31
Matrix: Solid
Analysis Batch: 635531

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
1,1-Dichloroethene			0.0250	0.0213		mg/L		85	66 - 127	1	16
1,2-Dichloroethane			0.0250	0.0242		mg/L		97	75 - 120	2	20
2-Butanone (MEK)			0.125	0.229	*+	mg/L		183	57 - 140	2	20
Benzene			0.0250	0.0226		mg/L		90	71 - 124	0	13

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCSD 480-635531/31
Matrix: Solid
Analysis Batch: 635531

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Carbon tetrachloride			0.0250	0.0209		mg/L		83	72 - 134	3	15
Chlorobenzene			0.0250	0.0226		mg/L		90	80 - 120	1	25
Chloroform			0.0250	0.0230		mg/L		92	73 - 127	1	20
Tetrachloroethene			0.0250	0.0228		mg/L		91	74 - 122	1	20
Trichloroethene			0.0250	0.0224		mg/L		90	74 - 123	2	16
Vinyl chloride			0.0250	0.0171		mg/L		69	65 - 133	1	15

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*103*		*77 - 120*
4-Bromofluorobenzene (Surr)	*95*		*73 - 120*
Dibromofluoromethane (Surr)	*99*		*75 - 123*
Toluene-d8 (Surr)	*96*		*80 - 120*

Lab Sample ID: LB 480-635235/1-A
Matrix: Solid
Analysis Batch: 635531

Client Sample ID: Method Blank
Prep Type: TCLP

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	ND		0.010		mg/L			07/30/22 01:33	10
1,2-Dichloroethane	ND		0.010		mg/L			07/30/22 01:33	10
2-Butanone (MEK)	ND		0.050		mg/L			07/30/22 01:33	10
Benzene	ND		0.010		mg/L			07/30/22 01:33	10
Carbon tetrachloride	ND		0.010		mg/L			07/30/22 01:33	10
Chlorobenzene	ND		0.010		mg/L			07/30/22 01:33	10
Chloroform	ND		0.010		mg/L			07/30/22 01:33	10
Tetrachloroethene	ND		0.010		mg/L			07/30/22 01:33	10
Trichloroethene	ND		0.010		mg/L			07/30/22 01:33	10
Vinyl chloride	ND		0.010		mg/L			07/30/22 01:33	10

Surrogate	*LB %Recovery*	*LB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*108*		*77 - 120*		*07/30/22 01:33*	*10*
4-Bromofluorobenzene (Surr)	*91*		*73 - 120*		*07/30/22 01:33*	*10*
Dibromofluoromethane (Surr)	*97*		*75 - 123*		*07/30/22 01:33*	*10*
Toluene-d8 (Surr)	*97*		*80 - 120*		*07/30/22 01:33*	*10*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 480-635530/1-A
Matrix: Solid
Analysis Batch: 635864

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 635530

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dichlorobenzene	ND		0.010		mg/L		07/29/22 14:25	08/02/22 21:11	1
2,4-Dinitrotoluene	ND		0.0050		mg/L		07/29/22 14:25	08/02/22 21:11	1
2,4,5-Trichlorophenol	ND		0.0050		mg/L		07/29/22 14:25	08/02/22 21:11	1
2,4,6-Trichlorophenol	ND		0.0050		mg/L		07/29/22 14:25	08/02/22 21:11	1
2-Methylphenol	ND		0.0050		mg/L		07/29/22 14:25	08/02/22 21:11	1
3-Methylphenol	ND		0.010		mg/L		07/29/22 14:25	08/02/22 21:11	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 480-635530/1-A
Matrix: Solid
Analysis Batch: 635864

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 635530

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4-Methylphenol	ND		0.010		mg/L		07/29/22 14:25	08/02/22 21:11	1
Hexachlorobenzene	ND		0.0050		mg/L		07/29/22 14:25	08/02/22 21:11	1
Hexachlorobutadiene	ND		0.0050		mg/L		07/29/22 14:25	08/02/22 21:11	1
Hexachloroethane	ND		0.0050		mg/L		07/29/22 14:25	08/02/22 21:11	1
Nitrobenzene	ND		0.0050		mg/L		07/29/22 14:25	08/02/22 21:11	1
Pentachlorophenol	ND		0.010		mg/L		07/29/22 14:25	08/02/22 21:11	1
Pyridine	ND		0.025		mg/L		07/29/22 14:25	08/02/22 21:11	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*48*		*41 - 120*	*07/29/22 14:25*	*08/02/22 21:11*	*1*
2-Fluorobiphenyl (Surr)	*58*		*48 - 120*	*07/29/22 14:25*	*08/02/22 21:11*	*1*
2-Fluorophenol (Surr)	*32*	*S1-*	*35 - 120*	*07/29/22 14:25*	*08/02/22 21:11*	*1*
Nitrobenzene-d5 (Surr)	*56*		*46 - 120*	*07/29/22 14:25*	*08/02/22 21:11*	*1*
p-Terphenyl-d14 (Surr)	*86*		*60 - 148*	*07/29/22 14:25*	*08/02/22 21:11*	*1*
Phenol-d5 (Surr)	*25*		*22 - 120*	*07/29/22 14:25*	*08/02/22 21:11*	*1*

Lab Sample ID: LCS 480-635530/2-A
Matrix: Solid
Analysis Batch: 635864

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 635530

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
1,4-Dichlorobenzene	0.0500	0.0301		mg/L		60	51 - 120
2,4-Dinitrotoluene	0.0500	0.0484		mg/L		97	69 - 120
2,4,5-Trichlorophenol	0.0500	0.0405		mg/L		81	65 - 126
2,4,6-Trichlorophenol	0.0500	0.0418		mg/L		84	64 - 120
2-Methylphenol	0.0500	0.0347		mg/L		69	39 - 120
3-Methylphenol	0.0500	0.0346		mg/L		69	39 - 120
4-Methylphenol	0.0500	0.0346		mg/L		69	29 - 131
Hexachlorobenzene	0.0500	0.0435		mg/L		87	61 - 120
Hexachlorobutadiene	0.0500	0.0291		mg/L		58	35 - 120
Hexachloroethane	0.0500	0.0303		mg/L		61	43 - 120
Nitrobenzene	0.0500	0.0366		mg/L		73	53 - 123
Pentachlorophenol	0.100	0.0866		mg/L		87	29 - 136
Pyridine	0.100	0.0247	J	mg/L		25	10 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*91*		*41 - 120*
2-Fluorobiphenyl (Surr)	*76*		*48 - 120*
2-Fluorophenol (Surr)	*39*		*35 - 120*
Nitrobenzene-d5 (Surr)	*70*		*46 - 120*
p-Terphenyl-d14 (Surr)	*97*		*60 - 148*
Phenol-d5 (Surr)	*32*		*22 - 120*

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCSD 480-635530/3-A
Matrix: Solid
Analysis Batch: 635864

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 635530

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
1,4-Dichlorobenzene			0.0500	0.0330		mg/L		66	51 - 120	9	36
2,4-Dinitrotoluene			0.0500	0.0546		mg/L		109	69 - 120	12	20
2,4,5-Trichlorophenol			0.0500	0.0472		mg/L		94	65 - 126	15	18
2,4,6-Trichlorophenol			0.0500	0.0458		mg/L		92	64 - 120	9	19
2-Methylphenol			0.0500	0.0400		mg/L		80	39 - 120	14	27
3-Methylphenol			0.0500	0.0393		mg/L		79	39 - 120	13	30
4-Methylphenol			0.0500	0.0393		mg/L		79	29 - 131	13	24
Hexachlorobenzene			0.0500	0.0485		mg/L		97	61 - 120	11	15
Hexachlorobutadiene			0.0500	0.0336		mg/L		67	35 - 120	14	44
Hexachloroethane			0.0500	0.0333		mg/L		67	43 - 120	9	46
Nitrobenzene			0.0500	0.0407		mg/L		81	53 - 123	11	24
Pentachlorophenol			0.100	0.100		mg/L		100	29 - 136	14	37
Pyridine			0.100	0.0358		mg/L		36	10 - 120	37	49

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*95*		*41 - 120*
2-Fluorobiphenyl (Surr)	*86*		*48 - 120*
2-Fluorophenol (Surr)	*45*		*35 - 120*
Nitrobenzene-d5 (Surr)	*80*		*46 - 120*
p-Terphenyl-d14 (Surr)	*106*		*60 - 148*
Phenol-d5 (Surr)	*36*		*22 - 120*

Lab Sample ID: MB 480-636139/1-A
Matrix: Solid
Analysis Batch: 636514

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 636139

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dichlorobenzene	ND		0.010		mg/L		08/04/22 09:50	08/08/22 13:18	1
2,4-Dinitrotoluene	ND		0.0050		mg/L		08/04/22 09:50	08/08/22 13:18	1
2,4,5-Trichlorophenol	ND		0.0050		mg/L		08/04/22 09:50	08/08/22 13:18	1
2,4,6-Trichlorophenol	ND		0.0050		mg/L		08/04/22 09:50	08/08/22 13:18	1
2-Methylphenol	ND		0.0050		mg/L		08/04/22 09:50	08/08/22 13:18	1
3-Methylphenol	ND		0.010		mg/L		08/04/22 09:50	08/08/22 13:18	1
4-Methylphenol	ND		0.010		mg/L		08/04/22 09:50	08/08/22 13:18	1
Hexachlorobenzene	ND		0.0050		mg/L		08/04/22 09:50	08/08/22 13:18	1
Hexachlorobutadiene	ND		0.0050		mg/L		08/04/22 09:50	08/08/22 13:18	1
Hexachloroethane	ND		0.0050		mg/L		08/04/22 09:50	08/08/22 13:18	1
Nitrobenzene	ND		0.0050		mg/L		08/04/22 09:50	08/08/22 13:18	1
Pentachlorophenol	ND		0.010		mg/L		08/04/22 09:50	08/08/22 13:18	1
Pyridine	ND		0.025		mg/L		08/04/22 09:50	08/08/22 13:18	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*74*		*41 - 120*	*08/04/22 09:50*	*08/08/22 13:18*	*1*
2-Fluorobiphenyl (Surr)	*76*		*48 - 120*	*08/04/22 09:50*	*08/08/22 13:18*	*1*
2-Fluorophenol (Surr)	*47*		*35 - 120*	*08/04/22 09:50*	*08/08/22 13:18*	*1*
Nitrobenzene-d5 (Surr)	*78*		*46 - 120*	*08/04/22 09:50*	*08/08/22 13:18*	*1*
p-Terphenyl-d14 (Surr)	*101*		*60 - 148*	*08/04/22 09:50*	*08/08/22 13:18*	*1*
Phenol-d5 (Surr)	*37*		*22 - 120*	*08/04/22 09:50*	*08/08/22 13:18*	*1*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: LCS 480-636139/2-A
Matrix: Solid
Analysis Batch: 636514

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 636139

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
1,4-Dichlorobenzene			0.0500	0.0277		mg/L		55	51 - 120		
2,4-Dinitrotoluene			0.0500	0.0544		mg/L		109	69 - 120		
2,4,5-Trichlorophenol			0.0500	0.0484		mg/L		97	65 - 126		
2,4,6-Trichlorophenol			0.0500	0.0484		mg/L		97	64 - 120		
2-Methylphenol			0.0500	0.0462		mg/L		92	39 - 120		
3-Methylphenol			0.0500	0.0465		mg/L		93	39 - 120		
4-Methylphenol			0.0500	0.0465		mg/L		93	29 - 131		
Hexachlorobenzene			0.0500	0.0476		mg/L		95	61 - 120		
Hexachlorobutadiene			0.0500	0.0214		mg/L		43	35 - 120		
Hexachloroethane			0.0500	0.0241		mg/L		48	43 - 120		
Nitrobenzene			0.0500	0.0456		mg/L		91	53 - 123		
Pentachlorophenol			0.100	0.103		mg/L		103	29 - 136		
Pyridine			0.100	0.0448		mg/L		45	10 - 120		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*96*		*41 - 120*
2-Fluorobiphenyl (Surr)	*86*		*48 - 120*
2-Fluorophenol (Surr)	*55*		*35 - 120*
Nitrobenzene-d5 (Surr)	*88*		*46 - 120*
p-Terphenyl-d14 (Surr)	*105*		*60 - 148*
Phenol-d5 (Surr)	*44*		*22 - 120*

Lab Sample ID: LCSD 480-636139/3-A
Matrix: Solid
Analysis Batch: 636514

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 636139

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
1,4-Dichlorobenzene			0.0500	0.0252	*-	mg/L		50	51 - 120	9	36
2,4-Dinitrotoluene			0.0500	0.0493		mg/L		99	69 - 120	10	20
2,4,5-Trichlorophenol			0.0500	0.0430		mg/L		86	65 - 126	12	18
2,4,6-Trichlorophenol			0.0500	0.0432		mg/L		86	64 - 120	11	19
2-Methylphenol			0.0500	0.0429		mg/L		86	39 - 120	7	27
3-Methylphenol			0.0500	0.0412		mg/L		82	39 - 120	12	30
4-Methylphenol			0.0500	0.0412		mg/L		82	29 - 131	12	24
Hexachlorobenzene			0.0500	0.0423		mg/L		85	61 - 120	12	15
Hexachlorobutadiene			0.0500	0.0188		mg/L		38	35 - 120	13	44
Hexachloroethane			0.0500	0.0216		mg/L		43	43 - 120	11	46
Nitrobenzene			0.0500	0.0414		mg/L		83	53 - 123	10	24
Pentachlorophenol			0.100	0.0925		mg/L		92	29 - 136	11	37
Pyridine			0.100	0.0381		mg/L		38	10 - 120	16	49

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*82*		*41 - 120*
2-Fluorobiphenyl (Surr)	*79*		*48 - 120*
2-Fluorophenol (Surr)	*53*		*35 - 120*
Nitrobenzene-d5 (Surr)	*81*		*46 - 120*
p-Terphenyl-d14 (Surr)	*96*		*60 - 148*
Phenol-d5 (Surr)	*41*		*22 - 120*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: LB 480-635233/1-F
Matrix: Solid
Analysis Batch: 636045

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 635530

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dichlorobenzene	ND		0.040		mg/L		07/29/22 14:25	08/03/22 15:57	1
2,4-Dinitrotoluene	ND		0.020		mg/L		07/29/22 14:25	08/03/22 15:57	1
2,4,5-Trichlorophenol	ND		0.020		mg/L		07/29/22 14:25	08/03/22 15:57	1
2,4,6-Trichlorophenol	ND		0.020		mg/L		07/29/22 14:25	08/03/22 15:57	1
2-Methylphenol	ND		0.020		mg/L		07/29/22 14:25	08/03/22 15:57	1
3-Methylphenol	ND		0.040		mg/L		07/29/22 14:25	08/03/22 15:57	1
4-Methylphenol	ND		0.040		mg/L		07/29/22 14:25	08/03/22 15:57	1
Hexachlorobenzene	ND		0.020		mg/L		07/29/22 14:25	08/03/22 15:57	1
Hexachlorobutadiene	ND		0.020		mg/L		07/29/22 14:25	08/03/22 15:57	1
Hexachloroethane	ND		0.020		mg/L		07/29/22 14:25	08/03/22 15:57	1
Nitrobenzene	ND		0.020		mg/L		07/29/22 14:25	08/03/22 15:57	1
Pentachlorophenol	ND		0.040		mg/L		07/29/22 14:25	08/03/22 15:57	1
Pyridine	ND		0.10		mg/L		07/29/22 14:25	08/03/22 15:57	1

Surrogate	*LB %Recovery*	*LB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*75*		*41 - 120*	*07/29/22 14:25*	*08/03/22 15:57*	*1*
2-Fluorobiphenyl (Surr)	*68*		*48 - 120*	*07/29/22 14:25*	*08/03/22 15:57*	*1*
2-Fluorophenol (Surr)	*39*		*35 - 120*	*07/29/22 14:25*	*08/03/22 15:57*	*1*
Nitrobenzene-d5 (Surr)	*68*		*46 - 120*	*07/29/22 14:25*	*08/03/22 15:57*	*1*
p-Terphenyl-d14 (Surr)	*110*		*60 - 148*	*07/29/22 14:25*	*08/03/22 15:57*	*1*
Phenol-d5 (Surr)	*30*		*22 - 120*	*07/29/22 14:25*	*08/03/22 15:57*	*1*

Lab Sample ID: LB 480-635233/1-I
Matrix: Solid
Analysis Batch: 636514

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 636139

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dichlorobenzene	ND		0.20		mg/L		08/04/22 09:50	08/08/22 14:31	1
2,4-Dinitrotoluene	ND		0.10		mg/L		08/04/22 09:50	08/08/22 14:31	1
2,4,5-Trichlorophenol	ND		0.10		mg/L		08/04/22 09:50	08/08/22 14:31	1
2,4,6-Trichlorophenol	ND		0.10		mg/L		08/04/22 09:50	08/08/22 14:31	1
2-Methylphenol	ND		0.10		mg/L		08/04/22 09:50	08/08/22 14:31	1
3-Methylphenol	ND		0.20		mg/L		08/04/22 09:50	08/08/22 14:31	1
4-Methylphenol	ND		0.20		mg/L		08/04/22 09:50	08/08/22 14:31	1
Hexachlorobenzene	ND		0.10		mg/L		08/04/22 09:50	08/08/22 14:31	1
Hexachlorobutadiene	ND		0.10		mg/L		08/04/22 09:50	08/08/22 14:31	1
Hexachloroethane	ND		0.10		mg/L		08/04/22 09:50	08/08/22 14:31	1
Nitrobenzene	ND		0.10		mg/L		08/04/22 09:50	08/08/22 14:31	1
Pentachlorophenol	ND		0.20		mg/L		08/04/22 09:50	08/08/22 14:31	1
Pyridine	ND		0.50		mg/L		08/04/22 09:50	08/08/22 14:31	1

Surrogate	*LB %Recovery*	*LB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*79*		*41 - 120*	*08/04/22 09:50*	*08/08/22 14:31*	*1*
2-Fluorobiphenyl (Surr)	*76*		*48 - 120*	*08/04/22 09:50*	*08/08/22 14:31*	*1*
2-Fluorophenol (Surr)	*54*		*35 - 120*	*08/04/22 09:50*	*08/08/22 14:31*	*1*
Nitrobenzene-d5 (Surr)	*82*		*46 - 120*	*08/04/22 09:50*	*08/08/22 14:31*	*1*
p-Terphenyl-d14 (Surr)	*101*		*60 - 148*	*08/04/22 09:50*	*08/08/22 14:31*	*1*
Phenol-d5 (Surr)	*39*		*22 - 120*	*08/04/22 09:50*	*08/08/22 14:31*	*1*

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 480-635172/1-A
Matrix: Solid
Analysis Batch: 635329

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 635172

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.20		mg/Kg		07/27/22 15:41	07/28/22 16:13	1
PCB-1221	ND		0.20		mg/Kg		07/27/22 15:41	07/28/22 16:13	1
PCB-1232	ND		0.20		mg/Kg		07/27/22 15:41	07/28/22 16:13	1
PCB-1242	ND		0.20		mg/Kg		07/27/22 15:41	07/28/22 16:13	1
PCB-1248	ND		0.20		mg/Kg		07/27/22 15:41	07/28/22 16:13	1
PCB-1254	ND		0.20		mg/Kg		07/27/22 15:41	07/28/22 16:13	1
PCB-1260	ND		0.20		mg/Kg		07/27/22 15:41	07/28/22 16:13	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*81*		*60 - 154*	*07/27/22 15:41*	*07/28/22 16:13*	*1*
Tetrachloro-m-xylene	*98*		*60 - 154*	*07/27/22 15:41*	*07/28/22 16:13*	*1*
DCB Decachlorobiphenyl	*79*		*65 - 174*	*07/27/22 15:41*	*07/28/22 16:13*	*1*
DCB Decachlorobiphenyl	*90*		*65 - 174*	*07/27/22 15:41*	*07/28/22 16:13*	*1*

Lab Sample ID: LCS 480-635172/2-A
Matrix: Solid
Analysis Batch: 635329

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 635172

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
PCB-1016			2.00	2.28		mg/Kg		114	51 - 185		
PCB-1260			2.00	2.21		mg/Kg		111	61 - 184		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Tetrachloro-m-xylene	*97*		*60 - 154*
Tetrachloro-m-xylene	*117*		*60 - 154*
DCB Decachlorobiphenyl	*92*		*65 - 174*
DCB Decachlorobiphenyl	*102*		*65 - 174*

Method: 6010C - Metals (ICP)

Lab Sample ID: MB 480-635484/2-A
Matrix: Solid
Analysis Batch: 635662

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 635484

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.015		mg/L		07/29/22 11:27	07/29/22 21:13	1
Barium	ND		1.0		mg/L		07/29/22 11:27	07/29/22 21:13	1
Cadmium	ND		0.0020		mg/L		07/29/22 11:27	07/29/22 21:13	1
Chromium	ND		0.020		mg/L		07/29/22 11:27	07/29/22 21:13	1
Lead	ND		0.020		mg/L		07/29/22 11:27	07/29/22 21:13	1
Selenium	ND		0.025		mg/L		07/29/22 11:27	07/29/22 21:13	1
Silver	ND		0.0060		mg/L		07/29/22 11:27	07/29/22 21:13	1

Method: 6010C - Metals (ICP) (Continued)

Lab Sample ID: LCS 480-635484/3-A
Matrix: Solid
Analysis Batch: 635662

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 635484

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Arsenic	1.00	1.02		mg/L		102	80 - 120
Barium	1.00	0.903	J	mg/L		90	80 - 120
Cadmium	1.00	0.961		mg/L		96	80 - 120
Chromium	1.00	0.963		mg/L		96	80 - 120
Lead	1.00	0.996		mg/L		100	80 - 120
Selenium	1.00	1.02		mg/L		102	80 - 120
Silver	1.00	1.00		mg/L		100	80 - 120

Lab Sample ID: LB 480-635233/1-D
Matrix: Solid
Analysis Batch: 635662

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 635484

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.015		mg/L		07/29/22 11:27	07/29/22 21:09	1
Barium	ND		1.0		mg/L		07/29/22 11:27	07/29/22 21:09	1
Cadmium	ND		0.0020		mg/L		07/29/22 11:27	07/29/22 21:09	1
Chromium	ND		0.020		mg/L		07/29/22 11:27	07/29/22 21:09	1
Lead	ND		0.020		mg/L		07/29/22 11:27	07/29/22 21:09	1
Selenium	ND		0.025		mg/L		07/29/22 11:27	07/29/22 21:09	1
Silver	ND		0.0060		mg/L		07/29/22 11:27	07/29/22 21:09	1

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 480-635496/2-A
Matrix: Solid
Analysis Batch: 635566

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 635496

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00020		mg/L		07/29/22 12:55	07/29/22 15:50	1

Lab Sample ID: LCS 480-635496/3-A
Matrix: Solid
Analysis Batch: 635566

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 635496

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	0.00678	0.00645		mg/L		95	80 - 120

Lab Sample ID: LB 480-635233/1-E
Matrix: Solid
Analysis Batch: 635566

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 635496

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00020		mg/L		07/29/22 12:55	07/29/22 15:49	1

GC/MS VOA

Leach Batch: 635235

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200132-3	H067-EX6-COMP	TCLP	Solid	1311	
480-200132-7	H067-EX7-COMP	TCLP	Solid	1311	
480-200132-8	DUP-02-20220725	TCLP	Solid	1311	
LB 480-635235/1-A	Method Blank	TCLP	Solid	1311	

Analysis Batch: 635531

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200132-3	H067-EX6-COMP	TCLP	Solid	8260C	635235
480-200132-7	H067-EX7-COMP	TCLP	Solid	8260C	635235
480-200132-8	DUP-02-20220725	TCLP	Solid	8260C	635235
LB 480-635235/1-A	Method Blank	TCLP	Solid	8260C	635235
MB 480-635531/8	Method Blank	Total/NA	Solid	8260C	
LCS 480-635531/6	Lab Control Sample	Total/NA	Solid	8260C	
LCSD 480-635531/31	Lab Control Sample Dup	Total/NA	Solid	8260C	

GC/MS Semi VOA

Leach Batch: 635233

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200132-3 - RE	H067-EX6-COMP	TCLP	Solid	1311	
480-200132-3	H067-EX6-COMP	TCLP	Solid	1311	
480-200132-7	H067-EX7-COMP	TCLP	Solid	1311	
480-200132-7 - RE	H067-EX7-COMP	TCLP	Solid	1311	
480-200132-8 - RE	DUP-02-20220725	TCLP	Solid	1311	
480-200132-8	DUP-02-20220725	TCLP	Solid	1311	
LB 480-635233/1-F	Method Blank	TCLP	Solid	1311	
LB 480-635233/1-I	Method Blank	TCLP	Solid	1311	

Prep Batch: 635530

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200132-3	H067-EX6-COMP	TCLP	Solid	3510C	635233
480-200132-7	H067-EX7-COMP	TCLP	Solid	3510C	635233
480-200132-8	DUP-02-20220725	TCLP	Solid	3510C	635233
LB 480-635233/1-F	Method Blank	TCLP	Solid	3510C	635233
MB 480-635530/1-A	Method Blank	Total/NA	Solid	3510C	
LCS 480-635530/2-A	Lab Control Sample	Total/NA	Solid	3510C	
LCSD 480-635530/3-A	Lab Control Sample Dup	Total/NA	Solid	3510C	

Analysis Batch: 635864

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 480-635530/1-A	Method Blank	Total/NA	Solid	8270D	635530
LCS 480-635530/2-A	Lab Control Sample	Total/NA	Solid	8270D	635530
LCSD 480-635530/3-A	Lab Control Sample Dup	Total/NA	Solid	8270D	635530

Analysis Batch: 635868

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200132-3	H067-EX6-COMP	TCLP	Solid	8270D	635530
480-200132-7	H067-EX7-COMP	TCLP	Solid	8270D	635530
480-200132-8	DUP-02-20220725	TCLP	Solid	8270D	635530

GC/MS Semi VOA

Analysis Batch: 636045

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LB 480-635233/1-F	Method Blank	TCLP	Solid	8270D	635530

Prep Batch: 636139

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200132-3 - RE	H067-EX6-COMP	TCLP	Solid	3510C	635233
480-200132-7 - RE	H067-EX7-COMP	TCLP	Solid	3510C	635233
480-200132-8 - RE	DUP-02-20220725	TCLP	Solid	3510C	635233
LB 480-635233/1-I	Method Blank	TCLP	Solid	3510C	635233
MB 480-636139/1-A	Method Blank	Total/NA	Solid	3510C	
LCS 480-636139/2-A	Lab Control Sample	Total/NA	Solid	3510C	
LCSD 480-636139/3-A	Lab Control Sample Dup	Total/NA	Solid	3510C	

Analysis Batch: 636514

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200132-3 - RE	H067-EX6-COMP	TCLP	Solid	8270D	636139
480-200132-7 - RE	H067-EX7-COMP	TCLP	Solid	8270D	636139
480-200132-8 - RE	DUP-02-20220725	TCLP	Solid	8270D	636139
LB 480-635233/1-I	Method Blank	TCLP	Solid	8270D	636139
MB 480-636139/1-A	Method Blank	Total/NA	Solid	8270D	636139
LCS 480-636139/2-A	Lab Control Sample	Total/NA	Solid	8270D	636139
LCSD 480-636139/3-A	Lab Control Sample Dup	Total/NA	Solid	8270D	636139

GC Semi VOA

Prep Batch: 635172

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200132-3	H067-EX6-COMP	Total/NA	Solid	3550C	
480-200132-7	H067-EX7-COMP	Total/NA	Solid	3550C	
480-200132-8	DUP-02-20220725	Total/NA	Solid	3550C	
MB 480-635172/1-A	Method Blank	Total/NA	Solid	3550C	
LCS 480-635172/2-A	Lab Control Sample	Total/NA	Solid	3550C	

Analysis Batch: 635329

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200132-3	H067-EX6-COMP	Total/NA	Solid	8082A	635172
480-200132-7	H067-EX7-COMP	Total/NA	Solid	8082A	635172
480-200132-8	DUP-02-20220725	Total/NA	Solid	8082A	635172
MB 480-635172/1-A	Method Blank	Total/NA	Solid	8082A	635172
LCS 480-635172/2-A	Lab Control Sample	Total/NA	Solid	8082A	635172

Metals

Leach Batch: 635233

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200132-3	H067-EX6-COMP	TCLP	Solid	1311	
480-200132-7	H067-EX7-COMP	TCLP	Solid	1311	
480-200132-8	DUP-02-20220725	TCLP	Solid	1311	
LB 480-635233/1-D	Method Blank	TCLP	Solid	1311	
LB 480-635233/1-E	Method Blank	TCLP	Solid	1311	

Metals

Prep Batch: 635484

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200132-3	H067-EX6-COMP	TCLP	Solid	3010A	635233
480-200132-7	H067-EX7-COMP	TCLP	Solid	3010A	635233
480-200132-8	DUP-02-20220725	TCLP	Solid	3010A	635233
LB 480-635233/1-D	Method Blank	TCLP	Solid	3010A	635233
MB 480-635484/2-A	Method Blank	Total/NA	Solid	3010A	
LCS 480-635484/3-A	Lab Control Sample	Total/NA	Solid	3010A	

Prep Batch: 635496

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200132-3	H067-EX6-COMP	TCLP	Solid	7470A	635233
480-200132-7	H067-EX7-COMP	TCLP	Solid	7470A	635233
480-200132-8	DUP-02-20220725	TCLP	Solid	7470A	635233
LB 480-635233/1-E	Method Blank	TCLP	Solid	7470A	635233
MB 480-635496/2-A	Method Blank	Total/NA	Solid	7470A	
LCS 480-635496/3-A	Lab Control Sample	Total/NA	Solid	7470A	

Analysis Batch: 635566

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200132-3	H067-EX6-COMP	TCLP	Solid	7470A	635496
480-200132-7	H067-EX7-COMP	TCLP	Solid	7470A	635496
480-200132-8	DUP-02-20220725	TCLP	Solid	7470A	635496
LB 480-635233/1-E	Method Blank	TCLP	Solid	7470A	635496
MB 480-635496/2-A	Method Blank	Total/NA	Solid	7470A	635496
LCS 480-635496/3-A	Lab Control Sample	Total/NA	Solid	7470A	635496

Analysis Batch: 635662

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200132-3	H067-EX6-COMP	TCLP	Solid	6010C	635484
480-200132-7	H067-EX7-COMP	TCLP	Solid	6010C	635484
480-200132-8	DUP-02-20220725	TCLP	Solid	6010C	635484
LB 480-635233/1-D	Method Blank	TCLP	Solid	6010C	635484
MB 480-635484/2-A	Method Blank	Total/NA	Solid	6010C	635484
LCS 480-635484/3-A	Lab Control Sample	Total/NA	Solid	6010C	635484

General Chemistry

Analysis Batch: 635192

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200132-3	H067-EX6-COMP	Total/NA	Solid	Moisture	
480-200132-7	H067-EX7-COMP	Total/NA	Solid	Moisture	
480-200132-8	DUP-02-20220725	Total/NA	Solid	Moisture	

Lab Chronicle

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200132-1

Client Sample ID: H067-EX6-COMP
Date Collected: 07/25/22 10:30
Date Received: 07/27/22 10:00

Lab Sample ID: 480-200132-3
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
TCLP	Leach	1311			635235	BML	EETNE BUF	07/28/22 08:28 - 07/29/22 13:02 [1]
TCLP	Analysis	8260C		10	635531	CR	EETNE BUF	07/30/22 04:18
TCLP	Leach	1311			635233	BML	EETNE BUF	07/28/22 08:19 - 07/29/22 10:35 [1]
TCLP	Prep	3510C			635530	CMC	EETNE BUF	07/29/22 14:25
TCLP	Analysis	8270D		1	635868	PJQ	EETNE BUF	08/03/22 03:39
TCLP	Leach	1311	RE		635233	BML	EETNE BUF	07/28/22 08:19 - 07/29/22 10:35 [1]
TCLP	Prep	3510C	RE		636139	MS	EETNE BUF	08/04/22 09:50
TCLP	Analysis	8270D	RE	1	636514	PJQ	EETNE BUF	08/08/22 18:13
TCLP	Leach	1311			635233	BML	EETNE BUF	07/28/22 08:19 - 07/29/22 10:35 [1]
TCLP	Prep	3010A			635484	NVK	EETNE BUF	07/29/22 11:27
TCLP	Analysis	6010C		1	635662	BMB	EETNE BUF	07/29/22 22:12
TCLP	Leach	1311			635233	BML	EETNE BUF	07/28/22 08:19 - 07/29/22 10:35 [1]
TCLP	Prep	7470A			635496	NVK	EETNE BUF	07/29/22 12:55
TCLP	Analysis	7470A		1	635566	BMB	EETNE BUF	07/29/22 16:10
Total/NA	Analysis	Moisture		1	635192	KER	EETNE BUF	07/27/22 16:25

Client Sample ID: H067-EX6-COMP
Date Collected: 07/25/22 10:30
Date Received: 07/27/22 10:00

Lab Sample ID: 480-200132-3
Matrix: Solid
Percent Solids: 80.3

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	3550C			635172	SJM	EETNE BUF	07/27/22 15:41
Total/NA	Analysis	8082A		1	635329	W1T	EETNE BUF	07/28/22 18:54

Client Sample ID: H067-EX7-COMP
Date Collected: 07/25/22 12:30
Date Received: 07/27/22 10:00

Lab Sample ID: 480-200132-7
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
TCLP	Leach	1311			635235	BML	EETNE BUF	07/28/22 08:28 - 07/29/22 13:02 [1]
TCLP	Analysis	8260C		10	635531	CR	EETNE BUF	07/30/22 04:41
TCLP	Leach	1311			635233	BML	EETNE BUF	07/28/22 08:19 - 07/29/22 10:35 [1]
TCLP	Prep	3510C			635530	CMC	EETNE BUF	07/29/22 14:25
TCLP	Analysis	8270D		1	635868	PJQ	EETNE BUF	08/03/22 04:03
TCLP	Leach	1311	RE		635233	BML	EETNE BUF	07/28/22 08:19 - 07/29/22 10:35 [1]
TCLP	Prep	3510C	RE		636139	MS	EETNE BUF	08/04/22 09:50
TCLP	Analysis	8270D	RE	1	636514	PJQ	EETNE BUF	08/08/22 18:38
TCLP	Leach	1311			635233	BML	EETNE BUF	07/28/22 08:19 - 07/29/22 10:35 [1]
TCLP	Prep	3010A			635484	NVK	EETNE BUF	07/29/22 11:27
TCLP	Analysis	6010C		1	635662	BMB	EETNE BUF	07/29/22 22:28
TCLP	Leach	1311			635233	BML	EETNE BUF	07/28/22 08:19 - 07/29/22 10:35 [1]
TCLP	Prep	7470A			635496	NVK	EETNE BUF	07/29/22 12:55
TCLP	Analysis	7470A		1	635566	BMB	EETNE BUF	07/29/22 16:11
Total/NA	Analysis	Moisture		1	635192	KER	EETNE BUF	07/27/22 16:25

Lab Chronicle

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200132-1

Client Sample ID: H067-EX7-COMP

Lab Sample ID: 480-200132-7
Date Collected: 07/25/22 12:30
Matrix: Solid
Date Received: 07/27/22 10:00
Percent Solids: 73.5

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	3550C			635172	SJM	EETNE BUF	07/27/22 15:41
Total/NA	Analysis	8082A		1	635329	W1T	EETNE BUF	07/28/22 19:07

Client Sample ID: DUP-02-20220725

Lab Sample ID: 480-200132-8
Date Collected: 07/25/22 13:00
Matrix: Solid
Date Received: 07/27/22 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
TCLP	Leach	1311			635235	BML	EETNE BUF	07/28/22 08:28 - 07/29/22 13:02 [1]
TCLP	Analysis	8260C		10	635531	CR	EETNE BUF	07/30/22 05:05
TCLP	Leach	1311			635233	BML	EETNE BUF	07/28/22 08:23 - 07/29/22 10:35 [1]
TCLP	Prep	3510C			635530	CMC	EETNE BUF	07/29/22 14:25
TCLP	Analysis	8270D		1	635868	PJQ	EETNE BUF	08/03/22 04:27
TCLP	Leach	1311	RE		635233	BML	EETNE BUF	07/28/22 08:23 - 07/29/22 10:35 [1]
TCLP	Prep	3510C	RE		636139	MS	EETNE BUF	08/04/22 09:50
TCLP	Analysis	8270D	RE	1	636514	PJQ	EETNE BUF	08/08/22 19:03
TCLP	Leach	1311			635233	BML	EETNE BUF	07/28/22 08:23 - 07/29/22 10:35 [1]
TCLP	Prep	3010A			635484	NVK	EETNE BUF	07/29/22 11:27
TCLP	Analysis	6010C		1	635662	BMB	EETNE BUF	07/29/22 22:32
TCLP	Leach	1311			635233	BML	EETNE BUF	07/28/22 08:23 - 07/29/22 10:35 [1]
TCLP	Prep	7470A			635496	NVK	EETNE BUF	07/29/22 12:55
TCLP	Analysis	7470A		1	635566	BMB	EETNE BUF	07/29/22 16:12
Total/NA	Analysis	Moisture		1	635192	KER	EETNE BUF	07/27/22 16:25

Client Sample ID: DUP-02-20220725

Lab Sample ID: 480-200132-8
Date Collected: 07/25/22 13:00
Matrix: Solid
Date Received: 07/27/22 10:00
Percent Solids: 78.0

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	3550C			635172	SJM	EETNE BUF	07/27/22 15:41
Total/NA	Analysis	8082A		1	635329	W1T	EETNE BUF	07/28/22 19:20

[1] Completion dates and times are reported or not reported per method requirements or individual lab discretion.

Laboratory References:

EETNE BUF = Eurofins Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

Accreditation/Certification Summary

Client: ARCADIS U.S. Inc
Job ID: 480-200132-1
Project/Site: GTEOSI - Seneca Falls

Laboratory: Eurofins Buffalo

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
New York	NELAP	10026	03-31-23

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
7470A	7470A	Solid	Mercury
Moisture		Solid	Percent Moisture
Moisture		Solid	Percent Solids

Method Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200132-1

Method	Method Description	Protocol	Laboratory
8260C	Volatile Organic Compounds by GC/MS	SW846	EETNE BUF
8270D	Semivolatile Organic Compounds (GC/MS)	SW846	EETNE BUF
8082A	Polychlorinated Biphenyls (PCBs) by Gas Chromatography	SW846	EETNE BUF
6010C	Metals (ICP)	SW846	EETNE BUF
7470A	Mercury (CVAA)	SW846	EETNE BUF
Moisture	Percent Moisture	EPA	EETNE BUF
1311	TCLP Extraction	SW846	EETNE BUF
3010A	Preparation, Total Metals	SW846	EETNE BUF
3510C	Liquid-Liquid Extraction (Separatory Funnel)	SW846	EETNE BUF
3550C	Ultrasonic Extraction	SW846	EETNE BUF
5030C	Purge and Trap	SW846	EETNE BUF
7470A	Preparation, Mercury	SW846	EETNE BUF

Protocol References:

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EETNE BUF = Eurofins Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

Sample Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200132-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
480-200132-3	H067-EX6-COMP	Solid	07/25/22 10:30	07/27/22 10:00
480-200132-7	H067-EX7-COMP	Solid	07/25/22 12:30	07/27/22 10:00
480-200132-8	DUP-02-20220725	Solid	07/25/22 13:00	07/27/22 10:00

Eurofins TestAmerica, Buffalo
10 Hazelwood Drive

Amherst, NY 14228-2223
phone 716.691.2600 fax 716.691.7991

Chain of Custody Record

eurofins | Environment Testing America

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc. d/b/a Eurofins TestAmerica

Client Contact	**Project Manager: Mark Flusche**		COC No: 4
Company: Arcadis of New York, Inc.	Email: mark.flusche@arcadis.com	Site Contact: Ryan Clare	Date: 7/26/22 — 1 of 1 COCs
Address: 855 Route 146 Suite 210	Tel: 518-250-7322	Lab Contact: Schove, John R	Carrier: FedEx — TALS Project #:
Clifton Park, NY 12065	**Analysis Turnaround Time**		Sampler:
	☐ CALENDAR DAYS ☐ WORKING DAYS		**For Lab Use Only:** Walk-in Client:
	TAT if different from Below ____		
Project Name: GTEOSI - Seneca Falls	☑ 2 weeks		
Site:	☐ 1 week		
PO #: 30112357.00055 Project #:	☐ 2 days		
	☐ 1 day		

480-200132 Chain of Custody

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	TCLP VOCs	TCLP SVOCs	TCLP Metals	PCBs	TCLP pest/herb	HOLD at Lab	Total VOCs	Total SVOCs	Sample Specific Notes:
H067-EX6-04	7/25/22	0930	G	Soil	3					X			✓	X	X	HOLD
H067-EX6-05	7/25/22	1000	G	Soil	3					X			✓	X	X	HOLD
H067-EX6-COMP	7/25/22	1030	C	Soil	5			X	X	X	X	X				HOLD-TCLP pest/herb
H067-EX7-01	7/25/22	1100	G	Soil	3					X			✓	X	X	HOLD
H067-EX7-02	7/25/22	1130	G	Soil	3					X			✓	X	X	HOLD
H067-EX7-03	7/25/22	1200	G	Soil	3					X			✓	X	X	HOLD
H067-EX7-COMP	7/25/22	1230	C	Soil	5			X	X	X	X	X				Hold-TCLP pest/herb
DUP-02-20220725	7/25/22	1300	C	Soil	5			X	X	X	X	X				Hold-TCLP pest/herb
	/22			Soil												
	/22			Soil												
	/22			Soil												
	/22			Soil												
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other								1	1	1	1					

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☑ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☑ Disposal by Lab ☐ Archive for_____ Months

Special Instructions/QC Requirements & Comments: HOLD - TCLP pest/herb for H067-EX6-COMP and H067-EX7-COMP and DUP-02-20220725

3.1 # ICE

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:		Cooler Temp. (°C): Obs'd:_____ Corr'd:_____		Therm ID No.:_____
Relinquished by: Ryan Clare	Company: Arcadis	Date/Time: 7/26/22 1600	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company: TA	Date/Time: 7/27/22 1000

Form No. CA-C-WI-002, Rev. 4.34, dated 8/3/2020

Login Sample Receipt Checklist

Client: ARCADIS U.S. Inc

Job Number: 480-200132-1

Login Number: 200132
List Number: 1
Creator: Kolb, Chris M

List Source: Eurofins Buffalo

Question	Answer	Comment
Radioactivity either was not measured or, if measured, is at or below background	True	
The cooler's custody seal, if present, is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time (Excluding tests with immediate HTs)..	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	N/A	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Sampling Company provided.	True	ARCADIS
Samples received within 48 hours of sampling.	True	
Samples requiring field filtration have been filtered in the field.	True	
Chlorine Residual checked.	N/A	

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ANALYTICAL REPORT

Eurofins Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Tel: (716)691-2600

Laboratory Job ID: 480-200132-3
Client Project/Site: GTEOSI - Seneca Falls

For:
ARCADIS U.S. Inc
855 Route 146
Suite 210
Clifton Park, New York 12065

Attn: Mark Flusche

Authorized for release by:
8/8/2022 5:27:42 PM
Judy Stone, Senior Project Manager
(484)685-0868
Judy.Stone@et.eurofinsus.com

Designee for

John Schove, Project Manager II
(716)504-9838
John.Schove@et.eurofinsus.com

The test results in this report meet all 2003 NELAC, 2009 TNI, and 2016 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

LINKS

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Table of Contents

Cover Page 1
Table of Contents 2
Definitions/Glossary 3
Case Narrative 4
Detection Summary 5
Client Sample Results 6
Surrogate Summary 8
QC Sample Results 9
QC Association Summary 12
Lab Chronicle 13
Certification Summary 14
Method Summary 15
Sample Summary 16
Chain of Custody 17
Receipt Checklists 18

Definitions/Glossary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200132-3

Qualifiers

GC Semi VOA

Qualifier	Qualifier Description
S1-	Surrogate recovery exceeds control limits, low biased.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 480-200132-3

Laboratory: Eurofins Buffalo

Narrative

Job Narrative
480-200132-3

Comments
These samples were originally put on hold by the client for TCLP pesticides and herbicides. These samples were activated for these tests on 8/1/22.

Receipt
The samples were received on 7/27/2022 10:00 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 3.1º C.

GC Semi VOA
Method 8151A: Surrogate recoveries for the following samples were outside control limits: H067-EX6-COMP (480-200132-3), H067-EX7-COMP (480-200132-7) and (LB 480-635233/1-H). This is routine for TCLP herbicides, due to the pH effects created during the leaching process, inhibiting the herbicide derivatization of the free acid components.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Organic Prep
Method 8151A: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate/sample duplicate (MS/MSD/DUP) associated with preparation batch 480-635233 and 480-635998.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200132-3

Client Sample ID: H067-EX6-COMP — Lab Sample ID: 480-200132-3

No Detections.

Client Sample ID: H067-EX7-COMP — Lab Sample ID: 480-200132-7

No Detections.

This Detection Summary does not include radiochemical test results.

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200132-3

Client Sample ID: H067-EX6-COMP
Date Collected: 07/25/22 10:30
Date Received: 07/27/22 10:00

Lab Sample ID: 480-200132-3
Matrix: Solid

Method: 8081B - Organochlorine Pesticides (GC) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
gamma-BHC (Lindane)	ND		0.00020		mg/L		08/01/22 15:07	08/02/22 13:27	1
Chlordane (technical)	ND		0.0020		mg/L		08/01/22 15:07	08/02/22 13:27	1
Endrin	ND		0.00020		mg/L		08/01/22 15:07	08/02/22 13:27	1
Heptachlor	ND		0.00020		mg/L		08/01/22 15:07	08/02/22 13:27	1
Heptachlor epoxide	ND		0.00020		mg/L		08/01/22 15:07	08/02/22 13:27	1
Methoxychlor	ND		0.00020		mg/L		08/01/22 15:07	08/02/22 13:27	1
Toxaphene	ND		0.0020		mg/L		08/01/22 15:07	08/02/22 13:27	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl	*84*		*20 - 120*	*08/01/22 15:07*	*08/02/22 13:27*	*1*
DCB Decachlorobiphenyl	*85*		*20 - 120*	*08/01/22 15:07*	*08/02/22 13:27*	*1*
Tetrachloro-m-xylene	*76*		*44 - 120*	*08/01/22 15:07*	*08/02/22 13:27*	*1*
Tetrachloro-m-xylene	*72*		*44 - 120*	*08/01/22 15:07*	*08/02/22 13:27*	*1*

Method: 8151 - TCLP Herbicides - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silvex (2,4,5-TP)	ND		0.0020		mg/L		08/03/22 10:08	08/04/22 20:11	1
2,4-D	ND		0.0020		mg/L		08/03/22 10:08	08/04/22 20:11	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*27*	*S1-*	*48 - 132*	*08/03/22 10:08*	*08/04/22 20:11*	*1*
2,4-Dichlorophenylacetic acid	*34*	*S1-*	*48 - 132*	*08/03/22 10:08*	*08/04/22 20:11*	*1*

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200132-3

Client Sample ID: H067-EX7-COMP
Date Collected: 07/25/22 12:30
Date Received: 07/27/22 10:00

Lab Sample ID: 480-200132-7
Matrix: Solid

Method: 8081B - Organochlorine Pesticides (GC) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
gamma-BHC (Lindane)	ND		0.00020		mg/L		08/01/22 15:07	08/02/22 13:47	1
Chlordane (technical)	ND		0.0020		mg/L		08/01/22 15:07	08/02/22 13:47	1
Endrin	ND		0.00020		mg/L		08/01/22 15:07	08/02/22 13:47	1
Heptachlor	ND		0.00020		mg/L		08/01/22 15:07	08/02/22 13:47	1
Heptachlor epoxide	ND		0.00020		mg/L		08/01/22 15:07	08/02/22 13:47	1
Methoxychlor	ND		0.00020		mg/L		08/01/22 15:07	08/02/22 13:47	1
Toxaphene	ND		0.0020		mg/L		08/01/22 15:07	08/02/22 13:47	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl	*82*		*20 - 120*	*08/01/22 15:07*	*08/02/22 13:47*	*1*
DCB Decachlorobiphenyl	*92*		*20 - 120*	*08/01/22 15:07*	*08/02/22 13:47*	*1*
Tetrachloro-m-xylene	*78*		*44 - 120*	*08/01/22 15:07*	*08/02/22 13:47*	*1*
Tetrachloro-m-xylene	*72*		*44 - 120*	*08/01/22 15:07*	*08/02/22 13:47*	*1*

Method: 8151 - TCLP Herbicides - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silvex (2,4,5-TP)	ND		0.0020		mg/L		08/03/22 10:08	08/04/22 20:41	1
2,4-D	ND		0.0020		mg/L		08/03/22 10:08	08/04/22 20:41	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*32*	*S1-*	*48 - 132*	*08/03/22 10:08*	*08/04/22 20:41*	*1*
2,4-Dichlorophenylacetic acid	*29*	*S1-*	*48 - 132*	*08/03/22 10:08*	*08/04/22 20:41*	*1*

Surrogate Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200132-3

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid — **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCBP1	DCBP2	TCX1	TCX2
Lab Sample ID	Client Sample ID	(20-120)	(20-120)	(44-120)	(44-120)
LCS 480-635741/2-A	Lab Control Sample	53	54	74	68
MB 480-635741/1-A	Method Blank	49	49	76	67

Surrogate Legend

DCBP = DCB Decachlorobiphenyl

TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid — **Prep Type: TCLP**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCBP1	DCBP2	TCX1	TCX2
Lab Sample ID	Client Sample ID	(20-120)	(20-120)	(44-120)	(44-120)
480-200132-3	H067-EX6-COMP	84	85	76	72
480-200132-7	H067-EX7-COMP	82	92	78	72
LB 480-635233/1-G	Method Blank	90	93	83	76

Surrogate Legend

DCBP = DCB Decachlorobiphenyl

TCX = Tetrachloro-m-xylene

Method: 8151 - TCLP Herbicides

Matrix: Solid — **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCPAA1	DCPAA2
Lab Sample ID	Client Sample ID	(48-132)	(48-132)
LCS 480-635998/2-A	Lab Control Sample	111	76
LCSD 480-635998/3-A	Lab Control Sample Dup	106	75
MB 480-635998/1-A	Method Blank	99	82

Surrogate Legend

DCPAA = 2,4-Dichlorophenylacetic acid

Method: 8151 - TCLP Herbicides

Matrix: Solid — **Prep Type: TCLP**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCPAA1	DCPAA2
Lab Sample ID	Client Sample ID	(48-132)	(48-132)
480-200132-3	H067-EX6-COMP	27 S1-	34 S1-
480-200132-7	H067-EX7-COMP	32 S1-	29 S1-
LB 480-635233/1-H	Method Blank	29 S1-	36 S1-

Surrogate Legend

DCPAA = 2,4-Dichlorophenylacetic acid

Method: 8081B - Organochlorine Pesticides (GC)

Lab Sample ID: MB 480-635741/1-A
Matrix: Solid
Analysis Batch: 635787

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 635741

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
gamma-BHC (Lindane)	ND		0.000050		mg/L		08/01/22 15:07	08/02/22 09:53	1
Chlordane (technical)	ND		0.00050		mg/L		08/01/22 15:07	08/02/22 09:53	1
Endrin	ND		0.000050		mg/L		08/01/22 15:07	08/02/22 09:53	1
Heptachlor	ND		0.000050		mg/L		08/01/22 15:07	08/02/22 09:53	1
Heptachlor epoxide	ND		0.000050		mg/L		08/01/22 15:07	08/02/22 09:53	1
Methoxychlor	ND		0.000050		mg/L		08/01/22 15:07	08/02/22 09:53	1
Toxaphene	ND		0.00050		mg/L		08/01/22 15:07	08/02/22 09:53	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl	*49*		*20 - 120*	*08/01/22 15:07*	*08/02/22 09:53*	*1*
DCB Decachlorobiphenyl	*49*		*20 - 120*	*08/01/22 15:07*	*08/02/22 09:53*	*1*
Tetrachloro-m-xylene	*76*		*44 - 120*	*08/01/22 15:07*	*08/02/22 09:53*	*1*
Tetrachloro-m-xylene	*67*		*44 - 120*	*08/01/22 15:07*	*08/02/22 09:53*	*1*

Lab Sample ID: LCS 480-635741/2-A
Matrix: Solid
Analysis Batch: 635787

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 635741

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
gamma-BHC (Lindane)			0.000500	0.000454		mg/L		91	56 - 120		
Endrin			0.000500	0.000449		mg/L		90	65 - 135		
Heptachlor			0.000500	0.000446		mg/L		89	58 - 120		
Heptachlor epoxide			0.000500	0.000475		mg/L		95	65 - 125		
Methoxychlor			0.000500	0.000551		mg/L		110	50 - 150		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
DCB Decachlorobiphenyl	*53*		*20 - 120*
DCB Decachlorobiphenyl	*54*		*20 - 120*
Tetrachloro-m-xylene	*74*		*44 - 120*
Tetrachloro-m-xylene	*68*		*44 - 120*

Lab Sample ID: LB 480-635233/1-G
Matrix: Solid
Analysis Batch: 635787

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 635741

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
gamma-BHC (Lindane)	ND		0.00050		mg/L		08/01/22 15:07	08/02/22 12:09	1
Chlordane (technical)	ND		0.0050		mg/L		08/01/22 15:07	08/02/22 12:09	1
Endrin	ND		0.00050		mg/L		08/01/22 15:07	08/02/22 12:09	1
Heptachlor	ND		0.00050		mg/L		08/01/22 15:07	08/02/22 12:09	1
Heptachlor epoxide	ND		0.00050		mg/L		08/01/22 15:07	08/02/22 12:09	1
Methoxychlor	ND		0.00050		mg/L		08/01/22 15:07	08/02/22 12:09	1
Toxaphene	ND		0.0050		mg/L		08/01/22 15:07	08/02/22 12:09	1

Surrogate	*LB %Recovery*	*LB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl	*90*		*20 - 120*	*08/01/22 15:07*	*08/02/22 12:09*	*1*
DCB Decachlorobiphenyl	*93*		*20 - 120*	*08/01/22 15:07*	*08/02/22 12:09*	*1*

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: LB 480-635233/1-G
Matrix: Solid
Analysis Batch: 635787

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 635741

Surrogate	*LB %Recovery*	*LB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*83*		*44 - 120*	*08/01/22 15:07*	*08/02/22 12:09*	*1*
Tetrachloro-m-xylene	*76*		*44 - 120*	*08/01/22 15:07*	*08/02/22 12:09*	*1*

Method: 8151 - TCLP Herbicides

Lab Sample ID: MB 480-635998/1-A
Matrix: Solid
Analysis Batch: 636179

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 635998

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silvex (2,4,5-TP)	ND		0.00050		mg/L		08/03/22 10:08	08/04/22 13:15	1
2,4-D	ND		0.00050		mg/L		08/03/22 10:08	08/04/22 13:15	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*99*		*48 - 132*	*08/03/22 10:08*	*08/04/22 13:15*	*1*
2,4-Dichlorophenylacetic acid	*82*		*48 - 132*	*08/03/22 10:08*	*08/04/22 13:15*	*1*

Lab Sample ID: LCS 480-635998/2-A
Matrix: Solid
Analysis Batch: 636179

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 635998

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Silvex (2,4,5-TP)			0.00200	0.00150		mg/L		75	49 - 150		
2,4-D			0.00200	0.00164		mg/L		82	36 - 150		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2,4-Dichlorophenylacetic acid	*111*		*48 - 132*
2,4-Dichlorophenylacetic acid	*76*		*48 - 132*

Lab Sample ID: LCSD 480-635998/3-A
Matrix: Solid
Analysis Batch: 636179

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 635998

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Silvex (2,4,5-TP)			0.00200	0.00145		mg/L		73	49 - 150	3	50
2,4-D			0.00200	0.00167		mg/L		84	36 - 150	2	50

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
2,4-Dichlorophenylacetic acid	*106*		*48 - 132*
2,4-Dichlorophenylacetic acid	*75*		*48 - 132*

Lab Sample ID: LB 480-635233/1-H
Matrix: Solid
Analysis Batch: 636179

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 635998

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silvex (2,4,5-TP)	ND		0.0050		mg/L		08/03/22 10:08	08/04/22 18:42	1
2,4-D	ND		0.0050		mg/L		08/03/22 10:08	08/04/22 18:42	1

Method: 8151 - TCLP Herbicides (Continued)

Surrogate	%Recovery	LB Qualifier	Limits	Prepared	Analyzed	Dil Fac
2,4-Dichlorophenylacetic acid	29	S1-	48 - 132	08/03/22 10:08	08/04/22 18:42	1
2,4-Dichlorophenylacetic acid	36	S1-	48 - 132	08/03/22 10:08	08/04/22 18:42	1

QC Association Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200132-3

GC Semi VOA

Leach Batch: 635233

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200132-3	H067-EX6-COMP	TCLP	Solid	1311	
480-200132-7	H067-EX7-COMP	TCLP	Solid	1311	
LB 480-635233/1-G	Method Blank	TCLP	Solid	1311	
LB 480-635233/1-H	Method Blank	TCLP	Solid	1311	

Prep Batch: 635741

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200132-3	H067-EX6-COMP	TCLP	Solid	3510C	635233
480-200132-7	H067-EX7-COMP	TCLP	Solid	3510C	635233
LB 480-635233/1-G	Method Blank	TCLP	Solid	3510C	635233
MB 480-635741/1-A	Method Blank	Total/NA	Solid	3510C	
LCS 480-635741/2-A	Lab Control Sample	Total/NA	Solid	3510C	

Analysis Batch: 635787

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200132-3	H067-EX6-COMP	TCLP	Solid	8081B	635741
480-200132-7	H067-EX7-COMP	TCLP	Solid	8081B	635741
LB 480-635233/1-G	Method Blank	TCLP	Solid	8081B	635741
MB 480-635741/1-A	Method Blank	Total/NA	Solid	8081B	635741
LCS 480-635741/2-A	Lab Control Sample	Total/NA	Solid	8081B	635741

Prep Batch: 635998

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200132-3	H067-EX6-COMP	TCLP	Solid	8151A	635233
480-200132-7	H067-EX7-COMP	TCLP	Solid	8151A	635233
LB 480-635233/1-H	Method Blank	TCLP	Solid	8151A	635233
MB 480-635998/1-A	Method Blank	Total/NA	Solid	8151A	
LCS 480-635998/2-A	Lab Control Sample	Total/NA	Solid	8151A	
LCSD 480-635998/3-A	Lab Control Sample Dup	Total/NA	Solid	8151A	

Analysis Batch: 636179

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200132-3	H067-EX6-COMP	TCLP	Solid	8151	635998
480-200132-7	H067-EX7-COMP	TCLP	Solid	8151	635998
LB 480-635233/1-H	Method Blank	TCLP	Solid	8151	635998
MB 480-635998/1-A	Method Blank	Total/NA	Solid	8151	635998
LCS 480-635998/2-A	Lab Control Sample	Total/NA	Solid	8151	635998
LCSD 480-635998/3-A	Lab Control Sample Dup	Total/NA	Solid	8151	635998

Lab Chronicle

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200132-3

Client Sample ID: H067-EX6-COMP

Lab Sample ID: 480-200132-3

Date Collected: 07/25/22 10:30

Matrix: Solid

Date Received: 07/27/22 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
TCLP	Leach	1311			635233	07/28/22 08:19	BML	EETNE BUF
TCLP	Prep	3510C			635741	08/01/22 15:07	CMC	EETNE BUF
TCLP	Analysis	8081B		1	635787	08/02/22 13:27	JLS	EETNE BUF
TCLP	Leach	1311			635233	07/28/22 08:19	BML	EETNE BUF
TCLP	Prep	8151A			635998	08/03/22 10:08	JMP	EETNE BUF
TCLP	Analysis	8151		1	636179	08/04/22 20:11	MAN	EETNE BUF

Client Sample ID: H067-EX7-COMP

Lab Sample ID: 480-200132-7

Date Collected: 07/25/22 12:30

Matrix: Solid

Date Received: 07/27/22 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
TCLP	Leach	1311			635233	07/28/22 08:19	BML	EETNE BUF
TCLP	Prep	3510C			635741	08/01/22 15:07	CMC	EETNE BUF
TCLP	Analysis	8081B		1	635787	08/02/22 13:47	JLS	EETNE BUF
TCLP	Leach	1311			635233	07/28/22 08:19	BML	EETNE BUF
TCLP	Prep	8151A			635998	08/03/22 10:08	JMP	EETNE BUF
TCLP	Analysis	8151		1	636179	08/04/22 20:41	MAN	EETNE BUF

Laboratory References:

EETNE BUF = Eurofins Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

Accreditation/Certification Summary

Client: ARCADIS U.S. Inc
Job ID: 480-200132-3
Project/Site: GTEOSI - Seneca Falls

Laboratory: Eurofins Buffalo

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
New York	NELAP	10026	03-31-23

Method Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200132-3

Method	Method Description	Protocol	Laboratory
8081B	Organochlorine Pesticides (GC)	SW846	EETNE BUF
8151	TCLP Herbicides	SW846	EETNE BUF
1311	TCLP Extraction	SW846	EETNE BUF
3510C	Liquid-Liquid Extraction (Separatory Funnel)	SW846	EETNE BUF
8151A	Extraction (Herbicides)	SW846	EETNE BUF

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EETNE BUF = Eurofins Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

Sample Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200132-3

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
480-200132-3	H067-EX6-COMP	Solid	07/25/22 10:30	07/27/22 10:00
480-200132-7	H067-EX7-COMP	Solid	07/25/22 12:30	07/27/22 10:00

Eurofins TestAmerica, Buffalo
10 Hazelwood Drive

Amherst, NY 14228-2223
phone 716.691.2600 fax 716.691.7991

Chain of Custody Record

eurofins | Environment Testing America

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc. d/b/a Eurofins TestAmerica

Client Contact	**Project Manager: Mark Flusche**		COC No: 4
Company: Arcadis of New York, Inc.	Email: mark.flusche@arcadis.com	Site Contact: Ryan Clare	Date: 7/26/22
Address: 855 Route 146 Suite 210	Tel: 518-250-7322	Lab Contact: Schove, John R	Carrier: FedEx
Clifton Park, NY 12065	**Analysis Turnaround Time**		1 of 1 COCs
	☐ CALENDAR DAYS ☐ WORKING DAYS		TALS Project #:
	TAT if different from Below		Sampler:
Project Name: GTEOSI - Seneca Falls	☑ 2 weeks		For Lab Use Only:
Site:	☐ 1 week		Walk-in Client:
PO #: 30112357.00055 Project #:	☐ 2 days		
	☐ 1 day		

480-200132 Chain of Custody

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	TCLP VOCs	TCLP SVOCs	TCLP Metals	PCBs	TCLP pest/herb	HOLD at Lab	Total VOCs	Total SVOCs	Sample Specific Notes:
H067-EX6-04	7/25/22	0930	G	Soil	3					X			✓	X	X	HOLD
H067-EX6-05	7/25/22	1000	G	Soil	3					X			✓	X	X	HOLD
H067-EX6-COMP	7/25/22	1030	C	Soil	5			X	X	X	X	X				HOLD-TCLP pest/herb
H067-EX7-01	7/25/22	1100	G	Soil	3					X			✓	X	X	HOLD
H067-EX7-02	7/25/22	1130	G	Soil	3					X			✓	X	X	HOLD
H067-EX7-03	7/25/22	1200	G	Soil	3					X			✓	X	X	HOLD
H067-EX7-COMP	7/25/22	1230	C	Soil	5			X	X	X	X	X				Hold-TCLP pest/herb
DUP-02-20220725	7/25/22	1300	C	Soil	5			X	X	X	X	X				Hold-TCLP pest/herb
	/22			Soil												
	/22			Soil												
	/22			Soil												
	/22			Soil												
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other								1	1	1	1					

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☑ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☑ Disposal by Lab ☐ Archive for_____ Months

Special Instructions/QC Requirements & Comments: HOLD - TCLP pest/herb for H067-EX6-COMP and H067-EX7-COMP and DUP-02-20220725

3.1 # ICE

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:		Cooler Temp. (°C): Obs'd:_____	Corr'd:_____	Therm ID No.:_____
Relinquished by: Ryan Clare	Company: Arcadis	Date/Time: 7/26/22 1600	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company: TA	Date/Time: 7/27/22 1000

Form No. CA-C-WI-002, Rev. 4.34, dated 8/3/2020

Login Sample Receipt Checklist

Client: ARCADIS U.S. Inc

Job Number: 480-200132-3

Login Number: 200132
List Number: 1
Creator: Kolb, Chris M

List Source: Eurofins Buffalo

Question	Answer	Comment
Radioactivity either was not measured or, if measured, is at or below background	True	
The cooler's custody seal, if present, is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time (Excluding tests with immediate HTs)..	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	N/A	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Sampling Company provided.	True	ARCADIS
Samples received within 48 hours of sampling.	True	
Samples requiring field filtration have been filtered in the field.	True	
Chlorine Residual checked.	N/A	

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ANALYTICAL REPORT

Eurofins Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Tel: (716)691-2600

Laboratory Job ID: 480-199965-1
Client Project/Site: GTEOSI - Seneca Falls

For:
ARCADIS U.S. Inc
855 Route 146
Suite 210
Clifton Park, New York 12065

Attn: Mark Flusche

Authorized for release by:
8/10/2022 4:15:51 PM
Wyatt Watson, Project Management Assistant I
Wyatt.Watson@et.eurofinsus.com

Designee for

John Schove, Project Manager II
(716)504-9838
John.Schove@et.eurofinsus.com

LINKS

Review your project results through my EOL

Have a Question? Ask The Expert

Visit us at: www.eurofinsus.com/Env

The test results in this report meet all 2003 NELAC, 2009 TNI, and 2016 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Cover Page 1
Table of Contents 2
Definitions/Glossary 3
Case Narrative 4
Detection Summary 5
Client Sample Results 6
Surrogate Summary 12
QC Sample Results 14
QC Association Summary 23
Lab Chronicle 26
Certification Summary 28
Method Summary 29
Sample Summary 30
Chain of Custody 31
Receipt Checklists 33

Definitions/Glossary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-199965-1

Qualifiers

GC Semi VOA

Qualifier	Qualifier Description
S1-	Surrogate recovery exceeds control limits, low biased.

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 480-199965-1

Laboratory: Eurofins Buffalo

Narrative

Job Narrative
480-199965-1

Comments
No additional comments.

Receipt
The samples were received on 7/20/2022 10:00 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 2.8º C.

Receipt Exceptions
The following samples were put on hold by the client on 7/21/22: H067-EX1-COMP (480-199965-10) and H067-EX2-COMP (480-199965-16).

GC/MS VOA
Method 8260C: The following samples were diluted due to the nature of the TCLP matrix: H067-EX1-COMP (480-199965-10), H067-EX2-COMP (480-199965-16) and (LB 480-634728/1-A). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

GC/MS Semi VOA
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

GC Semi VOA
Method 8082A: The following samples are associated with a continuing calibration verification (CCV 480-634680/8) that had recoveries for the surrogate Decachlorobiphenyl that were below acceptance limits: H067-EX1-COMP (480-199965-10) and H067-EX2-COMP (480-199965-16). The secondary surrogate Tetrachloro-m-xylene is within limits. Therefore, the data has been reported.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Metals
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Organic Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Detection Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-199965-1

Client Sample ID: H067-EX1-COMP — Lab Sample ID: 480-199965-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Cadmium	0.24		0.0020		mg/L	1		6010C	TCLP

Client Sample ID: H067-EX2-COMP — Lab Sample ID: 480-199965-16

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Cadmium	0.21		0.0020		mg/L	1		6010C	TCLP

This Detection Summary does not include radiochemical test results.

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-199965-1

Client Sample ID: H067-EX1-COMP
Date Collected: 07/19/22 12:20
Date Received: 07/20/22 10:00

Lab Sample ID: 480-199965-10
Matrix: Solid

Method: 8260C - Volatile Organic Compounds by GC/MS - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	ND		0.010		mg/L			07/27/22 06:18	10
1,2-Dichloroethane	ND		0.010		mg/L			07/27/22 06:18	10
2-Butanone (MEK)	ND		0.050		mg/L			07/27/22 06:18	10
Benzene	ND		0.010		mg/L			07/27/22 06:18	10
Carbon tetrachloride	ND		0.010		mg/L			07/27/22 06:18	10
Chlorobenzene	ND		0.010		mg/L			07/27/22 06:18	10
Chloroform	ND		0.010		mg/L			07/27/22 06:18	10
Tetrachloroethene	ND		0.010		mg/L			07/27/22 06:18	10
Trichloroethene	ND		0.010		mg/L			07/27/22 06:18	10
Vinyl chloride	ND		0.010		mg/L			07/27/22 06:18	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*110*		*77 - 120*		*07/27/22 06:18*	*10*
4-Bromofluorobenzene (Surr)	*92*		*73 - 120*		*07/27/22 06:18*	*10*
Dibromofluoromethane (Surr)	*98*		*75 - 123*		*07/27/22 06:18*	*10*
Toluene-d8 (Surr)	*99*		*80 - 120*		*07/27/22 06:18*	*10*

Method: 8270D - Semivolatile Organic Compounds (GC/MS) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dichlorobenzene	ND		0.040		mg/L		07/29/22 09:26	08/01/22 19:27	1
2,4-Dinitrotoluene	ND		0.020		mg/L		07/29/22 09:26	08/01/22 19:27	1
2,4,5-Trichlorophenol	ND		0.020		mg/L		07/29/22 09:26	08/01/22 19:27	1
2,4,6-Trichlorophenol	ND		0.020		mg/L		07/29/22 09:26	08/01/22 19:27	1
2-Methylphenol	ND		0.020		mg/L		07/29/22 09:26	08/01/22 19:27	1
3-Methylphenol	ND		0.040		mg/L		07/29/22 09:26	08/01/22 19:27	1
4-Methylphenol	ND		0.040		mg/L		07/29/22 09:26	08/01/22 19:27	1
Hexachlorobenzene	ND		0.020		mg/L		07/29/22 09:26	08/01/22 19:27	1
Hexachlorobutadiene	ND		0.020		mg/L		07/29/22 09:26	08/01/22 19:27	1
Hexachloroethane	ND		0.020		mg/L		07/29/22 09:26	08/01/22 19:27	1
Nitrobenzene	ND		0.020		mg/L		07/29/22 09:26	08/01/22 19:27	1
Pentachlorophenol	ND		0.040		mg/L		07/29/22 09:26	08/01/22 19:27	1
Pyridine	ND		0.10		mg/L		07/29/22 09:26	08/01/22 19:27	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*72*		*41 - 120*	*07/29/22 09:26*	*08/01/22 19:27*	*1*
2-Fluorobiphenyl (Surr)	*81*		*48 - 120*	*07/29/22 09:26*	*08/01/22 19:27*	*1*
2-Fluorophenol (Surr)	*42*		*35 - 120*	*07/29/22 09:26*	*08/01/22 19:27*	*1*
Nitrobenzene-d5 (Surr)	*74*		*46 - 120*	*07/29/22 09:26*	*08/01/22 19:27*	*1*
p-Terphenyl-d14 (Surr)	*89*		*60 - 148*	*07/29/22 09:26*	*08/01/22 19:27*	*1*
Phenol-d5 (Surr)	*32*		*22 - 120*	*07/29/22 09:26*	*08/01/22 19:27*	*1*

Method: 6010C - Metals (ICP) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.015		mg/L		07/26/22 11:22	07/27/22 03:55	1
Barium	ND		1.0		mg/L		07/26/22 11:22	07/27/22 03:55	1
Cadmium	**0.24**		0.0020		mg/L		07/26/22 11:22	07/27/22 03:55	1
Chromium	ND		0.020		mg/L		07/26/22 11:22	07/27/22 03:55	1
Lead	ND		0.020		mg/L		07/26/22 11:22	07/27/22 03:55	1
Selenium	ND		0.025		mg/L		07/26/22 11:22	07/27/22 03:55	1
Silver	ND		0.0060		mg/L		07/26/22 11:22	07/27/22 03:55	1

Client Sample Results

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-199965-1

Client Sample ID: H067-EX1-COMP
Date Collected: 07/19/22 12:20
Date Received: 07/20/22 10:00

Lab Sample ID: 480-199965-10
Matrix: Solid

Method: 7470A - Mercury (CVAA) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00020		mg/L		07/27/22 10:23	07/27/22 14:54	1

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-199965-1

Client Sample ID: H067-EX1-COMP
Date Collected: 07/19/22 12:20
Date Received: 07/20/22 10:00

Lab Sample ID: 480-199965-10
Matrix: Solid
Percent Solids: 78.7

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.30		mg/Kg	☼	07/22/22 09:03	07/24/22 21:16	1
PCB-1221	ND		0.30		mg/Kg	☼	07/22/22 09:03	07/24/22 21:16	1
PCB-1232	ND		0.30		mg/Kg	☼	07/22/22 09:03	07/24/22 21:16	1
PCB-1242	ND		0.30		mg/Kg	☼	07/22/22 09:03	07/24/22 21:16	1
PCB-1248	ND		0.30		mg/Kg	☼	07/22/22 09:03	07/24/22 21:16	1
PCB-1254	ND		0.30		mg/Kg	☼	07/22/22 09:03	07/24/22 21:16	1
PCB-1260	ND		0.30		mg/Kg	☼	07/22/22 09:03	07/24/22 21:16	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*98*		*60 - 154*	*07/22/22 09:03*	*07/24/22 21:16*	*1*
Tetrachloro-m-xylene	*92*		*60 - 154*	*07/22/22 09:03*	*07/24/22 21:16*	*1*
DCB Decachlorobiphenyl	*69*		*65 - 174*	*07/22/22 09:03*	*07/24/22 21:16*	*1*
DCB Decachlorobiphenyl	*69*		*65 - 174*	*07/22/22 09:03*	*07/24/22 21:16*	*1*

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-199965-1

Client Sample ID: H067-EX2-COMP
Date Collected: 07/19/22 15:00
Date Received: 07/20/22 10:00

Lab Sample ID: 480-199965-16
Matrix: Solid

Method: 8260C - Volatile Organic Compounds by GC/MS - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	ND		0.010		mg/L			07/27/22 06:42	10
1,2-Dichloroethane	ND		0.010		mg/L			07/27/22 06:42	10
2-Butanone (MEK)	ND		0.050		mg/L			07/27/22 06:42	10
Benzene	ND		0.010		mg/L			07/27/22 06:42	10
Carbon tetrachloride	ND		0.010		mg/L			07/27/22 06:42	10
Chlorobenzene	ND		0.010		mg/L			07/27/22 06:42	10
Chloroform	ND		0.010		mg/L			07/27/22 06:42	10
Tetrachloroethene	ND		0.010		mg/L			07/27/22 06:42	10
Trichloroethene	ND		0.010		mg/L			07/27/22 06:42	10
Vinyl chloride	ND		0.010		mg/L			07/27/22 06:42	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*108*		*77 - 120*		*07/27/22 06:42*	*10*
4-Bromofluorobenzene (Surr)	*91*		*73 - 120*		*07/27/22 06:42*	*10*
Dibromofluoromethane (Surr)	*99*		*75 - 123*		*07/27/22 06:42*	*10*
Toluene-d8 (Surr)	*98*		*80 - 120*		*07/27/22 06:42*	*10*

Method: 8270D - Semivolatile Organic Compounds (GC/MS) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dichlorobenzene	ND		0.040		mg/L		08/03/22 09:34	08/08/22 21:53	1
2,4-Dinitrotoluene	ND		0.020		mg/L		08/03/22 09:34	08/08/22 21:53	1
2,4,5-Trichlorophenol	ND		0.020		mg/L		08/03/22 09:34	08/08/22 21:53	1
2,4,6-Trichlorophenol	ND		0.020		mg/L		08/03/22 09:34	08/08/22 21:53	1
2-Methylphenol	ND		0.020		mg/L		08/03/22 09:34	08/08/22 21:53	1
3-Methylphenol	ND		0.040		mg/L		08/03/22 09:34	08/08/22 21:53	1
4-Methylphenol	ND		0.040		mg/L		08/03/22 09:34	08/08/22 21:53	1
Hexachlorobenzene	ND		0.020		mg/L		08/03/22 09:34	08/08/22 21:53	1
Hexachlorobutadiene	ND		0.020		mg/L		08/03/22 09:34	08/08/22 21:53	1
Hexachloroethane	ND		0.020		mg/L		08/03/22 09:34	08/08/22 21:53	1
Nitrobenzene	ND		0.020		mg/L		08/03/22 09:34	08/08/22 21:53	1
Pentachlorophenol	ND		0.040		mg/L		08/03/22 09:34	08/08/22 21:53	1
Pyridine	ND		0.10		mg/L		08/03/22 09:34	08/08/22 21:53	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*88*		*41 - 120*	*08/03/22 09:34*	*08/08/22 21:53*	*1*
2-Fluorobiphenyl (Surr)	*91*		*48 - 120*	*08/03/22 09:34*	*08/08/22 21:53*	*1*
2-Fluorophenol (Surr)	*54*		*35 - 120*	*08/03/22 09:34*	*08/08/22 21:53*	*1*
Nitrobenzene-d5 (Surr)	*89*		*46 - 120*	*08/03/22 09:34*	*08/08/22 21:53*	*1*
p-Terphenyl-d14 (Surr)	*97*		*60 - 148*	*08/03/22 09:34*	*08/08/22 21:53*	*1*
Phenol-d5 (Surr)	*41*		*22 - 120*	*08/03/22 09:34*	*08/08/22 21:53*	*1*

Method: 6010C - Metals (ICP) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.015		mg/L		07/26/22 11:22	07/27/22 13:00	1
Barium	ND		1.0		mg/L		07/26/22 11:22	07/27/22 13:00	1
Cadmium	**0.21**		0.0020		mg/L		07/26/22 11:22	07/27/22 13:00	1
Chromium	ND		0.020		mg/L		07/26/22 11:22	07/27/22 13:00	1
Lead	ND		0.020		mg/L		07/26/22 11:22	07/27/22 13:00	1
Selenium	ND		0.025		mg/L		07/26/22 11:22	07/27/22 13:00	1
Silver	ND		0.0060		mg/L		07/26/22 11:22	07/27/22 13:00	1

Client Sample Results

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-199965-1

Client Sample ID: H067-EX2-COMP
Date Collected: 07/19/22 15:00
Date Received: 07/20/22 10:00

Lab Sample ID: 480-199965-16
Matrix: Solid

Method: 7470A - Mercury (CVAA) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00020		mg/L		07/27/22 10:23	07/27/22 15:17	1

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-199965-1

Client Sample ID: H067-EX2-COMP
Date Collected: 07/19/22 15:00
Date Received: 07/20/22 10:00

Lab Sample ID: 480-199965-16
Matrix: Solid
Percent Solids: 76.3

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.29		mg/Kg	☼	07/22/22 09:03	07/24/22 21:29	1
PCB-1221	ND		0.29		mg/Kg	☼	07/22/22 09:03	07/24/22 21:29	1
PCB-1232	ND		0.29		mg/Kg	☼	07/22/22 09:03	07/24/22 21:29	1
PCB-1242	ND		0.29		mg/Kg	☼	07/22/22 09:03	07/24/22 21:29	1
PCB-1248	ND		0.29		mg/Kg	☼	07/22/22 09:03	07/24/22 21:29	1
PCB-1254	ND		0.29		mg/Kg	☼	07/22/22 09:03	07/24/22 21:29	1
PCB-1260	ND		0.29		mg/Kg	☼	07/22/22 09:03	07/24/22 21:29	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*93*		*60 - 154*	*07/22/22 09:03*	*07/24/22 21:29*	*1*
Tetrachloro-m-xylene	*86*		*60 - 154*	*07/22/22 09:03*	*07/24/22 21:29*	*1*
DCB Decachlorobiphenyl	*63*	*S1-*	*65 - 174*	*07/22/22 09:03*	*07/24/22 21:29*	*1*
DCB Decachlorobiphenyl	*67*		*65 - 174*	*07/22/22 09:03*	*07/24/22 21:29*	*1*

Surrogate Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-199965-1

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(77-120)	(73-120)	(75-123)	(80-120)
LCS 480-634938/6	Lab Control Sample	104	93	101	98
MB 480-634938/8	Method Blank	104	88	95	99

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Solid **Prep Type: TCLP**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(77-120)	(73-120)	(75-123)	(80-120)
480-199965-10	H067-EX1-COMP	110	92	98	99
480-199965-16	H067-EX2-COMP	108	91	99	98
LB 480-634728/1-A	Method Blank	111	89	100	99

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	TPHd14	PHL
Lab Sample ID	Client Sample ID	(41-120)	(48-120)	(35-120)	(46-120)	(60-148)	(22-120)
LCS 480-635440/2-A	Lab Control Sample	100	96	58	89	111	44
LCS 480-635974/2-A	Lab Control Sample	94	91	56	84	96	44
LCSD 480-635974/3-A	Lab Control Sample Dup	101	93	60	94	104	46
MB 480-635440/1-A	Method Blank	85	90	54	88	115	40
MB 480-635974/1-A	Method Blank	74	95	57	93	100	42

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
TPHd14 = p-Terphenyl-d14 (Surr)
PHL = Phenol-d5 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Solid **Prep Type: TCLP**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	TPHd14	PHL
Lab Sample ID	Client Sample ID	(41-120)	(48-120)	(35-120)	(46-120)	(60-148)	(22-120)
480-199965-10	H067-EX1-COMP	72	81	42	74	89	32

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Matrix: Solid **Prep Type: TCLP**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	TPHd14	PHL
Lab Sample ID	Client Sample ID	(41-120)	(48-120)	(35-120)	(46-120)	(60-148)	(22-120)
480-199965-16	H067-EX2-COMP	88	91	54	89	97	41
LB 480-635828/1-B	Method Blank	88	93	56	91	108	43
LB2 480-634779/1-E	Method Blank	71	68	36	64	102	28

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
TPHd14 = p-Terphenyl-d14 (Surr)
PHL = Phenol-d5 (Surr)

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		TCX1	TCX2	DCBP1	DCBP2
Lab Sample ID	Client Sample ID	(60-154)	(60-154)	(65-174)	(65-174)
480-199965-10	H067-EX1-COMP	92	98	69	69
480-199965-16	H067-EX2-COMP	86	93	67	63 S1-
LCS 480-634539/2-A	Lab Control Sample	125	135	102	95
MB 480-634539/1-A	Method Blank	118	128	88	87

Surrogate Legend

TCX = Tetrachloro-m-xylene
DCBP = DCB Decachlorobiphenyl

Method: 8260C - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 480-634938/8
Matrix: Solid
Analysis Batch: 634938

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	ND		0.0010		mg/L			07/27/22 00:23	1
1,2-Dichloroethane	ND		0.0010		mg/L			07/27/22 00:23	1
2-Butanone (MEK)	ND		0.0050		mg/L			07/27/22 00:23	1
Benzene	ND		0.0010		mg/L			07/27/22 00:23	1
Carbon tetrachloride	ND		0.0010		mg/L			07/27/22 00:23	1
Chlorobenzene	ND		0.0010		mg/L			07/27/22 00:23	1
Chloroform	ND		0.0010		mg/L			07/27/22 00:23	1
Tetrachloroethene	ND		0.0010		mg/L			07/27/22 00:23	1
Trichloroethene	ND		0.0010		mg/L			07/27/22 00:23	1
Vinyl chloride	ND		0.0010		mg/L			07/27/22 00:23	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*104*		*77 - 120*		*07/27/22 00:23*	*1*
4-Bromofluorobenzene (Surr)	*88*		*73 - 120*		*07/27/22 00:23*	*1*
Dibromofluoromethane (Surr)	*95*		*75 - 123*		*07/27/22 00:23*	*1*
Toluene-d8 (Surr)	*99*		*80 - 120*		*07/27/22 00:23*	*1*

Lab Sample ID: LCS 480-634938/6
Matrix: Solid
Analysis Batch: 634938

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
1,1-Dichloroethene	0.0250	0.0256		mg/L		102	66 - 127
1,2-Dichloroethane	0.0250	0.0264		mg/L		106	75 - 120
2-Butanone (MEK)	0.125	0.135		mg/L		108	57 - 140
Benzene	0.0250	0.0254		mg/L		102	71 - 124
Carbon tetrachloride	0.0250	0.0250		mg/L		100	72 - 134
Chlorobenzene	0.0250	0.0245		mg/L		98	80 - 120
Chloroform	0.0250	0.0260		mg/L		104	73 - 127
Tetrachloroethene	0.0250	0.0228		mg/L		91	74 - 122
Trichloroethene	0.0250	0.0247		mg/L		99	74 - 123
Vinyl chloride	0.0250	0.0231		mg/L		93	65 - 133

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*104*		*77 - 120*
4-Bromofluorobenzene (Surr)	*93*		*73 - 120*
Dibromofluoromethane (Surr)	*101*		*75 - 123*
Toluene-d8 (Surr)	*98*		*80 - 120*

Lab Sample ID: LB 480-634728/1-A
Matrix: Solid
Analysis Batch: 634938

Client Sample ID: Method Blank
Prep Type: TCLP

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	ND		0.010		mg/L			07/27/22 04:44	10
1,2-Dichloroethane	ND		0.010		mg/L			07/27/22 04:44	10
2-Butanone (MEK)	ND		0.050		mg/L			07/27/22 04:44	10
Benzene	ND		0.010		mg/L			07/27/22 04:44	10

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LB 480-634728/1-A
Matrix: Solid
Analysis Batch: 634938

Client Sample ID: Method Blank
Prep Type: TCLP

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon tetrachloride	ND		0.010		mg/L			07/27/22 04:44	10
Chlorobenzene	ND		0.010		mg/L			07/27/22 04:44	10
Chloroform	ND		0.010		mg/L			07/27/22 04:44	10
Tetrachloroethene	ND		0.010		mg/L			07/27/22 04:44	10
Trichloroethene	ND		0.010		mg/L			07/27/22 04:44	10
Vinyl chloride	ND		0.010		mg/L			07/27/22 04:44	10

Surrogate	*LB %Recovery*	*LB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*111*		*77 - 120*		*07/27/22 04:44*	*10*
4-Bromofluorobenzene (Surr)	*89*		*73 - 120*		*07/27/22 04:44*	*10*
Dibromofluoromethane (Surr)	*100*		*75 - 123*		*07/27/22 04:44*	*10*
Toluene-d8 (Surr)	*99*		*80 - 120*		*07/27/22 04:44*	*10*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 480-635440/1-A
Matrix: Solid
Analysis Batch: 635692

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 635440

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dichlorobenzene	ND		0.010		mg/L		07/29/22 09:26	08/01/22 14:57	1
2,4-Dinitrotoluene	ND		0.0050		mg/L		07/29/22 09:26	08/01/22 14:57	1
2,4,5-Trichlorophenol	ND		0.0050		mg/L		07/29/22 09:26	08/01/22 14:57	1
2,4,6-Trichlorophenol	ND		0.0050		mg/L		07/29/22 09:26	08/01/22 14:57	1
2-Methylphenol	ND		0.0050		mg/L		07/29/22 09:26	08/01/22 14:57	1
3-Methylphenol	ND		0.010		mg/L		07/29/22 09:26	08/01/22 14:57	1
4-Methylphenol	ND		0.010		mg/L		07/29/22 09:26	08/01/22 14:57	1
Hexachlorobenzene	ND		0.0050		mg/L		07/29/22 09:26	08/01/22 14:57	1
Hexachlorobutadiene	ND		0.0050		mg/L		07/29/22 09:26	08/01/22 14:57	1
Hexachloroethane	ND		0.0050		mg/L		07/29/22 09:26	08/01/22 14:57	1
Nitrobenzene	ND		0.0050		mg/L		07/29/22 09:26	08/01/22 14:57	1
Pentachlorophenol	ND		0.010		mg/L		07/29/22 09:26	08/01/22 14:57	1
Pyridine	ND		0.025		mg/L		07/29/22 09:26	08/01/22 14:57	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*85*		*41 - 120*	*07/29/22 09:26*	*08/01/22 14:57*	*1*
2-Fluorobiphenyl (Surr)	*90*		*48 - 120*	*07/29/22 09:26*	*08/01/22 14:57*	*1*
2-Fluorophenol (Surr)	*54*		*35 - 120*	*07/29/22 09:26*	*08/01/22 14:57*	*1*
Nitrobenzene-d5 (Surr)	*88*		*46 - 120*	*07/29/22 09:26*	*08/01/22 14:57*	*1*
p-Terphenyl-d14 (Surr)	*115*		*60 - 148*	*07/29/22 09:26*	*08/01/22 14:57*	*1*
Phenol-d5 (Surr)	*40*		*22 - 120*	*07/29/22 09:26*	*08/01/22 14:57*	*1*

Lab Sample ID: LCS 480-635440/2-A
Matrix: Solid
Analysis Batch: 635692

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 635440

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
1,4-Dichlorobenzene	0.0500	0.0356		mg/L		71	51 - 120

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 480-635440/2-A
Matrix: Solid
Analysis Batch: 635692

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 635440

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
2,4-Dinitrotoluene	0.0500	0.0527		mg/L		105	69 - 120
2,4,5-Trichlorophenol	0.0500	0.0504		mg/L		101	65 - 126
2,4,6-Trichlorophenol	0.0500	0.0498		mg/L		100	64 - 120
2-Methylphenol	0.0500	0.0456		mg/L		91	39 - 120
3-Methylphenol	0.0500	0.0448		mg/L		90	39 - 120
4-Methylphenol	0.0500	0.0448		mg/L		90	29 - 131
Hexachlorobenzene	0.0500	0.0483		mg/L		97	61 - 120
Hexachlorobutadiene	0.0500	0.0313		mg/L		63	35 - 120
Hexachloroethane	0.0500	0.0328		mg/L		66	43 - 120
Nitrobenzene	0.0500	0.0463		mg/L		93	53 - 123
Pentachlorophenol	0.100	0.104		mg/L		104	29 - 136
Pyridine	0.100	0.0546		mg/L		55	10 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*100*		*41 - 120*
2-Fluorobiphenyl (Surr)	*96*		*48 - 120*
2-Fluorophenol (Surr)	*58*		*35 - 120*
Nitrobenzene-d5 (Surr)	*89*		*46 - 120*
p-Terphenyl-d14 (Surr)	*111*		*60 - 148*
Phenol-d5 (Surr)	*44*		*22 - 120*

Lab Sample ID: MB 480-635974/1-A
Matrix: Solid
Analysis Batch: 636514

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 635974

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dichlorobenzene	ND		0.010		mg/L		08/03/22 09:34	08/08/22 20:16	1
2,4-Dinitrotoluene	ND		0.0050		mg/L		08/03/22 09:34	08/08/22 20:16	1
2,4,5-Trichlorophenol	ND		0.0050		mg/L		08/03/22 09:34	08/08/22 20:16	1
2,4,6-Trichlorophenol	ND		0.0050		mg/L		08/03/22 09:34	08/08/22 20:16	1
2-Methylphenol	ND		0.0050		mg/L		08/03/22 09:34	08/08/22 20:16	1
3-Methylphenol	ND		0.010		mg/L		08/03/22 09:34	08/08/22 20:16	1
4-Methylphenol	ND		0.010		mg/L		08/03/22 09:34	08/08/22 20:16	1
Hexachlorobenzene	ND		0.0050		mg/L		08/03/22 09:34	08/08/22 20:16	1
Hexachlorobutadiene	ND		0.0050		mg/L		08/03/22 09:34	08/08/22 20:16	1
Hexachloroethane	ND		0.0050		mg/L		08/03/22 09:34	08/08/22 20:16	1
Nitrobenzene	ND		0.0050		mg/L		08/03/22 09:34	08/08/22 20:16	1
Pentachlorophenol	ND		0.010		mg/L		08/03/22 09:34	08/08/22 20:16	1
Pyridine	ND		0.025		mg/L		08/03/22 09:34	08/08/22 20:16	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*74*		*41 - 120*	*08/03/22 09:34*	*08/08/22 20:16*	*1*
2-Fluorobiphenyl (Surr)	*95*		*48 - 120*	*08/03/22 09:34*	*08/08/22 20:16*	*1*
2-Fluorophenol (Surr)	*57*		*35 - 120*	*08/03/22 09:34*	*08/08/22 20:16*	*1*
Nitrobenzene-d5 (Surr)	*93*		*46 - 120*	*08/03/22 09:34*	*08/08/22 20:16*	*1*
p-Terphenyl-d14 (Surr)	*100*		*60 - 148*	*08/03/22 09:34*	*08/08/22 20:16*	*1*
Phenol-d5 (Surr)	*42*		*22 - 120*	*08/03/22 09:34*	*08/08/22 20:16*	*1*

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 480-635974/2-A
Matrix: Solid
Analysis Batch: 636514

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 635974

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
1,4-Dichlorobenzene			0.0500	0.0354		mg/L		71	51 - 120		
2,4-Dinitrotoluene			0.0500	0.0523		mg/L		105	69 - 120		
2,4,5-Trichlorophenol			0.0500	0.0471		mg/L		94	65 - 126		
2,4,6-Trichlorophenol			0.0500	0.0487		mg/L		97	64 - 120		
2-Methylphenol			0.0500	0.0440		mg/L		88	39 - 120		
3-Methylphenol			0.0500	0.0437		mg/L		87	39 - 120		
4-Methylphenol			0.0500	0.0437		mg/L		87	29 - 131		
Hexachlorobenzene			0.0500	0.0450		mg/L		90	61 - 120		
Hexachlorobutadiene			0.0500	0.0280		mg/L		56	35 - 120		
Hexachloroethane			0.0500	0.0311		mg/L		62	43 - 120		
Nitrobenzene			0.0500	0.0439		mg/L		88	53 - 123		
Pentachlorophenol			0.100	0.0962		mg/L		96	29 - 136		
Pyridine			0.100	0.0490		mg/L		49	10 - 120		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*94*		*41 - 120*
2-Fluorobiphenyl (Surr)	*91*		*48 - 120*
2-Fluorophenol (Surr)	*56*		*35 - 120*
Nitrobenzene-d5 (Surr)	*84*		*46 - 120*
p-Terphenyl-d14 (Surr)	*96*		*60 - 148*
Phenol-d5 (Surr)	*44*		*22 - 120*

Lab Sample ID: LCSD 480-635974/3-A
Matrix: Solid
Analysis Batch: 636514

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 635974

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
1,4-Dichlorobenzene			0.0500	0.0370		mg/L		74	51 - 120	5	36
2,4-Dinitrotoluene			0.0500	0.0571		mg/L		114	69 - 120	9	20
2,4,5-Trichlorophenol			0.0500	0.0483		mg/L		97	65 - 126	3	18
2,4,6-Trichlorophenol			0.0500	0.0497		mg/L		99	64 - 120	2	19
2-Methylphenol			0.0500	0.0477		mg/L		95	39 - 120	8	27
3-Methylphenol			0.0500	0.0486		mg/L		97	39 - 120	11	30
4-Methylphenol			0.0500	0.0486		mg/L		97	29 - 131	11	24
Hexachlorobenzene			0.0500	0.0508		mg/L		102	61 - 120	12	15
Hexachlorobutadiene			0.0500	0.0318		mg/L		64	35 - 120	13	44
Hexachloroethane			0.0500	0.0345		mg/L		69	43 - 120	10	46
Nitrobenzene			0.0500	0.0492		mg/L		98	53 - 123	11	24
Pentachlorophenol			0.100	0.111		mg/L		111	29 - 136	14	37
Pyridine			0.100	0.0547		mg/L		55	10 - 120	11	49

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*101*		*41 - 120*
2-Fluorobiphenyl (Surr)	*93*		*48 - 120*
2-Fluorophenol (Surr)	*60*		*35 - 120*
Nitrobenzene-d5 (Surr)	*94*		*46 - 120*
p-Terphenyl-d14 (Surr)	*104*		*60 - 148*
Phenol-d5 (Surr)	*46*		*22 - 120*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: LB2 480-634779/1-E
Matrix: Solid
Analysis Batch: 635692

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 635440

Analyte	LB2 Result	LB2 Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dichlorobenzene	ND		0.040		mg/L		07/29/22 09:26	08/01/22 18:13	1
2,4-Dinitrotoluene	ND		0.020		mg/L		07/29/22 09:26	08/01/22 18:13	1
2,4,5-Trichlorophenol	ND		0.020		mg/L		07/29/22 09:26	08/01/22 18:13	1
2,4,6-Trichlorophenol	ND		0.020		mg/L		07/29/22 09:26	08/01/22 18:13	1
2-Methylphenol	ND		0.020		mg/L		07/29/22 09:26	08/01/22 18:13	1
3-Methylphenol	ND		0.040		mg/L		07/29/22 09:26	08/01/22 18:13	1
4-Methylphenol	ND		0.040		mg/L		07/29/22 09:26	08/01/22 18:13	1
Hexachlorobenzene	ND		0.020		mg/L		07/29/22 09:26	08/01/22 18:13	1
Hexachlorobutadiene	ND		0.020		mg/L		07/29/22 09:26	08/01/22 18:13	1
Hexachloroethane	ND		0.020		mg/L		07/29/22 09:26	08/01/22 18:13	1
Nitrobenzene	ND		0.020		mg/L		07/29/22 09:26	08/01/22 18:13	1
Pentachlorophenol	ND		0.040		mg/L		07/29/22 09:26	08/01/22 18:13	1
Pyridine	ND		0.10		mg/L		07/29/22 09:26	08/01/22 18:13	1

Surrogate	*LB2 %Recovery*	*LB2 Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*71*		*41 - 120*	*07/29/22 09:26*	*08/01/22 18:13*	*1*
2-Fluorobiphenyl (Surr)	*68*		*48 - 120*	*07/29/22 09:26*	*08/01/22 18:13*	*1*
2-Fluorophenol (Surr)	*36*		*35 - 120*	*07/29/22 09:26*	*08/01/22 18:13*	*1*
Nitrobenzene-d5 (Surr)	*64*		*46 - 120*	*07/29/22 09:26*	*08/01/22 18:13*	*1*
p-Terphenyl-d14 (Surr)	*102*		*60 - 148*	*07/29/22 09:26*	*08/01/22 18:13*	*1*
Phenol-d5 (Surr)	*28*		*22 - 120*	*07/29/22 09:26*	*08/01/22 18:13*	*1*

Lab Sample ID: LB 480-635828/1-B
Matrix: Solid
Analysis Batch: 636514

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 635974

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dichlorobenzene	ND		0.040		mg/L		08/03/22 09:34	08/08/22 21:29	1
2,4-Dinitrotoluene	ND		0.020		mg/L		08/03/22 09:34	08/08/22 21:29	1
2,4,5-Trichlorophenol	ND		0.020		mg/L		08/03/22 09:34	08/08/22 21:29	1
2,4,6-Trichlorophenol	ND		0.020		mg/L		08/03/22 09:34	08/08/22 21:29	1
2-Methylphenol	ND		0.020		mg/L		08/03/22 09:34	08/08/22 21:29	1
3-Methylphenol	ND		0.040		mg/L		08/03/22 09:34	08/08/22 21:29	1
4-Methylphenol	ND		0.040		mg/L		08/03/22 09:34	08/08/22 21:29	1
Hexachlorobenzene	ND		0.020		mg/L		08/03/22 09:34	08/08/22 21:29	1
Hexachlorobutadiene	ND		0.020		mg/L		08/03/22 09:34	08/08/22 21:29	1
Hexachloroethane	ND		0.020		mg/L		08/03/22 09:34	08/08/22 21:29	1
Nitrobenzene	ND		0.020		mg/L		08/03/22 09:34	08/08/22 21:29	1
Pentachlorophenol	ND		0.040		mg/L		08/03/22 09:34	08/08/22 21:29	1
Pyridine	ND		0.10		mg/L		08/03/22 09:34	08/08/22 21:29	1

Surrogate	*LB %Recovery*	*LB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*88*		*41 - 120*	*08/03/22 09:34*	*08/08/22 21:29*	*1*
2-Fluorobiphenyl (Surr)	*93*		*48 - 120*	*08/03/22 09:34*	*08/08/22 21:29*	*1*
2-Fluorophenol (Surr)	*56*		*35 - 120*	*08/03/22 09:34*	*08/08/22 21:29*	*1*
Nitrobenzene-d5 (Surr)	*91*		*46 - 120*	*08/03/22 09:34*	*08/08/22 21:29*	*1*
p-Terphenyl-d14 (Surr)	*108*		*60 - 148*	*08/03/22 09:34*	*08/08/22 21:29*	*1*
Phenol-d5 (Surr)	*43*		*22 - 120*	*08/03/22 09:34*	*08/08/22 21:29*	*1*

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 480-634539/1-A
Matrix: Solid
Analysis Batch: 634680

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 634539

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.22		mg/Kg		07/22/22 09:03	07/24/22 19:43	1
PCB-1221	ND		0.22		mg/Kg		07/22/22 09:03	07/24/22 19:43	1
PCB-1232	ND		0.22		mg/Kg		07/22/22 09:03	07/24/22 19:43	1
PCB-1242	ND		0.22		mg/Kg		07/22/22 09:03	07/24/22 19:43	1
PCB-1248	ND		0.22		mg/Kg		07/22/22 09:03	07/24/22 19:43	1
PCB-1254	ND		0.22		mg/Kg		07/22/22 09:03	07/24/22 19:43	1
PCB-1260	ND		0.22		mg/Kg		07/22/22 09:03	07/24/22 19:43	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*128*		*60 - 154*	*07/22/22 09:03*	*07/24/22 19:43*	*1*
Tetrachloro-m-xylene	*118*		*60 - 154*	*07/22/22 09:03*	*07/24/22 19:43*	*1*
DCB Decachlorobiphenyl	*87*		*65 - 174*	*07/22/22 09:03*	*07/24/22 19:43*	*1*
DCB Decachlorobiphenyl	*88*		*65 - 174*	*07/22/22 09:03*	*07/24/22 19:43*	*1*

Lab Sample ID: LCS 480-634539/2-A
Matrix: Solid
Analysis Batch: 634680

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 634539

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
PCB-1016			2.07	2.33		mg/Kg		113	51 - 185		
PCB-1260			2.07	2.20		mg/Kg		106	61 - 184		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Tetrachloro-m-xylene	*135*		*60 - 154*
Tetrachloro-m-xylene	*125*		*60 - 154*
DCB Decachlorobiphenyl	*95*		*65 - 174*
DCB Decachlorobiphenyl	*102*		*65 - 174*

Method: 6010C - Metals (ICP)

Lab Sample ID: MB 480-634888/2-A
Matrix: Solid
Analysis Batch: 635183

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 634888

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.015		mg/L		07/26/22 11:22	07/27/22 12:09	1
Barium	ND		1.0		mg/L		07/26/22 11:22	07/27/22 12:09	1
Cadmium	ND		0.0020		mg/L		07/26/22 11:22	07/27/22 12:09	1
Chromium	ND		0.020		mg/L		07/26/22 11:22	07/27/22 12:09	1
Lead	ND		0.020		mg/L		07/26/22 11:22	07/27/22 12:09	1
Selenium	ND		0.025		mg/L		07/26/22 11:22	07/27/22 12:09	1
Silver	ND		0.0060		mg/L		07/26/22 11:22	07/27/22 12:09	1

Method: 6010C - Metals (ICP) (Continued)

Lab Sample ID: LCS 480-634888/3-A
Matrix: Solid
Analysis Batch: 635183

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 634888

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Arsenic	1.00	0.986		mg/L		99	80 - 120
Barium	1.00	0.883	J	mg/L		88	80 - 120
Cadmium	1.00	0.938		mg/L		94	80 - 120
Chromium	1.00	0.903		mg/L		90	80 - 120
Lead	1.00	0.938		mg/L		94	80 - 120
Selenium	1.00	0.978		mg/L		98	80 - 120
Silver	1.00	0.926		mg/L		93	80 - 120

Lab Sample ID: MB 480-634892/2-A
Matrix: Solid
Analysis Batch: 635040

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 634892

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.015		mg/L		07/26/22 11:22	07/27/22 03:47	1
Barium	ND		1.0		mg/L		07/26/22 11:22	07/27/22 03:47	1
Cadmium	ND		0.0020		mg/L		07/26/22 11:22	07/27/22 03:47	1
Chromium	ND		0.020		mg/L		07/26/22 11:22	07/27/22 03:47	1
Lead	ND		0.020		mg/L		07/26/22 11:22	07/27/22 03:47	1
Selenium	ND		0.025		mg/L		07/26/22 11:22	07/27/22 03:47	1
Silver	ND		0.0060		mg/L		07/26/22 11:22	07/27/22 03:47	1

Lab Sample ID: LCS 480-634892/3-A
Matrix: Solid
Analysis Batch: 635040

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 634892

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Arsenic	1.00	0.921		mg/L		92	80 - 120
Barium	1.00	0.925	J	mg/L		92	80 - 120
Cadmium	1.00	0.910		mg/L		91	80 - 120
Chromium	1.00	0.939		mg/L		94	80 - 120
Lead	1.00	0.872		mg/L		87	80 - 120
Selenium	1.00	0.938		mg/L		94	80 - 120
Silver	1.00	0.900		mg/L		90	80 - 120

Lab Sample ID: LB 480-634721/1-B
Matrix: Solid
Analysis Batch: 635183

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 634888

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.015		mg/L		07/26/22 11:22	07/27/22 12:05	1
Barium	ND		1.0		mg/L		07/26/22 11:22	07/27/22 12:05	1
Cadmium	ND		0.0020		mg/L		07/26/22 11:22	07/27/22 12:05	1
Chromium	ND		0.020		mg/L		07/26/22 11:22	07/27/22 12:05	1
Lead	ND		0.020		mg/L		07/26/22 11:22	07/27/22 12:05	1
Selenium	ND		0.025		mg/L		07/26/22 11:22	07/27/22 12:05	1
Silver	ND		0.0060		mg/L		07/26/22 11:22	07/27/22 12:05	1

Method: 6010C - Metals (ICP) (Continued)

Lab Sample ID: LB2 480-634779/1-B
Matrix: Solid
Analysis Batch: 635040

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 634892

Analyte	LB2 Result	LB2 Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.015		mg/L		07/26/22 11:22	07/27/22 03:43	1
Barium	ND		1.0		mg/L		07/26/22 11:22	07/27/22 03:43	1
Cadmium	ND		0.0020		mg/L		07/26/22 11:22	07/27/22 03:43	1
Chromium	ND		0.020		mg/L		07/26/22 11:22	07/27/22 03:43	1
Lead	ND		0.020		mg/L		07/26/22 11:22	07/27/22 03:43	1
Selenium	ND		0.025		mg/L		07/26/22 11:22	07/27/22 03:43	1
Silver	ND		0.0060		mg/L		07/26/22 11:22	07/27/22 03:43	1

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 480-634966/2-A
Matrix: Solid
Analysis Batch: 635187

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 634966

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00020		mg/L		07/27/22 10:23	07/27/22 14:52	1

Lab Sample ID: LCS 480-634966/3-A
Matrix: Solid
Analysis Batch: 635187

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 634966

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	0.00678	0.00542		mg/L		80	80 - 120

Lab Sample ID: MB 480-634967/2-A
Matrix: Solid
Analysis Batch: 635187

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 634967

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00020		mg/L		07/27/22 10:23	07/27/22 15:05	1

Lab Sample ID: LCS 480-634967/3-A
Matrix: Solid
Analysis Batch: 635187

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 634967

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	0.00678	0.00600		mg/L		89	80 - 120

Lab Sample ID: LB2 480-634779/1-D
Matrix: Solid
Analysis Batch: 635187

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 634966

Analyte	LB2 Result	LB2 Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00020		mg/L		07/27/22 10:23	07/27/22 14:51	1

Method: 7470A - Mercury (CVAA) (Continued)

Lab Sample ID: LB 480-634721/1-D
Matrix: Solid
Analysis Batch: 635187

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 634967

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00020		mg/L		07/27/22 10:23	07/27/22 15:01	1

GC/MS VOA

Leach Batch: 634728

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-199965-10	H067-EX1-COMP	TCLP	Solid	1311	
480-199965-16	H067-EX2-COMP	TCLP	Solid	1311	
LB 480-634728/1-A	Method Blank	TCLP	Solid	1311	

Analysis Batch: 634938

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-199965-10	H067-EX1-COMP	TCLP	Solid	8260C	634728
480-199965-16	H067-EX2-COMP	TCLP	Solid	8260C	634728
LB 480-634728/1-A	Method Blank	TCLP	Solid	8260C	634728
MB 480-634938/8	Method Blank	Total/NA	Solid	8260C	
LCS 480-634938/6	Lab Control Sample	Total/NA	Solid	8260C	

GC/MS Semi VOA

Leach Batch: 634779

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-199965-10	H067-EX1-COMP	TCLP	Solid	1311	
LB2 480-634779/1-E	Method Blank	TCLP	Solid	1311	

Prep Batch: 635440

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-199965-10	H067-EX1-COMP	TCLP	Solid	3510C	634779
LB2 480-634779/1-E	Method Blank	TCLP	Solid	3510C	634779
MB 480-635440/1-A	Method Blank	Total/NA	Solid	3510C	
LCS 480-635440/2-A	Lab Control Sample	Total/NA	Solid	3510C	

Analysis Batch: 635692

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-199965-10	H067-EX1-COMP	TCLP	Solid	8270D	635440
LB2 480-634779/1-E	Method Blank	TCLP	Solid	8270D	635440
MB 480-635440/1-A	Method Blank	Total/NA	Solid	8270D	635440
LCS 480-635440/2-A	Lab Control Sample	Total/NA	Solid	8270D	635440

Leach Batch: 635828

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-199965-16	H067-EX2-COMP	TCLP	Solid	1311	
LB 480-635828/1-B	Method Blank	TCLP	Solid	1311	

Prep Batch: 635974

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-199965-16	H067-EX2-COMP	TCLP	Solid	3510C	635828
LB 480-635828/1-B	Method Blank	TCLP	Solid	3510C	635828
MB 480-635974/1-A	Method Blank	Total/NA	Solid	3510C	
LCS 480-635974/2-A	Lab Control Sample	Total/NA	Solid	3510C	
LCSD 480-635974/3-A	Lab Control Sample Dup	Total/NA	Solid	3510C	

Analysis Batch: 636514

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-199965-16	H067-EX2-COMP	TCLP	Solid	8270D	635974
LB 480-635828/1-B	Method Blank	TCLP	Solid	8270D	635974
MB 480-635974/1-A	Method Blank	Total/NA	Solid	8270D	635974

GC/MS Semi VOA (Continued)

Analysis Batch: 636514 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 480-635974/2-A	Lab Control Sample	Total/NA	Solid	8270D	635974
LCSD 480-635974/3-A	Lab Control Sample Dup	Total/NA	Solid	8270D	635974

GC Semi VOA

Prep Batch: 634539

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-199965-10	H067-EX1-COMP	Total/NA	Solid	3550C	
480-199965-16	H067-EX2-COMP	Total/NA	Solid	3550C	
MB 480-634539/1-A	Method Blank	Total/NA	Solid	3550C	
LCS 480-634539/2-A	Lab Control Sample	Total/NA	Solid	3550C	

Analysis Batch: 634680

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-199965-10	H067-EX1-COMP	Total/NA	Solid	8082A	634539
480-199965-16	H067-EX2-COMP	Total/NA	Solid	8082A	634539
MB 480-634539/1-A	Method Blank	Total/NA	Solid	8082A	634539
LCS 480-634539/2-A	Lab Control Sample	Total/NA	Solid	8082A	634539

Metals

Leach Batch: 634721

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-199965-16	H067-EX2-COMP	TCLP	Solid	1311	
LB 480-634721/1-B	Method Blank	TCLP	Solid	1311	
LB 480-634721/1-D	Method Blank	TCLP	Solid	1311	

Leach Batch: 634779

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-199965-10	H067-EX1-COMP	TCLP	Solid	1311	
LB2 480-634779/1-B	Method Blank	TCLP	Solid	1311	
LB2 480-634779/1-D	Method Blank	TCLP	Solid	1311	

Prep Batch: 634888

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-199965-16	H067-EX2-COMP	TCLP	Solid	3010A	634721
LB 480-634721/1-B	Method Blank	TCLP	Solid	3010A	634721
MB 480-634888/2-A	Method Blank	Total/NA	Solid	3010A	
LCS 480-634888/3-A	Lab Control Sample	Total/NA	Solid	3010A	

Prep Batch: 634892

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-199965-10	H067-EX1-COMP	TCLP	Solid	3010A	634779
LB2 480-634779/1-B	Method Blank	TCLP	Solid	3010A	634779
MB 480-634892/2-A	Method Blank	Total/NA	Solid	3010A	
LCS 480-634892/3-A	Lab Control Sample	Total/NA	Solid	3010A	

Prep Batch: 634966

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-199965-10	H067-EX1-COMP	TCLP	Solid	7470A	634779
LB2 480-634779/1-D	Method Blank	TCLP	Solid	7470A	634779
MB 480-634966/2-A	Method Blank	Total/NA	Solid	7470A	

Metals (Continued)

Prep Batch: 634966 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 480-634966/3-A	Lab Control Sample	Total/NA	Solid	7470A	

Prep Batch: 634967

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-199965-16	H067-EX2-COMP	TCLP	Solid	7470A	634721
LB 480-634721/1-D	Method Blank	TCLP	Solid	7470A	634721
MB 480-634967/2-A	Method Blank	Total/NA	Solid	7470A	
LCS 480-634967/3-A	Lab Control Sample	Total/NA	Solid	7470A	

Analysis Batch: 635040

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-199965-10	H067-EX1-COMP	TCLP	Solid	6010C	634892
LB2 480-634779/1-B	Method Blank	TCLP	Solid	6010C	634892
MB 480-634892/2-A	Method Blank	Total/NA	Solid	6010C	634892
LCS 480-634892/3-A	Lab Control Sample	Total/NA	Solid	6010C	634892

Analysis Batch: 635183

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-199965-16	H067-EX2-COMP	TCLP	Solid	6010C	634888
LB 480-634721/1-B	Method Blank	TCLP	Solid	6010C	634888
MB 480-634888/2-A	Method Blank	Total/NA	Solid	6010C	634888
LCS 480-634888/3-A	Lab Control Sample	Total/NA	Solid	6010C	634888

Analysis Batch: 635187

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-199965-10	H067-EX1-COMP	TCLP	Solid	7470A	634966
480-199965-16	H067-EX2-COMP	TCLP	Solid	7470A	634967
LB 480-634721/1-D	Method Blank	TCLP	Solid	7470A	634967
LB2 480-634779/1-D	Method Blank	TCLP	Solid	7470A	634966
MB 480-634966/2-A	Method Blank	Total/NA	Solid	7470A	634966
MB 480-634967/2-A	Method Blank	Total/NA	Solid	7470A	634967
LCS 480-634966/3-A	Lab Control Sample	Total/NA	Solid	7470A	634966
LCS 480-634967/3-A	Lab Control Sample	Total/NA	Solid	7470A	634967

General Chemistry

Analysis Batch: 634392

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-199965-10	H067-EX1-COMP	Total/NA	Solid	Moisture	
480-199965-16	H067-EX2-COMP	Total/NA	Solid	Moisture	

Client Sample ID: H067-EX1-COMP
Lab Sample ID: 480-199965-10

Date Collected: 07/19/22 12:20
Matrix: Solid
Date Received: 07/20/22 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
TCLP	Leach	1311			634728	BML	EETNE BUF	07/25/22 10:20 - 07/26/22 11:48 [1]
TCLP	Analysis	8260C		10	634938	CB	EETNE BUF	07/27/22 06:18
TCLP	Leach	1311			634779	BML	EETNE BUF	07/25/22 13:45 - 07/26/22 10:29 [1]
TCLP	Prep	3510C			635440	JMP	EETNE BUF	07/29/22 09:26
TCLP	Analysis	8270D		1	635692	PJQ	EETNE BUF	08/01/22 19:27
TCLP	Leach	1311			634779	BML	EETNE BUF	07/25/22 13:45 - 07/26/22 10:29 [1]
TCLP	Prep	3010A			634892	NVK	EETNE BUF	07/26/22 11:22
TCLP	Analysis	6010C		1	635040	LMH	EETNE BUF	07/27/22 03:55
TCLP	Leach	1311			634779	BML	EETNE BUF	07/25/22 13:45 - 07/26/22 10:29 [1]
TCLP	Prep	7470A			634966	NVK	EETNE BUF	07/27/22 10:23
TCLP	Analysis	7470A		1	635187	NVK	EETNE BUF	07/27/22 14:54
Total/NA	Analysis	Moisture		1	634392	CMK	EETNE BUF	07/21/22 10:56

Client Sample ID: H067-EX1-COMP
Lab Sample ID: 480-199965-10

Date Collected: 07/19/22 12:20
Matrix: Solid
Date Received: 07/20/22 10:00
Percent Solids: 78.7

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	3550C			634539	JMP	EETNE BUF	07/22/22 09:03
Total/NA	Analysis	8082A		1	634680	NC	EETNE BUF	07/24/22 21:16

Client Sample ID: H067-EX2-COMP
Lab Sample ID: 480-199965-16

Date Collected: 07/19/22 15:00
Matrix: Solid
Date Received: 07/20/22 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
TCLP	Leach	1311			634728	BML	EETNE BUF	07/25/22 10:20 - 07/26/22 11:48 [1]
TCLP	Analysis	8260C		10	634938	CB	EETNE BUF	07/27/22 06:42
TCLP	Leach	1311			635828	BML	EETNE BUF	08/02/22 12:29 - 08/03/22 08:58 [1]
TCLP	Prep	3510C			635974	JMP	EETNE BUF	08/03/22 09:34
TCLP	Analysis	8270D		1	636514	PJQ	EETNE BUF	08/08/22 21:53
TCLP	Leach	1311			634721	BML	EETNE BUF	07/25/22 09:37 - 07/26/22 10:31 [1]
TCLP	Prep	3010A			634888	NVK	EETNE BUF	07/26/22 11:22
TCLP	Analysis	6010C		1	635183	LMH	EETNE BUF	07/27/22 13:00
TCLP	Leach	1311			634721	BML	EETNE BUF	07/25/22 09:37 - 07/26/22 10:31 [1]
TCLP	Prep	7470A			634967	NVK	EETNE BUF	07/27/22 10:23
TCLP	Analysis	7470A		1	635187	NVK	EETNE BUF	07/27/22 15:17
Total/NA	Analysis	Moisture		1	634392	CMK	EETNE BUF	07/21/22 10:56

Client Sample ID: H067-EX2-COMP
Lab Sample ID: 480-199965-16

Date Collected: 07/19/22 15:00
Matrix: Solid
Date Received: 07/20/22 10:00
Percent Solids: 76.3

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	3550C			634539	JMP	EETNE BUF	07/22/22 09:03
Total/NA	Analysis	8082A		1	634680	NC	EETNE BUF	07/24/22 21:29

Lab Chronicle

Client: ARCADIS U.S. Inc
Job ID: 480-199965-1
Project/Site: GTEOSI - Seneca Falls

[1] Completion dates and times are reported or not reported per method requirements or individual lab discretion.

Laboratory References:

EETNE BUF = Eurofins Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

Accreditation/Certification Summary

Client: ARCADIS U.S. Inc
Job ID: 480-199965-1
Project/Site: GTEOSI - Seneca Falls

Laboratory: Eurofins Buffalo

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
New York	NELAP	10026	03-31-23

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
7470A	7470A	Solid	Mercury
Moisture		Solid	Percent Moisture
Moisture		Solid	Percent Solids

Method Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-199965-1

Method	Method Description	Protocol	Laboratory
8260C	Volatile Organic Compounds by GC/MS	SW846	EETNE BUF
8270D	Semivolatile Organic Compounds (GC/MS)	SW846	EETNE BUF
8082A	Polychlorinated Biphenyls (PCBs) by Gas Chromatography	SW846	EETNE BUF
6010C	Metals (ICP)	SW846	EETNE BUF
7470A	Mercury (CVAA)	SW846	EETNE BUF
Moisture	Percent Moisture	EPA	EETNE BUF
1311	TCLP Extraction	SW846	EETNE BUF
3010A	Preparation, Total Metals	SW846	EETNE BUF
3510C	Liquid-Liquid Extraction (Separatory Funnel)	SW846	EETNE BUF
3550C	Ultrasonic Extraction	SW846	EETNE BUF
5030C	Purge and Trap	SW846	EETNE BUF
7470A	Preparation, Mercury	SW846	EETNE BUF

Protocol References:

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EETNE BUF = Eurofins Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

Sample Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-199965-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
480-199965-10	H067-EX1-COMP	Solid	07/19/22 12:20	07/20/22 10:00
480-199965-16	H067-EX2-COMP	Solid	07/19/22 15:00	07/20/22 10:00

Eurofins TestAmerica, Buffalo
10 Hazelwood Drive

Amherst, NY 14228-2223
phone 716.691.2600 fax 716.691.7991

Chain of Custody Record

eurofins Environment Testing America

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc. d/b/a Eurofins TestAmerica

Client Contact	**Project Manager: Mark Flusche**		COC No: 4
Company: Arcadis of New York, Inc.	**Email: mark.flusche@arcadis.com**	**Site Contact: Ryan Clare**	**Date:** 7-19-22 — 1 of 2 COCs
Address: 855 Route 146 Suite 210	**Tel: 518-250-7322**	**Lab Contact: Schove, John R**	**Carrier:** — TALS Project #:
Clifton Park, NY 12065	**Analysis Turnaround Time** ☐ CALENDAR DAYS ☐ WORKING DAYS		Sampler:
	TAT if different from Below ☑ 2 weeks ☐ 1 week ☐ 2 days ☐ 1 day		**For Lab Use Only:**
Project Name: GTEOSI - Seneca Falls			
Site:			
PO #: 30112357.00055 Project #:			

480-199965 Chain of Custody

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	TCLP VOCs	TCLP SVOCs	TCLP Metals	PCBs - Total Pesticides / herbicides	HOLD at Lab	Total VOCs	Total SVOCs	TCLP Metals	Sample Specific Notes:
H067-EX1-01	7/18 /22	1450	G	Soil	3							✓	X	X	X	HOLD
H067-EX1-02	7/18 /22	1505	G	Soil	3							✓	X	X	X	HOLD
H067-EX1-03	7/18 /22	1520	G	Soil	3							✓	X	X	X	HOLD
H067-EX1-04	7/19 /22	1010	G	Soil	3							✓	X	X	X	HOLD
H067-EX1-05	7/18 /22	1600	G	Soil	3							✓	X	X	X	HOLD
H067-EX1-06	7/19 /22	1110	G	Soil	3							✓	X	X	X	HOLD
H067-EX1-07	7/19 /22	1130	G	Soil	3							✓	X	X	X	HOLD
H067-EX1-08	7/19 /22	1150	G	Soil	3							✓	X	X	X	HOLD
H067-EX1-09	7/19 /22	1200	G	Soil	3							✓	X	X	X	HOLD
H067-EX1-COMP	7/19 /22	1220	C	Soil	5			X	X	X	X	X				
	~~/22~~			~~Soil~~												
	~~/22~~			~~Soil~~												
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other								1	1	1	1		1	1	1	

Syracuse #225

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☑ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☑ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:

28 #1 ICE

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:		Cooler Temp. (°C): Obs'd:	Corr'd:	Therm ID No.:
Relinquished by: Dan Gillo	Company: Arcadis	Date/Time: 7/19/22 1776	Received by: Reinlik	Company: Eya	Date/Time: 7-19-22, 17:26
Relinquished by: Reinlik	Company: Eya 7-19-22 1900	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by: [illegible] 1400	Company: TA	Date/Time: 7/20/22 1000

Form No. CA-C-WI-002, Rev. 4.34, dated 8/3/2020

Eurofins TestAmerica, Buffalo
10 Hazelwood Drive

Amherst, NY 14228-2223
phone 716.691.2600 fax 716.691 7991

Chain of Custody Record

eurofins Environment Testing America

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc. d/b/a Eurofins TestAmerica

Client Contact	**Project Manager: Mark Flusche**		COC No: 4
Company: Arcadis of New York, Inc.	Email: mark.flusche@arcadis.com	Site Contact: Ryan Clare	Date: 7-19-22	2 of 2 COCs
Address: 855 Route 146 Suite 210	Tel: 518-250-7322	Lab Contact: Schove, John R	Carrier:	TALS Project #:
Clifton Park, NY 12065	**Analysis Turnaround Time**			Sampler:
	☐ CALENDAR DAYS ☐ WORKING DAYS			**For Lab Use Only:**
	TAT if different from Below _____			Walk-in Client:
	☑ 2 weeks			Lab Sampling:
Project Name: GTEOSI - Seneca Falls	☐ 1 week			
Site:	☐ 2 days			Job / SDG No.:
PO #: 30112357.00055 Project #:	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	TCLP VOCs	TCLP SVOCs	TCLP Metals	PCBs - Total	Pesticides/Herbicides	HOLD at Lab	Total VOCs	Total SVOCs	TCLP Metals	Sample Specific Notes:
HOG7-EX2-01	7/19/22	1300	G	Soil	3								✓	X	X	X	HOLD
HOG7-EX2-02	7/19/22	1315	G	Soil	3								✓	X	X	X	HOLD
HOG7-EX2-03	7/19/22	1345	G	Soil	3								✓	X	X	X	HOLD
HOG7-EX2-04	7/19/22	1400	G	Soil	3								✓	X	X	X	HOLD
HOG7-EX2-05	7/19/22	1440	G	Soil	3								✓	X	X	X	HOLD
HOG7-EX2-comp	7/19/22	1500	C	Soil	5			X	X	X	X	X				1	
	/22			Soil													
	/22			Soil													
	/22			Soil													
	/22			Soil													
	/22			Soil													
	/22			Soil													
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____								1	1	1	1			1	1	1	

Syracuse #225

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☑ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☑ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:		Cooler Temp. (°C): Obs'd: _____ Corr'd: _____ Therm ID No.: _____		
Relinquished by: Dan Mus	Company: Arcadis	Date/Time: 7/19/22 1926	Received by: English	Company: Syr	Date/Time: 7-19-22, 17:26
Relinquished by: English	Company: Syr 7-19-22, 1940	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by: PGI	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.34, dated 8/3/2020

8/10/2022

Login Sample Receipt Checklist

Client: ARCADIS U.S. Inc

Job Number: 480-199965-1

Login Number: 199965
List Number: 1
Creator: Kolb, Chris M

List Source: Eurofins Buffalo

Question	Answer	Comment
Radioactivity either was not measured or, if measured, is at or below background	True	
The cooler's custody seal, if present, is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time (Excluding tests with immediate HTs)..	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	N/A	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Sampling Company provided.	True	ARCADIS
Samples received within 48 hours of sampling.	True	
Samples requiring field filtration have been filtered in the field.	True	
Chlorine Residual checked.	N/A	

eurofins | Environment Testing America



ANALYTICAL REPORT

Eurofins Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Tel: (716)691-2600

Laboratory Job ID: 480-199965-3
Client Project/Site: GTEOSI - Seneca Falls

For:
ARCADIS U.S. Inc
855 Route 146
Suite 210
Clifton Park, New York 12065

Attn: Mark Flusche

Authorized for release by:
8/8/2022 5:07:42 PM
Judy Stone, Senior Project Manager
(484)685-0868
Judy.Stone@et.eurofinsus.com

Designee for

John Schove, Project Manager II
(716)504-9838
John.Schove@et.eurofinsus.com

LINKS

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The test results in this report meet all 2003 NELAC, 2009 TNI, and 2016 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Cover Page 1
Table of Contents 2
Definitions/Glossary 3
Case Narrative 4
Detection Summary 5
Client Sample Results 6
Surrogate Summary 8
QC Sample Results 9
QC Association Summary 12
Lab Chronicle 13
Certification Summary 14
Method Summary 15
Sample Summary 16
Chain of Custody 17
Receipt Checklists 19

Definitions/Glossary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-199965-3

Qualifiers

GC Semi VOA

Qualifier	Qualifier Description
S1-	Surrogate recovery exceeds control limits, low biased.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 480-199965-3

Laboratory: Eurofins Buffalo

Narrative

Job Narrative
480-199965-3

Comments
No additional comments.

Receipt
The samples were received on 7/20/2022 10:00 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 2.8º C.

Receipt Exceptions
The following samples were put on hold by the client on 7/21/22: H067-EX1-COMP (480-199965-10) and H067-EX2-COMP (480-199965-16). These were activated for the reported tests on 8/1/22.

GC Semi VOA
Method 8151A: Surrogate recoveries for the following samples were outside control limits: H067-EX1-COMP (480-199965-10), H067-EX2-COMP (480-199965-16), (LB 480-634721/1-G) and (LB2 480-634779/1-G). This is routine for TCLP herbicides, due to the pH effects created during the leaching process, inhibiting the herbicide derivatization of the free acid components.

Method 8151A: The continuing calibration verification (CCV) associated with batch 480-635969 recovered above the upper control limit for 2,4-D. The samples associated with this CCV were non-detects for the affected analyte; therefore, the data have been reported. The associated samples are impacted: H067-EX1-COMP (480-199965-10) and H067-EX2-COMP (480-199965-16).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Organic Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Detection Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-199965-3

Client Sample ID: H067-EX1-COMP — Lab Sample ID: 480-199965-10

No Detections.

Client Sample ID: H067-EX2-COMP — Lab Sample ID: 480-199965-16

No Detections.

This Detection Summary does not include radiochemical test results.

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-199965-3

Client Sample ID: H067-EX1-COMP
Date Collected: 07/19/22 12:20
Date Received: 07/20/22 10:00

Lab Sample ID: 480-199965-10
Matrix: Solid

Method: 8081B - Organochlorine Pesticides (GC) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
gamma-BHC (Lindane)	ND		0.00020		mg/L		08/01/22 15:07	08/02/22 12:29	1
Chlordane (technical)	ND		0.0020		mg/L		08/01/22 15:07	08/02/22 12:29	1
Endrin	ND		0.00020		mg/L		08/01/22 15:07	08/02/22 12:29	1
Heptachlor	ND		0.00020		mg/L		08/01/22 15:07	08/02/22 12:29	1
Heptachlor epoxide	ND		0.00020		mg/L		08/01/22 15:07	08/02/22 12:29	1
Methoxychlor	ND		0.00020		mg/L		08/01/22 15:07	08/02/22 12:29	1
Toxaphene	ND		0.0020		mg/L		08/01/22 15:07	08/02/22 12:29	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl	*93*		*20 - 120*	*08/01/22 15:07*	*08/02/22 12:29*	*1*
DCB Decachlorobiphenyl	*94*		*20 - 120*	*08/01/22 15:07*	*08/02/22 12:29*	*1*
Tetrachloro-m-xylene	*83*		*44 - 120*	*08/01/22 15:07*	*08/02/22 12:29*	*1*
Tetrachloro-m-xylene	*82*		*44 - 120*	*08/01/22 15:07*	*08/02/22 12:29*	*1*

Method: 8151 - TCLP Herbicides - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silvex (2,4,5-TP)	ND		0.0020		mg/L		08/02/22 09:06	08/03/22 22:07	1
2,4-D	ND		0.0020		mg/L		08/02/22 09:06	08/03/22 22:07	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*23*	*S1-*	*48 - 132*	*08/02/22 09:06*	*08/03/22 22:07*	*1*
2,4-Dichlorophenylacetic acid	*22*	*S1-*	*48 - 132*	*08/02/22 09:06*	*08/03/22 22:07*	*1*

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-199965-3

Client Sample ID: H067-EX2-COMP
Date Collected: 07/19/22 15:00
Date Received: 07/20/22 10:00

Lab Sample ID: 480-199965-16
Matrix: Solid

Method: 8081B - Organochlorine Pesticides (GC) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
gamma-BHC (Lindane)	ND		0.00020		mg/L		08/01/22 15:07	08/02/22 12:48	1
Chlordane (technical)	ND		0.0020		mg/L		08/01/22 15:07	08/02/22 12:48	1
Endrin	ND		0.00020		mg/L		08/01/22 15:07	08/02/22 12:48	1
Heptachlor	ND		0.00020		mg/L		08/01/22 15:07	08/02/22 12:48	1
Heptachlor epoxide	ND		0.00020		mg/L		08/01/22 15:07	08/02/22 12:48	1
Methoxychlor	ND		0.00020		mg/L		08/01/22 15:07	08/02/22 12:48	1
Toxaphene	ND		0.0020		mg/L		08/01/22 15:07	08/02/22 12:48	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl	*87*		*20 - 120*	*08/01/22 15:07*	*08/02/22 12:48*	*1*
DCB Decachlorobiphenyl	*87*		*20 - 120*	*08/01/22 15:07*	*08/02/22 12:48*	*1*
Tetrachloro-m-xylene	*79*		*44 - 120*	*08/01/22 15:07*	*08/02/22 12:48*	*1*
Tetrachloro-m-xylene	*77*		*44 - 120*	*08/01/22 15:07*	*08/02/22 12:48*	*1*

Method: 8151 - TCLP Herbicides - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silvex (2,4,5-TP)	ND		0.0021		mg/L		08/02/22 09:06	08/03/22 22:37	1
2,4-D	ND		0.0021		mg/L		08/02/22 09:06	08/03/22 22:37	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*17*	*S1-*	*48 - 132*	*08/02/22 09:06*	*08/03/22 22:37*	*1*
2,4-Dichlorophenylacetic acid	*30*	*S1-*	*48 - 132*	*08/02/22 09:06*	*08/03/22 22:37*	*1*

Surrogate Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-199965-3

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCBP1	DCBP2	TCX1	TCX2
Lab Sample ID	Client Sample ID	(20-120)	(20-120)	(44-120)	(44-120)
LCS 480-635741/2-A	Lab Control Sample	53	54	74	68
MB 480-635741/1-A	Method Blank	49	49	76	67

Surrogate Legend

DCBP = DCB Decachlorobiphenyl

TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid **Prep Type: TCLP**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCBP1	DCBP2	TCX1	TCX2
Lab Sample ID	Client Sample ID	(20-120)	(20-120)	(44-120)	(44-120)
480-199965-10	H067-EX1-COMP	93	94	83	82
480-199965-16	H067-EX2-COMP	87	87	79	77
LB 480-634721/1-F	Method Blank	83	84	88	69
LB2 480-634779/1-F	Method Blank	78	79	74	72

Surrogate Legend

DCBP = DCB Decachlorobiphenyl

TCX = Tetrachloro-m-xylene

Method: 8151 - TCLP Herbicides

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCPAA1	DCPAA2
Lab Sample ID	Client Sample ID	(48-132)	(48-132)
LCS 480-635801/2-A	Lab Control Sample	120	80
MB 480-635801/1-A	Method Blank	103	84

Surrogate Legend

DCPAA = 2,4-Dichlorophenylacetic acid

Method: 8151 - TCLP Herbicides

Matrix: Solid **Prep Type: TCLP**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCPAA1	DCPAA2
Lab Sample ID	Client Sample ID	(48-132)	(48-132)
480-199965-10	H067-EX1-COMP	23 S1-	22 S1-
480-199965-16	H067-EX2-COMP	17 S1-	30 S1-
LB 480-634721/1-G	Method Blank	20 S1-	31 S1-
LB2 480-634779/1-G	Method Blank	27 S1-	28 S1-

Surrogate Legend

DCPAA = 2,4-Dichlorophenylacetic acid

Method: 8081B - Organochlorine Pesticides (GC)

Lab Sample ID: MB 480-635741/1-A
Matrix: Solid
Analysis Batch: 635787

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 635741

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
gamma-BHC (Lindane)	ND		0.000050		mg/L		08/01/22 15:07	08/02/22 09:53	1
Chlordane (technical)	ND		0.00050		mg/L		08/01/22 15:07	08/02/22 09:53	1
Endrin	ND		0.000050		mg/L		08/01/22 15:07	08/02/22 09:53	1
Heptachlor	ND		0.000050		mg/L		08/01/22 15:07	08/02/22 09:53	1
Heptachlor epoxide	ND		0.000050		mg/L		08/01/22 15:07	08/02/22 09:53	1
Methoxychlor	ND		0.000050		mg/L		08/01/22 15:07	08/02/22 09:53	1
Toxaphene	ND		0.00050		mg/L		08/01/22 15:07	08/02/22 09:53	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl	*49*		*20 - 120*	*08/01/22 15:07*	*08/02/22 09:53*	*1*
DCB Decachlorobiphenyl	*49*		*20 - 120*	*08/01/22 15:07*	*08/02/22 09:53*	*1*
Tetrachloro-m-xylene	*76*		*44 - 120*	*08/01/22 15:07*	*08/02/22 09:53*	*1*
Tetrachloro-m-xylene	*67*		*44 - 120*	*08/01/22 15:07*	*08/02/22 09:53*	*1*

Lab Sample ID: LCS 480-635741/2-A
Matrix: Solid
Analysis Batch: 635787

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 635741

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
gamma-BHC (Lindane)			0.000500	0.000454		mg/L		91	56 - 120		
Endrin			0.000500	0.000449		mg/L		90	65 - 135		
Heptachlor			0.000500	0.000446		mg/L		89	58 - 120		
Heptachlor epoxide			0.000500	0.000475		mg/L		95	65 - 125		
Methoxychlor			0.000500	0.000551		mg/L		110	50 - 150		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
DCB Decachlorobiphenyl	*53*		*20 - 120*
DCB Decachlorobiphenyl	*54*		*20 - 120*
Tetrachloro-m-xylene	*74*		*44 - 120*
Tetrachloro-m-xylene	*68*		*44 - 120*

Lab Sample ID: LB 480-634721/1-F
Matrix: Solid
Analysis Batch: 635787

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 635741

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
gamma-BHC (Lindane)	ND		0.00020		mg/L		08/01/22 15:07	08/02/22 11:30	1
Chlordane (technical)	ND		0.0020		mg/L		08/01/22 15:07	08/02/22 11:30	1
Endrin	ND		0.00020		mg/L		08/01/22 15:07	08/02/22 11:30	1
Heptachlor	ND		0.00020		mg/L		08/01/22 15:07	08/02/22 11:30	1
Heptachlor epoxide	ND		0.00020		mg/L		08/01/22 15:07	08/02/22 11:30	1
Methoxychlor	ND		0.00020		mg/L		08/01/22 15:07	08/02/22 11:30	1
Toxaphene	ND		0.0020		mg/L		08/01/22 15:07	08/02/22 11:30	1

Surrogate	*LB %Recovery*	*LB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl	*83*		*20 - 120*	*08/01/22 15:07*	*08/02/22 11:30*	*1*
DCB Decachlorobiphenyl	*84*		*20 - 120*	*08/01/22 15:07*	*08/02/22 11:30*	*1*

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: LB 480-634721/1-F
Matrix: Solid
Analysis Batch: 635787

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 635741

Surrogate	*LB %Recovery*	*LB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*88*		*44 - 120*	*08/01/22 15:07*	*08/02/22 11:30*	*1*
Tetrachloro-m-xylene	*69*		*44 - 120*	*08/01/22 15:07*	*08/02/22 11:30*	*1*

Lab Sample ID: LB2 480-634779/1-F
Matrix: Solid
Analysis Batch: 635787

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 635741

Analyte	LB2 Result	LB2 Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
gamma-BHC (Lindane)	ND		0.00020		mg/L		08/01/22 15:07	08/02/22 11:50	1
Chlordane (technical)	ND		0.0020		mg/L		08/01/22 15:07	08/02/22 11:50	1
Endrin	ND		0.00020		mg/L		08/01/22 15:07	08/02/22 11:50	1
Heptachlor	ND		0.00020		mg/L		08/01/22 15:07	08/02/22 11:50	1
Heptachlor epoxide	ND		0.00020		mg/L		08/01/22 15:07	08/02/22 11:50	1
Methoxychlor	ND		0.00020		mg/L		08/01/22 15:07	08/02/22 11:50	1
Toxaphene	ND		0.0020		mg/L		08/01/22 15:07	08/02/22 11:50	1

Surrogate	*LB2 %Recovery*	*LB2 Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl	*78*		*20 - 120*	*08/01/22 15:07*	*08/02/22 11:50*	*1*
DCB Decachlorobiphenyl	*79*		*20 - 120*	*08/01/22 15:07*	*08/02/22 11:50*	*1*
Tetrachloro-m-xylene	*74*		*44 - 120*	*08/01/22 15:07*	*08/02/22 11:50*	*1*
Tetrachloro-m-xylene	*72*		*44 - 120*	*08/01/22 15:07*	*08/02/22 11:50*	*1*

Method: 8151 - TCLP Herbicides

Lab Sample ID: MB 480-635801/1-A
Matrix: Solid
Analysis Batch: 635969

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 635801

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silvex (2,4,5-TP)	ND		0.00050		mg/L		08/02/22 09:06	08/03/22 14:12	1
2,4-D	ND		0.00050		mg/L		08/02/22 09:06	08/03/22 14:12	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*103*		*48 - 132*	*08/02/22 09:06*	*08/03/22 14:12*	*1*
2,4-Dichlorophenylacetic acid	*84*		*48 - 132*	*08/02/22 09:06*	*08/03/22 14:12*	*1*

Lab Sample ID: LCS 480-635801/2-A
Matrix: Solid
Analysis Batch: 635969

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 635801

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Silvex (2,4,5-TP)			0.00200	0.00174		mg/L		87	49 - 150		
2,4-D			0.00200	0.00180		mg/L		90	36 - 150		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2,4-Dichlorophenylacetic acid	*120*		*48 - 132*
2,4-Dichlorophenylacetic acid	*80*		*48 - 132*

Method: 8151 - TCLP Herbicides (Continued)

Lab Sample ID: LB 480-634721/1-G
Matrix: Solid
Analysis Batch: 635969

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 635801

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silvex (2,4,5-TP)	ND		0.0020		mg/L		08/02/22 09:06	08/03/22 21:08	1
2,4-D	ND		0.0020		mg/L		08/02/22 09:06	08/03/22 21:08	1

Surrogate	*LB %Recovery*	*LB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*20*	*S1-*	*48 - 132*	*08/02/22 09:06*	*08/03/22 21:08*	*1*
2,4-Dichlorophenylacetic acid	*31*	*S1-*	*48 - 132*	*08/02/22 09:06*	*08/03/22 21:08*	*1*

Lab Sample ID: LB2 480-634779/1-G
Matrix: Solid
Analysis Batch: 635969

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 635801

Analyte	LB2 Result	LB2 Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silvex (2,4,5-TP)	ND		0.0020		mg/L		08/02/22 09:06	08/03/22 21:37	1
2,4-D	ND		0.0020		mg/L		08/02/22 09:06	08/03/22 21:37	1

Surrogate	*LB2 %Recovery*	*LB2 Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*27*	*S1-*	*48 - 132*	*08/02/22 09:06*	*08/03/22 21:37*	*1*
2,4-Dichlorophenylacetic acid	*28*	*S1-*	*48 - 132*	*08/02/22 09:06*	*08/03/22 21:37*	*1*

GC Semi VOA

Leach Batch: 634721

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-199965-16	H067-EX2-COMP	TCLP	Solid	1311	
LB 480-634721/1-F	Method Blank	TCLP	Solid	1311	
LB 480-634721/1-G	Method Blank	TCLP	Solid	1311	

Leach Batch: 634779

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-199965-10	H067-EX1-COMP	TCLP	Solid	1311	
LB2 480-634779/1-F	Method Blank	TCLP	Solid	1311	
LB2 480-634779/1-G	Method Blank	TCLP	Solid	1311	

Prep Batch: 635741

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-199965-10	H067-EX1-COMP	TCLP	Solid	3510C	634779
480-199965-16	H067-EX2-COMP	TCLP	Solid	3510C	634721
LB 480-634721/1-F	Method Blank	TCLP	Solid	3510C	634721
LB2 480-634779/1-F	Method Blank	TCLP	Solid	3510C	634779
MB 480-635741/1-A	Method Blank	Total/NA	Solid	3510C	
LCS 480-635741/2-A	Lab Control Sample	Total/NA	Solid	3510C	

Analysis Batch: 635787

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-199965-10	H067-EX1-COMP	TCLP	Solid	8081B	635741
480-199965-16	H067-EX2-COMP	TCLP	Solid	8081B	635741
LB 480-634721/1-F	Method Blank	TCLP	Solid	8081B	635741
LB2 480-634779/1-F	Method Blank	TCLP	Solid	8081B	635741
MB 480-635741/1-A	Method Blank	Total/NA	Solid	8081B	635741
LCS 480-635741/2-A	Lab Control Sample	Total/NA	Solid	8081B	635741

Prep Batch: 635801

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-199965-10	H067-EX1-COMP	TCLP	Solid	8151A	634779
480-199965-16	H067-EX2-COMP	TCLP	Solid	8151A	634721
LB 480-634721/1-G	Method Blank	TCLP	Solid	8151A	634721
LB2 480-634779/1-G	Method Blank	TCLP	Solid	8151A	634779
MB 480-635801/1-A	Method Blank	Total/NA	Solid	8151A	
LCS 480-635801/2-A	Lab Control Sample	Total/NA	Solid	8151A	

Analysis Batch: 635969

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-199965-10	H067-EX1-COMP	TCLP	Solid	8151	635801
480-199965-16	H067-EX2-COMP	TCLP	Solid	8151	635801
LB 480-634721/1-G	Method Blank	TCLP	Solid	8151	635801
LB2 480-634779/1-G	Method Blank	TCLP	Solid	8151	635801
MB 480-635801/1-A	Method Blank	Total/NA	Solid	8151	635801
LCS 480-635801/2-A	Lab Control Sample	Total/NA	Solid	8151	635801

Lab Chronicle

Client: ARCADIS U.S. Inc
Job ID: 480-199965-3
Project/Site: GTEOSI - Seneca Falls

Client Sample ID: H067-EX1-COMP
Lab Sample ID: 480-199965-10
Date Collected: 07/19/22 12:20
Matrix: Solid
Date Received: 07/20/22 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
TCLP	Leach	1311			634779	07/25/22 13:45	BML	EETNE BUF
TCLP	Prep	3510C			635741	08/01/22 15:07	CMC	EETNE BUF
TCLP	Analysis	8081B		1	635787	08/02/22 12:29	JLS	EETNE BUF
TCLP	Leach	1311			634779	07/25/22 13:45	BML	EETNE BUF
TCLP	Prep	8151A			635801	08/02/22 09:06	JMP	EETNE BUF
TCLP	Analysis	8151		1	635969	08/03/22 22:07	MAN	EETNE BUF

Client Sample ID: H067-EX2-COMP
Lab Sample ID: 480-199965-16
Date Collected: 07/19/22 15:00
Matrix: Solid
Date Received: 07/20/22 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
TCLP	Leach	1311			634721	07/25/22 09:37	BML	EETNE BUF
TCLP	Prep	3510C			635741	08/01/22 15:07	CMC	EETNE BUF
TCLP	Analysis	8081B		1	635787	08/02/22 12:48	JLS	EETNE BUF
TCLP	Leach	1311			634721	07/25/22 09:37	BML	EETNE BUF
TCLP	Prep	8151A			635801	08/02/22 09:06	JMP	EETNE BUF
TCLP	Analysis	8151		1	635969	08/03/22 22:37	MAN	EETNE BUF

Laboratory References:
EETNE BUF = Eurofins Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

Accreditation/Certification Summary

Client: ARCADIS U.S. Inc
Job ID: 480-199965-3
Project/Site: GTEOSI - Seneca Falls

Laboratory: Eurofins Buffalo

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
New York	NELAP	10026	03-31-23

Method Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-199965-3

Method	Method Description	Protocol	Laboratory
8081B	Organochlorine Pesticides (GC)	SW846	EETNE BUF
8151	TCLP Herbicides	SW846	EETNE BUF
1311	TCLP Extraction	SW846	EETNE BUF
3510C	Liquid-Liquid Extraction (Separatory Funnel)	SW846	EETNE BUF
8151A	Extraction (Herbicides)	SW846	EETNE BUF

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EETNE BUF = Eurofins Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

Sample Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-199965-3

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
480-199965-10	H067-EX1-COMP	Solid	07/19/22 12:20	07/20/22 10:00
480-199965-16	H067-EX2-COMP	Solid	07/19/22 15:00	07/20/22 10:00

Eurofins TestAmerica, Buffalo
10 Hazelwood Drive

Amherst, NY 14228-2223
phone 716.691.2600 fax 716.691.7991

Chain of Custody Record

eurofins Environment Testing America

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc. d/b/a Eurofins TestAmerica

Client Contact	**Project Manager: Mark Flusche**		COC No: 4
Company: Arcadis of New York, Inc.	**Email: mark.flusche@arcadis.com**	**Site Contact: Ryan Clare**	**Date:** 7-19-22 — 1 of 2 COCs
Address: 855 Route 146 Suite 210	**Tel: 518-250-7322**	**Lab Contact: Schove, John R**	**Carrier:** — TALS Project #:
Clifton Park, NY 12065	**Analysis Turnaround Time** ☐ CALENDAR DAYS ☐ WORKING DAYS		Sampler:
	TAT if different from Below ☑ 2 weeks ☐ 1 week ☐ 2 days ☐ 1 day		**For Lab Use Only:**
Project Name: GTEOSI - Seneca Falls			
Site:			
PO #: 30112357.00055 Project #:			

480-199965 Chain of Custody

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	TCLP VOCs	TCLP SVOCs	TCLP Metals	PCBs - Total Pesticides / herbicides	HOLD at Lab	Total VOCs	Total SVOCs	TCLP Metals	Sample Specific Notes:
H067-EX1-01	7/18 /22	1450	G	Soil	3							✓	X	X	X	HOLD
H067-EX1-02	7/18 /22	1505	G	Soil	3							✓	X	X	X	HOLD
H067-EX1-03	7/18 /22	1520	G	Soil	3							✓	X	X	X	HOLD
H067-EX1-04	7/19 /22	1010	G	Soil	3							✓	X	X	X	HOLD
H067-EX1-05	7/18 /22	1600	G	Soil	3							✓	X	X	X	HOLD
H067-EX1-06	7/19 /22	1110	G	Soil	3							✓	X	X	X	HOLD
H067-EX1-07	7/19 /22	1130	G	Soil	3							✓	X	X	X	HOLD
H067-EX1-08	7/19 /22	1150	G	Soil	3							✓	X	X	X	HOLD
H067-EX1-09	7/19 /22	1200	G	Soil	3							✓	X	X	X	HOLD
H067-EX1-COMP	7/19 /22	1220	C	Soil	5			X	X	X	X	X				
	~~/22~~			~~Soil~~												
	~~/22~~			~~Soil~~												
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other								1	1	1	1		1	1	1	

Syracuse #225

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☑ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☑ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:

28 #1 ICE

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:		Cooler Temp. (°C): Obs'd:	Corr'd:	Therm ID No.:
Relinquished by: Dan Gillo	Company: Arcadis	Date/Time: 7/19/22 1776	Received by: Reinlik	Company: Eurofins	Date/Time: 7-19-22, 17:26
Relinquished by: Reinlik	Company: Eurofins 7-19-22 1900	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company: TA	Date/Time: 7/20/22 1000

Form No. CA-C-WI-002, Rev. 4.34, dated 8/3/2020

Eurofins TestAmerica, Buffalo
10 Hazelwood Drive

Amherst, NY 14228-2223
phone 716.691.2600 fax 716.691 7991

Chain of Custody Record

eurofins Environment Testing America

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc. d/b/a Eurofins TestAmerica

Client Contact	**Project Manager: Mark Flusche**		COC No: 4
Company: Arcadis of New York, Inc.	Email: mark.flusche@arcadis.com	Site Contact: Ryan Clare	Date: 7-19-22	2 of 2 COCs
Address: 855 Route 146 Suite 210	Tel: 518-250-7322	Lab Contact: Schove, John R	Carrier:	TALS Project #:
Clifton Park, NY 12065	**Analysis Turnaround Time**			Sampler:
	☐ CALENDAR DAYS ☐ WORKING DAYS			**For Lab Use Only:**
	TAT if different from Below _____			Walk-in Client:
	☑ 2 weeks			Lab Sampling:
Project Name: GTEOSI - Seneca Falls	☐ 1 week			
Site:	☐ 2 days			Job / SDG No.:
PO #: 30112357.00055 Project #:	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	TCLP VOCs	TCLP SVOCs	TCLP Metals	PCBs - Total	Pesticides/Herbicides	HOLD at Lab	Total VOCs	Total SVOCs	TCLP Metals	Sample Specific Notes:
HOG7-EX2-01	7/19/22	1300	G	Soil	3								✓	X	X	X	HOLD
HOG7-EX2-02	7/19/22	1315	G	Soil	3								✓	X	X	X	HOLD
HOG7-EX2-03	7/19/22	1345	G	Soil	3								✓	X	X	X	HOLD
HOG7-EX2-04	7/19/22	1400	G	Soil	3								✓	X	X	X	HOLD
HOG7-EX2-05	7/19/22	1440	G	Soil	3								✓	X	X	X	HOLD
HOG7-EX2-comp	7/19/22	1500	C	Soil	5			X	X	X	X	X				X	
	/22			Soil													
	/22			Soil													
	/22			Soil													
	/22			Soil													
	/22			Soil													
	/22			Soil													
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____								1	1	1	1			1	1	1	

Syracuse #225

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☑ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☑ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:		Cooler Temp. (°C): Obs'd: _____ Corr'd: _____		Therm ID No.: _____
Relinquished by: Dan Gillen	Company: Arcadis	Date/Time: 7/19/22 1926	Received by: English	Company: Syr	Date/Time: 7-19-22, 17:26
Relinquished by: English	Company: Syr	Date/Time: 7-19-22, 1940	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by: PGI	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.34, dated 8/3/2020

8/8/2022

Login Sample Receipt Checklist

Client: ARCADIS U.S. Inc

Job Number: 480-199965-3

Login Number: 199965
List Number: 1
Creator: Kolb, Chris M

List Source: Eurofins Buffalo

Question	Answer	Comment
Radioactivity either was not measured or, if measured, is at or below background	True	
The cooler's custody seal, if present, is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time (Excluding tests with immediate HTs)..	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	N/A	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Sampling Company provided.	True	ARCADIS
Samples received within 48 hours of sampling.	True	
Samples requiring field filtration have been filtered in the field.	True	
Chlorine Residual checked.	N/A	

eurofins | Environment Testing America



ANALYTICAL REPORT

Eurofins Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Tel: (716)691-2600

Laboratory Job ID: 480-200014-1
Client Project/Site: GTEOSI - Seneca Falls

For:
ARCADIS U.S. Inc
855 Route 146
Suite 210
Clifton Park, New York 12065

Attn: Mark Flusche

Authorized for release by:
8/4/2022 3:24:42 PM
Judy Stone, Senior Project Manager
(484)685-0868
Judy.Stone@et.eurofinsus.com

Designee for

John Schove, Project Manager II
(716)504-9838
John.Schove@et.eurofinsus.com

The test results in this report meet all 2003 NELAC, 2009 TNI, and 2016 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

LINKS

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Table of Contents

Cover Page 1
Table of Contents 2
Definitions/Glossary 3
Case Narrative 4
Detection Summary 5
Client Sample Results 6
Surrogate Summary 12
QC Sample Results 14
QC Association Summary 24
Lab Chronicle 28
Certification Summary 30
Method Summary 31
Sample Summary 32
Chain of Custody 33
Receipt Checklists 35

Definitions/Glossary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200014-1

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
F1	MS and/or MSD recovery exceeds control limits.

GC/MS Semi VOA

Qualifier	Qualifier Description
F1	MS and/or MSD recovery exceeds control limits.

GC Semi VOA

Qualifier	Qualifier Description
F2	MS/MSD RPD exceeds control limits

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 480-200014-1

Laboratory: Eurofins Buffalo

Narrative

Job Narrative
480-200014-1

Comments
No additional comments.

Receipt
The samples were received on 7/22/2022 9:30 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperatures of the 2 coolers at receipt time were 4.0º C and 4.6º C.

GC/MS VOA
Method 8260C: The following samples were diluted due to the nature of the TCLP matrix: H067-EX3-COMP (480-200014-6), H067-EX4-COMP (480-200014-16), H067-EX4-COMP (480-200014-16[MS]), H067-EX4-COMP (480-200014-16[MSD]) and (LB 480-634728/1-A). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

GC/MS Semi VOA
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

GC Semi VOA
Method 8082A: The matrix spike / matrix spike duplicate (MS/MSD) precision for preparation batch 480-634713 and analytical batch 480-634933 was outside control limits. Sample matrix interference is suspected.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Metals
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Organic Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Detection Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200014-1

Client Sample ID: H067-EX3-COMP — Lab Sample ID: 480-200014-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Cadmium	0.12		0.0020		mg/L	1		6010C	TCLP

Client Sample ID: H067-EX4-COMP — Lab Sample ID: 480-200014-16

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Cadmium	0.42		0.0020		mg/L	1		6010C	TCLP

This Detection Summary does not include radiochemical test results.

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200014-1

Client Sample ID: H067-EX3-COMP
Date Collected: 07/20/22 11:30
Date Received: 07/22/22 09:30

Lab Sample ID: 480-200014-6
Matrix: Solid

Method: 8260C - Volatile Organic Compounds by GC/MS - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	ND		0.010		mg/L			07/27/22 07:29	10
1,2-Dichloroethane	ND		0.010		mg/L			07/27/22 07:29	10
2-Butanone (MEK)	ND		0.050		mg/L			07/27/22 07:29	10
Benzene	ND		0.010		mg/L			07/27/22 07:29	10
Carbon tetrachloride	ND		0.010		mg/L			07/27/22 07:29	10
Chlorobenzene	ND		0.010		mg/L			07/27/22 07:29	10
Chloroform	ND		0.010		mg/L			07/27/22 07:29	10
Tetrachloroethene	ND		0.010		mg/L			07/27/22 07:29	10
Trichloroethene	ND		0.010		mg/L			07/27/22 07:29	10
Vinyl chloride	ND		0.010		mg/L			07/27/22 07:29	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*108*		*77 - 120*		*07/27/22 07:29*	*10*
4-Bromofluorobenzene (Surr)	*90*		*73 - 120*		*07/27/22 07:29*	*10*
Dibromofluoromethane (Surr)	*97*		*75 - 123*		*07/27/22 07:29*	*10*
Toluene-d8 (Surr)	*100*		*80 - 120*		*07/27/22 07:29*	*10*

Method: 8270D - Semivolatile Organic Compounds (GC/MS) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dichlorobenzene	ND		0.040		mg/L		07/29/22 09:26	08/02/22 16:22	1
2,4-Dinitrotoluene	ND		0.020		mg/L		07/29/22 09:26	08/02/22 16:22	1
2,4,5-Trichlorophenol	ND		0.020		mg/L		07/29/22 09:26	08/02/22 16:22	1
2,4,6-Trichlorophenol	ND		0.020		mg/L		07/29/22 09:26	08/02/22 16:22	1
2-Methylphenol	ND		0.020		mg/L		07/29/22 09:26	08/02/22 16:22	1
3-Methylphenol	ND		0.040		mg/L		07/29/22 09:26	08/02/22 16:22	1
4-Methylphenol	ND		0.040		mg/L		07/29/22 09:26	08/02/22 16:22	1
Hexachlorobenzene	ND		0.020		mg/L		07/29/22 09:26	08/02/22 16:22	1
Hexachlorobutadiene	ND		0.020		mg/L		07/29/22 09:26	08/02/22 16:22	1
Hexachloroethane	ND		0.020		mg/L		07/29/22 09:26	08/02/22 16:22	1
Nitrobenzene	ND		0.020		mg/L		07/29/22 09:26	08/02/22 16:22	1
Pentachlorophenol	ND		0.040		mg/L		07/29/22 09:26	08/02/22 16:22	1
Pyridine	ND		0.10		mg/L		07/29/22 09:26	08/02/22 16:22	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*71*		*41 - 120*	*07/29/22 09:26*	*08/02/22 16:22*	*1*
2-Fluorobiphenyl (Surr)	*74*		*48 - 120*	*07/29/22 09:26*	*08/02/22 16:22*	*1*
2-Fluorophenol (Surr)	*38*		*35 - 120*	*07/29/22 09:26*	*08/02/22 16:22*	*1*
Nitrobenzene-d5 (Surr)	*66*		*46 - 120*	*07/29/22 09:26*	*08/02/22 16:22*	*1*
p-Terphenyl-d14 (Surr)	*100*		*60 - 148*	*07/29/22 09:26*	*08/02/22 16:22*	*1*
Phenol-d5 (Surr)	*30*		*22 - 120*	*07/29/22 09:26*	*08/02/22 16:22*	*1*

Method: 6010C - Metals (ICP) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.015		mg/L		07/26/22 11:22	07/27/22 13:04	1
Barium	ND		1.0		mg/L		07/26/22 11:22	07/27/22 13:04	1
Cadmium	**0.12**		0.0020		mg/L		07/26/22 11:22	07/27/22 13:04	1
Chromium	ND		0.020		mg/L		07/26/22 11:22	07/27/22 13:04	1
Lead	ND		0.020		mg/L		07/26/22 11:22	07/27/22 13:04	1
Selenium	ND		0.025		mg/L		07/26/22 11:22	07/27/22 13:04	1
Silver	ND		0.0060		mg/L		07/26/22 11:22	07/27/22 13:04	1

Client Sample Results

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200014-1

Client Sample ID: H067-EX3-COMP
Date Collected: 07/20/22 11:30
Date Received: 07/22/22 09:30

Lab Sample ID: 480-200014-6
Matrix: Solid

Method: 7470A - Mercury (CVAA) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00020		mg/L		07/27/22 10:23	07/27/22 15:21	1

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200014-1

Client Sample ID: H067-EX3-COMP
Date Collected: 07/20/22 11:30
Date Received: 07/22/22 09:30

Lab Sample ID: 480-200014-6
Matrix: Solid
Percent Solids: 77.4

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.31		mg/Kg	☼	07/25/22 09:14	07/26/22 18:00	1
PCB-1221	ND		0.31		mg/Kg	☼	07/25/22 09:14	07/26/22 18:00	1
PCB-1232	ND		0.31		mg/Kg	☼	07/25/22 09:14	07/26/22 18:00	1
PCB-1242	ND		0.31		mg/Kg	☼	07/25/22 09:14	07/26/22 18:00	1
PCB-1248	ND		0.31		mg/Kg	☼	07/25/22 09:14	07/26/22 18:00	1
PCB-1254	ND		0.31		mg/Kg	☼	07/25/22 09:14	07/26/22 18:00	1
PCB-1260	ND		0.31		mg/Kg	☼	07/25/22 09:14	07/26/22 18:00	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*113*		*60 - 154*	*07/25/22 09:14*	*07/26/22 18:00*	*1*
Tetrachloro-m-xylene	*108*		*60 - 154*	*07/25/22 09:14*	*07/26/22 18:00*	*1*
DCB Decachlorobiphenyl	*79*		*65 - 174*	*07/25/22 09:14*	*07/26/22 18:00*	*1*
DCB Decachlorobiphenyl	*81*		*65 - 174*	*07/25/22 09:14*	*07/26/22 18:00*	*1*

Client Sample ID: H067-EX4-COMP

Date Collected: 07/21/22 11:30
Date Received: 07/22/22 09:30

Lab Sample ID: 480-200014-16

Matrix: Solid

Method: 8260C - Volatile Organic Compounds by GC/MS - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	ND		0.010		mg/L			07/27/22 07:06	10
1,2-Dichloroethane	ND		0.010		mg/L			07/27/22 07:06	10
2-Butanone (MEK)	ND		0.050		mg/L			07/27/22 07:06	10
Benzene	ND		0.010		mg/L			07/27/22 07:06	10
Carbon tetrachloride	ND	F1	0.010		mg/L			07/27/22 07:06	10
Chlorobenzene	ND		0.010		mg/L			07/27/22 07:06	10
Chloroform	ND		0.010		mg/L			07/27/22 07:06	10
Tetrachloroethene	ND	F1	0.010		mg/L			07/27/22 07:06	10
Trichloroethene	ND	F1	0.010		mg/L			07/27/22 07:06	10
Vinyl chloride	ND		0.010		mg/L			07/27/22 07:06	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*109*		*77 - 120*		*07/27/22 07:06*	*10*
4-Bromofluorobenzene (Surr)	*90*		*73 - 120*		*07/27/22 07:06*	*10*
Dibromofluoromethane (Surr)	*97*		*75 - 123*		*07/27/22 07:06*	*10*
Toluene-d8 (Surr)	*100*		*80 - 120*		*07/27/22 07:06*	*10*

Method: 8270D - Semivolatile Organic Compounds (GC/MS) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dichlorobenzene	ND		0.040		mg/L		07/29/22 09:26	08/01/22 16:36	1
2,4-Dinitrotoluene	ND		0.020		mg/L		07/29/22 09:26	08/01/22 16:36	1
2,4,5-Trichlorophenol	ND		0.020		mg/L		07/29/22 09:26	08/01/22 16:36	1
2,4,6-Trichlorophenol	ND		0.020		mg/L		07/29/22 09:26	08/01/22 16:36	1
2-Methylphenol	ND		0.020		mg/L		07/29/22 09:26	08/01/22 16:36	1
3-Methylphenol	ND		0.040		mg/L		07/29/22 09:26	08/01/22 16:36	1
4-Methylphenol	ND		0.040		mg/L		07/29/22 09:26	08/01/22 16:36	1
Hexachlorobenzene	ND		0.020		mg/L		07/29/22 09:26	08/01/22 16:36	1
Hexachlorobutadiene	ND		0.020		mg/L		07/29/22 09:26	08/01/22 16:36	1
Hexachloroethane	ND		0.020		mg/L		07/29/22 09:26	08/01/22 16:36	1
Nitrobenzene	ND		0.020		mg/L		07/29/22 09:26	08/01/22 16:36	1
Pentachlorophenol	ND		0.040		mg/L		07/29/22 09:26	08/01/22 16:36	1
Pyridine	ND	F1	0.10		mg/L		07/29/22 09:26	08/01/22 16:36	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*88*		*41 - 120*	*07/29/22 09:26*	*08/01/22 16:36*	*1*
2-Fluorobiphenyl (Surr)	*93*		*48 - 120*	*07/29/22 09:26*	*08/01/22 16:36*	*1*
2-Fluorophenol (Surr)	*55*		*35 - 120*	*07/29/22 09:26*	*08/01/22 16:36*	*1*
Nitrobenzene-d5 (Surr)	*91*		*46 - 120*	*07/29/22 09:26*	*08/01/22 16:36*	*1*
p-Terphenyl-d14 (Surr)	*105*		*60 - 148*	*07/29/22 09:26*	*08/01/22 16:36*	*1*
Phenol-d5 (Surr)	*40*		*22 - 120*	*07/29/22 09:26*	*08/01/22 16:36*	*1*

Method: 6010C - Metals (ICP) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.015		mg/L		07/26/22 11:22	07/27/22 03:59	1
Barium	ND		1.0		mg/L		07/26/22 11:22	07/27/22 03:59	1
Cadmium	**0.42**		0.0020		mg/L		07/26/22 11:22	07/27/22 03:59	1
Chromium	ND		0.020		mg/L		07/26/22 11:22	07/27/22 03:59	1
Lead	ND		0.020		mg/L		07/26/22 11:22	07/27/22 03:59	1
Selenium	ND		0.025		mg/L		07/26/22 11:22	07/27/22 03:59	1
Silver	ND		0.0060		mg/L		07/26/22 11:22	07/27/22 03:59	1

Client Sample Results

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200014-1

Client Sample ID: H067-EX4-COMP
Date Collected: 07/21/22 11:30
Date Received: 07/22/22 09:30

Lab Sample ID: 480-200014-16
Matrix: Solid

Method: 7470A - Mercury (CVAA) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00020		mg/L		07/27/22 10:23	07/27/22 14:56	1

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200014-1

Client Sample ID: H067-EX4-COMP
Date Collected: 07/21/22 11:30
Date Received: 07/22/22 09:30

Lab Sample ID: 480-200014-16
Matrix: Solid
Percent Solids: 81.8

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.29		mg/Kg	☼	07/25/22 09:14	07/26/22 17:46	1
PCB-1221	ND		0.29		mg/Kg	☼	07/25/22 09:14	07/26/22 17:46	1
PCB-1232	ND		0.29		mg/Kg	☼	07/25/22 09:14	07/26/22 17:46	1
PCB-1242	ND		0.29		mg/Kg	☼	07/25/22 09:14	07/26/22 17:46	1
PCB-1248	ND		0.29		mg/Kg	☼	07/25/22 09:14	07/26/22 17:46	1
PCB-1254	ND		0.29		mg/Kg	☼	07/25/22 09:14	07/26/22 17:46	1
PCB-1260	ND	F2	0.29		mg/Kg	☼	07/25/22 09:14	07/26/22 17:46	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*94*		*60 - 154*	*07/25/22 09:14*	*07/26/22 17:46*	*1*
Tetrachloro-m-xylene	*106*		*60 - 154*	*07/25/22 09:14*	*07/26/22 17:46*	*1*
DCB Decachlorobiphenyl	*77*		*65 - 174*	*07/25/22 09:14*	*07/26/22 17:46*	*1*
DCB Decachlorobiphenyl	*79*		*65 - 174*	*07/25/22 09:14*	*07/26/22 17:46*	*1*

Surrogate Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200014-1

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(77-120)	(73-120)	(75-123)	(80-120)
LCS 480-634938/6	Lab Control Sample	104	93	101	98
MB 480-634938/8	Method Blank	104	88	95	99

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Solid **Prep Type: TCLP**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(77-120)	(73-120)	(75-123)	(80-120)
480-200014-6	H067-EX3-COMP	108	90	97	100
480-200014-16	H067-EX4-COMP	109	90	97	100
480-200014-16 MS	H067-EX4-COMP	102	95	98	100
480-200014-16 MSD	H067-EX4-COMP	102	97	100	102
LB 480-634728/1-A	Method Blank	111	89	100	99

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	TPHd14	PHL
Lab Sample ID	Client Sample ID	(41-120)	(48-120)	(35-120)	(46-120)	(60-148)	(22-120)
LCS 480-635440/2-A	Lab Control Sample	100	96	58	89	111	44
MB 480-635440/1-A	Method Blank	85	90	54	88	115	40

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
TPHd14 = p-Terphenyl-d14 (Surr)
PHL = Phenol-d5 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Solid **Prep Type: TCLP**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	TPHd14	PHL
Lab Sample ID	Client Sample ID	(41-120)	(48-120)	(35-120)	(46-120)	(60-148)	(22-120)
480-200014-6	H067-EX3-COMP	71	74	38	66	100	30
480-200014-16	H067-EX4-COMP	88	93	55	91	105	40

Surrogate Summary

Client: ARCADIS U.S. Inc
Job ID: 480-200014-1
Project/Site: GTEOSI - Seneca Falls

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Matrix: Solid **Prep Type: TCLP**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	TPHd14	PHL
Lab Sample ID	Client Sample ID	(41-120)	(48-120)	(35-120)	(46-120)	(60-148)	(22-120)
480-200014-16 MS	H067-EX4-COMP	98	100	54	97	115	42
480-200014-16 MSD	H067-EX4-COMP	99	95	55	94	112	41
LB 480-634721/1-E	Method Blank	87	95	55	91	112	42
LB2 480-634779/1-E	Method Blank	71	68	36	64	102	28

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
TPHd14 = p-Terphenyl-d14 (Surr)
PHL = Phenol-d5 (Surr)

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		TCX1	TCX2	DCBP1	DCBP2
Lab Sample ID	Client Sample ID	(60-154)	(60-154)	(65-174)	(65-174)
480-200014-6	H067-EX3-COMP	108	113	81	79
480-200014-16	H067-EX4-COMP	106	94	79	77
480-200014-16 MS	H067-EX4-COMP	136	142	156	133
480-200014-16 MSD	H067-EX4-COMP	112	120	86	88
LCS 480-634713/2-A	Lab Control Sample	143	145	110	102
MB 480-634713/1-A	Method Blank	127	132	100	93

Surrogate Legend

TCX = Tetrachloro-m-xylene
DCBP = DCB Decachlorobiphenyl

Method: 8260C - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 480-634938/8
Matrix: Solid
Analysis Batch: 634938

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	ND		0.0010		mg/L			07/27/22 00:23	1
1,2-Dichloroethane	ND		0.0010		mg/L			07/27/22 00:23	1
2-Butanone (MEK)	ND		0.0050		mg/L			07/27/22 00:23	1
Benzene	ND		0.0010		mg/L			07/27/22 00:23	1
Carbon tetrachloride	ND		0.0010		mg/L			07/27/22 00:23	1
Chlorobenzene	ND		0.0010		mg/L			07/27/22 00:23	1
Chloroform	ND		0.0010		mg/L			07/27/22 00:23	1
Tetrachloroethene	ND		0.0010		mg/L			07/27/22 00:23	1
Trichloroethene	ND		0.0010		mg/L			07/27/22 00:23	1
Vinyl chloride	ND		0.0010		mg/L			07/27/22 00:23	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*104*		*77 - 120*		*07/27/22 00:23*	*1*
4-Bromofluorobenzene (Surr)	*88*		*73 - 120*		*07/27/22 00:23*	*1*
Dibromofluoromethane (Surr)	*95*		*75 - 123*		*07/27/22 00:23*	*1*
Toluene-d8 (Surr)	*99*		*80 - 120*		*07/27/22 00:23*	*1*

Lab Sample ID: LCS 480-634938/6
Matrix: Solid
Analysis Batch: 634938

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
1,1-Dichloroethene	0.0250	0.0256		mg/L		102	66 - 127
1,2-Dichloroethane	0.0250	0.0264		mg/L		106	75 - 120
2-Butanone (MEK)	0.125	0.135		mg/L		108	57 - 140
Benzene	0.0250	0.0254		mg/L		102	71 - 124
Carbon tetrachloride	0.0250	0.0250		mg/L		100	72 - 134
Chlorobenzene	0.0250	0.0245		mg/L		98	80 - 120
Chloroform	0.0250	0.0260		mg/L		104	73 - 127
Tetrachloroethene	0.0250	0.0228		mg/L		91	74 - 122
Trichloroethene	0.0250	0.0247		mg/L		99	74 - 123
Vinyl chloride	0.0250	0.0231		mg/L		93	65 - 133

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*104*		*77 - 120*
4-Bromofluorobenzene (Surr)	*93*		*73 - 120*
Dibromofluoromethane (Surr)	*101*		*75 - 123*
Toluene-d8 (Surr)	*98*		*80 - 120*

Lab Sample ID: LB 480-634728/1-A
Matrix: Solid
Analysis Batch: 634938

Client Sample ID: Method Blank
Prep Type: TCLP

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	ND		0.010		mg/L			07/27/22 04:44	10
1,2-Dichloroethane	ND		0.010		mg/L			07/27/22 04:44	10
2-Butanone (MEK)	ND		0.050		mg/L			07/27/22 04:44	10
Benzene	ND		0.010		mg/L			07/27/22 04:44	10

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LB 480-634728/1-A
Matrix: Solid
Analysis Batch: 634938

Client Sample ID: Method Blank
Prep Type: TCLP

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon tetrachloride	ND		0.010		mg/L			07/27/22 04:44	10
Chlorobenzene	ND		0.010		mg/L			07/27/22 04:44	10
Chloroform	ND		0.010		mg/L			07/27/22 04:44	10
Tetrachloroethene	ND		0.010		mg/L			07/27/22 04:44	10
Trichloroethene	ND		0.010		mg/L			07/27/22 04:44	10
Vinyl chloride	ND		0.010		mg/L			07/27/22 04:44	10

Surrogate	*LB %Recovery*	*LB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*111*		*77 - 120*		*07/27/22 04:44*	*10*
4-Bromofluorobenzene (Surr)	*89*		*73 - 120*		*07/27/22 04:44*	*10*
Dibromofluoromethane (Surr)	*100*		*75 - 123*		*07/27/22 04:44*	*10*
Toluene-d8 (Surr)	*99*		*80 - 120*		*07/27/22 04:44*	*10*

Lab Sample ID: 480-200014-16 MS
Matrix: Solid
Analysis Batch: 634938

Client Sample ID: H067-EX4-COMP
Prep Type: TCLP

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
1,1-Dichloroethene	ND		0.250	0.191		mg/L		76	66 - 127
1,2-Dichloroethane	ND		0.250	0.255		mg/L		102	75 - 120
2-Butanone (MEK)	ND		1.25	1.27		mg/L		101	57 - 140
Benzene	ND		0.250	0.215		mg/L		86	71 - 124
Carbon tetrachloride	ND	F1	0.250	0.171	F1	mg/L		68	72 - 134
Chlorobenzene	ND		0.250	0.218		mg/L		87	80 - 120
Chloroform	ND		0.250	0.226		mg/L		90	73 - 127
Tetrachloroethene	ND	F1	0.250	0.168	F1	mg/L		67	74 - 122
Trichloroethene	ND	F1	0.250	0.189		mg/L		76	74 - 123
Vinyl chloride	ND		0.250	0.270		mg/L		108	65 - 133

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*102*		*77 - 120*
4-Bromofluorobenzene (Surr)	*95*		*73 - 120*
Dibromofluoromethane (Surr)	*98*		*75 - 123*
Toluene-d8 (Surr)	*100*		*80 - 120*

Lab Sample ID: 480-200014-16 MSD
Matrix: Solid
Analysis Batch: 634938

Client Sample ID: H067-EX4-COMP
Prep Type: TCLP

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
1,1-Dichloroethene	ND		0.250	0.181		mg/L		72	66 - 127	5	16
1,2-Dichloroethane	ND		0.250	0.247		mg/L		99	75 - 120	3	20
2-Butanone (MEK)	ND		1.25	1.25		mg/L		100	57 - 140	2	20
Benzene	ND		0.250	0.207		mg/L		83	71 - 124	4	13
Carbon tetrachloride	ND	F1	0.250	0.166	F1	mg/L		66	72 - 134	3	15
Chlorobenzene	ND		0.250	0.215		mg/L		86	80 - 120	1	25
Chloroform	ND		0.250	0.218		mg/L		87	73 - 127	4	20
Tetrachloroethene	ND	F1	0.250	0.167	F1	mg/L		67	74 - 122	1	20

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 480-200014-16 MSD
Matrix: Solid
Analysis Batch: 634938

Client Sample ID: H067-EX4-COMP
Prep Type: TCLP

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Trichloroethene	ND	F1	0.250	0.182	F1	mg/L		73	74 - 123	4	16
Vinyl chloride	ND		0.250	0.249		mg/L		100	65 - 133	8	15

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*102*		*77 - 120*
4-Bromofluorobenzene (Surr)	*97*		*73 - 120*
Dibromofluoromethane (Surr)	*100*		*75 - 123*
Toluene-d8 (Surr)	*102*		*80 - 120*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 480-635440/1-A
Matrix: Solid
Analysis Batch: 635692

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 635440

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dichlorobenzene	ND		0.010		mg/L		07/29/22 09:26	08/01/22 14:57	1
2,4-Dinitrotoluene	ND		0.0050		mg/L		07/29/22 09:26	08/01/22 14:57	1
2,4,5-Trichlorophenol	ND		0.0050		mg/L		07/29/22 09:26	08/01/22 14:57	1
2,4,6-Trichlorophenol	ND		0.0050		mg/L		07/29/22 09:26	08/01/22 14:57	1
2-Methylphenol	ND		0.0050		mg/L		07/29/22 09:26	08/01/22 14:57	1
3-Methylphenol	ND		0.010		mg/L		07/29/22 09:26	08/01/22 14:57	1
4-Methylphenol	ND		0.010		mg/L		07/29/22 09:26	08/01/22 14:57	1
Hexachlorobenzene	ND		0.0050		mg/L		07/29/22 09:26	08/01/22 14:57	1
Hexachlorobutadiene	ND		0.0050		mg/L		07/29/22 09:26	08/01/22 14:57	1
Hexachloroethane	ND		0.0050		mg/L		07/29/22 09:26	08/01/22 14:57	1
Nitrobenzene	ND		0.0050		mg/L		07/29/22 09:26	08/01/22 14:57	1
Pentachlorophenol	ND		0.010		mg/L		07/29/22 09:26	08/01/22 14:57	1
Pyridine	ND		0.025		mg/L		07/29/22 09:26	08/01/22 14:57	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*85*		*41 - 120*	*07/29/22 09:26*	*08/01/22 14:57*	*1*
2-Fluorobiphenyl (Surr)	*90*		*48 - 120*	*07/29/22 09:26*	*08/01/22 14:57*	*1*
2-Fluorophenol (Surr)	*54*		*35 - 120*	*07/29/22 09:26*	*08/01/22 14:57*	*1*
Nitrobenzene-d5 (Surr)	*88*		*46 - 120*	*07/29/22 09:26*	*08/01/22 14:57*	*1*
p-Terphenyl-d14 (Surr)	*115*		*60 - 148*	*07/29/22 09:26*	*08/01/22 14:57*	*1*
Phenol-d5 (Surr)	*40*		*22 - 120*	*07/29/22 09:26*	*08/01/22 14:57*	*1*

Lab Sample ID: LCS 480-635440/2-A
Matrix: Solid
Analysis Batch: 635692

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 635440

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
1,4-Dichlorobenzene	0.0500	0.0356		mg/L		71	51 - 120
2,4-Dinitrotoluene	0.0500	0.0527		mg/L		105	69 - 120
2,4,5-Trichlorophenol	0.0500	0.0504		mg/L		101	65 - 126
2,4,6-Trichlorophenol	0.0500	0.0498		mg/L		100	64 - 120
2-Methylphenol	0.0500	0.0456		mg/L		91	39 - 120

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 480-635440/2-A
Matrix: Solid
Analysis Batch: 635692

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 635440

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
3-Methylphenol	0.0500	0.0448		mg/L		90	39 - 120
4-Methylphenol	0.0500	0.0448		mg/L		90	29 - 131
Hexachlorobenzene	0.0500	0.0483		mg/L		97	61 - 120
Hexachlorobutadiene	0.0500	0.0313		mg/L		63	35 - 120
Hexachloroethane	0.0500	0.0328		mg/L		66	43 - 120
Nitrobenzene	0.0500	0.0463		mg/L		93	53 - 123
Pentachlorophenol	0.100	0.104		mg/L		104	29 - 136
Pyridine	0.100	0.0546		mg/L		55	10 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*100*		*41 - 120*
2-Fluorobiphenyl (Surr)	*96*		*48 - 120*
2-Fluorophenol (Surr)	*58*		*35 - 120*
Nitrobenzene-d5 (Surr)	*89*		*46 - 120*
p-Terphenyl-d14 (Surr)	*111*		*60 - 148*
Phenol-d5 (Surr)	*44*		*22 - 120*

Lab Sample ID: LB 480-634721/1-E
Matrix: Solid
Analysis Batch: 635692

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 635440

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dichlorobenzene	ND		0.040		mg/L		07/29/22 09:26	08/01/22 17:49	1
2,4-Dinitrotoluene	ND		0.020		mg/L		07/29/22 09:26	08/01/22 17:49	1
2,4,5-Trichlorophenol	ND		0.020		mg/L		07/29/22 09:26	08/01/22 17:49	1
2,4,6-Trichlorophenol	ND		0.020		mg/L		07/29/22 09:26	08/01/22 17:49	1
2-Methylphenol	ND		0.020		mg/L		07/29/22 09:26	08/01/22 17:49	1
3-Methylphenol	ND		0.040		mg/L		07/29/22 09:26	08/01/22 17:49	1
4-Methylphenol	ND		0.040		mg/L		07/29/22 09:26	08/01/22 17:49	1
Hexachlorobenzene	ND		0.020		mg/L		07/29/22 09:26	08/01/22 17:49	1
Hexachlorobutadiene	ND		0.020		mg/L		07/29/22 09:26	08/01/22 17:49	1
Hexachloroethane	ND		0.020		mg/L		07/29/22 09:26	08/01/22 17:49	1
Nitrobenzene	ND		0.020		mg/L		07/29/22 09:26	08/01/22 17:49	1
Pentachlorophenol	ND		0.040		mg/L		07/29/22 09:26	08/01/22 17:49	1
Pyridine	ND		0.10		mg/L		07/29/22 09:26	08/01/22 17:49	1

Surrogate	*LB %Recovery*	*LB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*87*		*41 - 120*	*07/29/22 09:26*	*08/01/22 17:49*	*1*
2-Fluorobiphenyl (Surr)	*95*		*48 - 120*	*07/29/22 09:26*	*08/01/22 17:49*	*1*
2-Fluorophenol (Surr)	*55*		*35 - 120*	*07/29/22 09:26*	*08/01/22 17:49*	*1*
Nitrobenzene-d5 (Surr)	*91*		*46 - 120*	*07/29/22 09:26*	*08/01/22 17:49*	*1*
p-Terphenyl-d14 (Surr)	*112*		*60 - 148*	*07/29/22 09:26*	*08/01/22 17:49*	*1*
Phenol-d5 (Surr)	*42*		*22 - 120*	*07/29/22 09:26*	*08/01/22 17:49*	*1*

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LB2 480-634779/1-E
Matrix: Solid
Analysis Batch: 635692

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 635440

Analyte	LB2 Result	LB2 Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dichlorobenzene	ND		0.040		mg/L		07/29/22 09:26	08/01/22 18:13	1
2,4-Dinitrotoluene	ND		0.020		mg/L		07/29/22 09:26	08/01/22 18:13	1
2,4,5-Trichlorophenol	ND		0.020		mg/L		07/29/22 09:26	08/01/22 18:13	1
2,4,6-Trichlorophenol	ND		0.020		mg/L		07/29/22 09:26	08/01/22 18:13	1
2-Methylphenol	ND		0.020		mg/L		07/29/22 09:26	08/01/22 18:13	1
3-Methylphenol	ND		0.040		mg/L		07/29/22 09:26	08/01/22 18:13	1
4-Methylphenol	ND		0.040		mg/L		07/29/22 09:26	08/01/22 18:13	1
Hexachlorobenzene	ND		0.020		mg/L		07/29/22 09:26	08/01/22 18:13	1
Hexachlorobutadiene	ND		0.020		mg/L		07/29/22 09:26	08/01/22 18:13	1
Hexachloroethane	ND		0.020		mg/L		07/29/22 09:26	08/01/22 18:13	1
Nitrobenzene	ND		0.020		mg/L		07/29/22 09:26	08/01/22 18:13	1
Pentachlorophenol	ND		0.040		mg/L		07/29/22 09:26	08/01/22 18:13	1
Pyridine	ND		0.10		mg/L		07/29/22 09:26	08/01/22 18:13	1

Surrogate	*LB2 %Recovery*	*LB2 Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*71*		*41 - 120*	*07/29/22 09:26*	*08/01/22 18:13*	*1*
2-Fluorobiphenyl (Surr)	*68*		*48 - 120*	*07/29/22 09:26*	*08/01/22 18:13*	*1*
2-Fluorophenol (Surr)	*36*		*35 - 120*	*07/29/22 09:26*	*08/01/22 18:13*	*1*
Nitrobenzene-d5 (Surr)	*64*		*46 - 120*	*07/29/22 09:26*	*08/01/22 18:13*	*1*
p-Terphenyl-d14 (Surr)	*102*		*60 - 148*	*07/29/22 09:26*	*08/01/22 18:13*	*1*
Phenol-d5 (Surr)	*28*		*22 - 120*	*07/29/22 09:26*	*08/01/22 18:13*	*1*

Lab Sample ID: 480-200014-16 MS
Matrix: Solid
Analysis Batch: 635692

Client Sample ID: H067-EX4-COMP
Prep Type: TCLP
Prep Batch: 635440

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
1,4-Dichlorobenzene	ND		0.200	0.148		mg/L		74	32 - 150
2,4-Dinitrotoluene	ND		0.200	0.202		mg/L		101	54 - 138
2,4,5-Trichlorophenol	ND		0.200	0.200		mg/L		100	65 - 126
2,4,6-Trichlorophenol	ND		0.200	0.204		mg/L		102	64 - 120
2-Methylphenol	ND		0.200	0.175		mg/L		87	46 - 120
3-Methylphenol	ND		0.200	0.172		mg/L		86	32 - 120
4-Methylphenol	ND		0.200	0.172		mg/L		86	36 - 120
Hexachlorobenzene	ND		0.200	0.199		mg/L		99	57 - 121
Hexachlorobutadiene	ND		0.200	0.136		mg/L		68	37 - 120
Hexachloroethane	ND		0.200	0.133		mg/L		67	16 - 130
Nitrobenzene	ND		0.200	0.197		mg/L		99	45 - 123
Pentachlorophenol	ND		0.400	0.419		mg/L		105	23 - 149
Pyridine	ND	F1	0.400	0.255	F1	mg/L		64	79 - 120

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*98*		*41 - 120*
2-Fluorobiphenyl (Surr)	*100*		*48 - 120*
2-Fluorophenol (Surr)	*54*		*35 - 120*
Nitrobenzene-d5 (Surr)	*97*		*46 - 120*
p-Terphenyl-d14 (Surr)	*115*		*60 - 148*
Phenol-d5 (Surr)	*42*		*22 - 120*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: 480-200014-16 MSD
Matrix: Solid
Analysis Batch: 635692

Client Sample ID: H067-EX4-COMP
Prep Type: TCLP
Prep Batch: 635440

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
1,4-Dichlorobenzene	ND		0.200	0.141		mg/L		71	32 - 150	5	36
2,4-Dinitrotoluene	ND		0.200	0.198		mg/L		99	54 - 138	2	20
2,4,5-Trichlorophenol	ND		0.200	0.201		mg/L		100	65 - 126	0	18
2,4,6-Trichlorophenol	ND		0.200	0.199		mg/L		99	64 - 120	3	19
2-Methylphenol	ND		0.200	0.179		mg/L		90	46 - 120	2	27
3-Methylphenol	ND		0.200	0.173		mg/L		87	32 - 120	1	30
4-Methylphenol	ND		0.200	0.173		mg/L		86	36 - 120	0	24
Hexachlorobenzene	ND		0.200	0.199		mg/L		99	57 - 121	0	15
Hexachlorobutadiene	ND		0.200	0.129		mg/L		64	37 - 120	5	44
Hexachloroethane	ND		0.200	0.131		mg/L		66	16 - 130	2	46
Nitrobenzene	ND		0.200	0.186		mg/L		93	45 - 123	6	24
Pentachlorophenol	ND		0.400	0.415		mg/L		104	23 - 149	1	37
Pyridine	ND	F1	0.400	0.244	F1	mg/L		61	79 - 120	5	49

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*99*		*41 - 120*
2-Fluorobiphenyl (Surr)	*95*		*48 - 120*
2-Fluorophenol (Surr)	*55*		*35 - 120*
Nitrobenzene-d5 (Surr)	*94*		*46 - 120*
p-Terphenyl-d14 (Surr)	*112*		*60 - 148*
Phenol-d5 (Surr)	*41*		*22 - 120*

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 480-634713/1-A
Matrix: Solid
Analysis Batch: 634933

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 634713

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.24		mg/Kg		07/25/22 09:14	07/26/22 16:03	1
PCB-1221	ND		0.24		mg/Kg		07/25/22 09:14	07/26/22 16:03	1
PCB-1232	ND		0.24		mg/Kg		07/25/22 09:14	07/26/22 16:03	1
PCB-1242	ND		0.24		mg/Kg		07/25/22 09:14	07/26/22 16:03	1
PCB-1248	ND		0.24		mg/Kg		07/25/22 09:14	07/26/22 16:03	1
PCB-1254	ND		0.24		mg/Kg		07/25/22 09:14	07/26/22 16:03	1
PCB-1260	ND		0.24		mg/Kg		07/25/22 09:14	07/26/22 16:03	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*132*		*60 - 154*	*07/25/22 09:14*	*07/26/22 16:03*	*1*
Tetrachloro-m-xylene	*127*		*60 - 154*	*07/25/22 09:14*	*07/26/22 16:03*	*1*
DCB Decachlorobiphenyl	*93*		*65 - 174*	*07/25/22 09:14*	*07/26/22 16:03*	*1*
DCB Decachlorobiphenyl	*100*		*65 - 174*	*07/25/22 09:14*	*07/26/22 16:03*	*1*

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

Lab Sample ID: LCS 480-634713/2-A
Matrix: Solid
Analysis Batch: 634933

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 634713

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
PCB-1016			2.43	2.76		mg/Kg		114	51 - 185		
PCB-1260			2.43	2.83		mg/Kg		117	61 - 184		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Tetrachloro-m-xylene	*145*		*60 - 154*
Tetrachloro-m-xylene	*143*		*60 - 154*
DCB Decachlorobiphenyl	*102*		*65 - 174*
DCB Decachlorobiphenyl	*110*		*65 - 174*

Lab Sample ID: 480-200014-16 MS
Matrix: Solid
Analysis Batch: 634933

Client Sample ID: H067-EX4-COMP
Prep Type: Total/NA
Prep Batch: 634713

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
PCB-1016	ND		2.82	3.79		mg/Kg	☼	135	50 - 177		
PCB-1260	ND	F2	2.82	4.32		mg/Kg	☼	153	33 - 200		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Tetrachloro-m-xylene	*142*		*60 - 154*
Tetrachloro-m-xylene	*136*		*60 - 154*
DCB Decachlorobiphenyl	*133*		*65 - 174*
DCB Decachlorobiphenyl	*156*		*65 - 174*

Lab Sample ID: 480-200014-16 MSD
Matrix: Solid
Analysis Batch: 634933

Client Sample ID: H067-EX4-COMP
Prep Type: Total/NA
Prep Batch: 634713

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
PCB-1016	ND		2.98	2.59		mg/Kg	☼	87	50 - 177	38	50
PCB-1260	ND	F2	2.98	2.55	F2	mg/Kg	☼	86	33 - 200	51	50

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
Tetrachloro-m-xylene	*120*		*60 - 154*
Tetrachloro-m-xylene	*112*		*60 - 154*
DCB Decachlorobiphenyl	*88*		*65 - 174*
DCB Decachlorobiphenyl	*86*		*65 - 174*

Method: 6010C - Metals (ICP)

Lab Sample ID: MB 480-634888/2-A
Matrix: Solid
Analysis Batch: 635183

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 634888

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.015		mg/L		07/26/22 11:22	07/27/22 12:09	1
Barium	ND		1.0		mg/L		07/26/22 11:22	07/27/22 12:09	1
Cadmium	ND		0.0020		mg/L		07/26/22 11:22	07/27/22 12:09	1
Chromium	ND		0.020		mg/L		07/26/22 11:22	07/27/22 12:09	1

Method: 6010C - Metals (ICP) (Continued)

Lab Sample ID: MB 480-634888/2-A
Matrix: Solid
Analysis Batch: 635183

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 634888

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	ND		0.020		mg/L		07/26/22 11:22	07/27/22 12:09	1
Selenium	ND		0.025		mg/L		07/26/22 11:22	07/27/22 12:09	1
Silver	ND		0.0060		mg/L		07/26/22 11:22	07/27/22 12:09	1

Lab Sample ID: LCS 480-634888/3-A
Matrix: Solid
Analysis Batch: 635183

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 634888

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Arsenic	1.00	0.986		mg/L		99	80 - 120
Barium	1.00	0.883	J	mg/L		88	80 - 120
Cadmium	1.00	0.938		mg/L		94	80 - 120
Chromium	1.00	0.903		mg/L		90	80 - 120
Lead	1.00	0.938		mg/L		94	80 - 120
Selenium	1.00	0.978		mg/L		98	80 - 120
Silver	1.00	0.926		mg/L		93	80 - 120

Lab Sample ID: MB 480-634892/2-A
Matrix: Solid
Analysis Batch: 635040

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 634892

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.015		mg/L		07/26/22 11:22	07/27/22 03:47	1
Barium	ND		1.0		mg/L		07/26/22 11:22	07/27/22 03:47	1
Cadmium	ND		0.0020		mg/L		07/26/22 11:22	07/27/22 03:47	1
Chromium	ND		0.020		mg/L		07/26/22 11:22	07/27/22 03:47	1
Lead	ND		0.020		mg/L		07/26/22 11:22	07/27/22 03:47	1
Selenium	ND		0.025		mg/L		07/26/22 11:22	07/27/22 03:47	1
Silver	ND		0.0060		mg/L		07/26/22 11:22	07/27/22 03:47	1

Lab Sample ID: LCS 480-634892/3-A
Matrix: Solid
Analysis Batch: 635040

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 634892

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Arsenic	1.00	0.921		mg/L		92	80 - 120
Barium	1.00	0.925	J	mg/L		92	80 - 120
Cadmium	1.00	0.910		mg/L		91	80 - 120
Chromium	1.00	0.939		mg/L		94	80 - 120
Lead	1.00	0.872		mg/L		87	80 - 120
Selenium	1.00	0.938		mg/L		94	80 - 120
Silver	1.00	0.900		mg/L		90	80 - 120

Lab Sample ID: LB 480-634721/1-B
Matrix: Solid
Analysis Batch: 635183

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 634888

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.015		mg/L		07/26/22 11:22	07/27/22 12:05	1
Barium	ND		1.0		mg/L		07/26/22 11:22	07/27/22 12:05	1

Method: 6010C - Metals (ICP) (Continued)

Lab Sample ID: LB 480-634721/1-B
Matrix: Solid
Analysis Batch: 635183

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 634888

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		0.0020		mg/L		07/26/22 11:22	07/27/22 12:05	1
Chromium	ND		0.020		mg/L		07/26/22 11:22	07/27/22 12:05	1
Lead	ND		0.020		mg/L		07/26/22 11:22	07/27/22 12:05	1
Selenium	ND		0.025		mg/L		07/26/22 11:22	07/27/22 12:05	1
Silver	ND		0.0060		mg/L		07/26/22 11:22	07/27/22 12:05	1

Lab Sample ID: LB2 480-634779/1-B
Matrix: Solid
Analysis Batch: 635040

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 634892

Analyte	LB2 Result	LB2 Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.015		mg/L		07/26/22 11:22	07/27/22 03:43	1
Barium	ND		1.0		mg/L		07/26/22 11:22	07/27/22 03:43	1
Cadmium	ND		0.0020		mg/L		07/26/22 11:22	07/27/22 03:43	1
Chromium	ND		0.020		mg/L		07/26/22 11:22	07/27/22 03:43	1
Lead	ND		0.020		mg/L		07/26/22 11:22	07/27/22 03:43	1
Selenium	ND		0.025		mg/L		07/26/22 11:22	07/27/22 03:43	1
Silver	ND		0.0060		mg/L		07/26/22 11:22	07/27/22 03:43	1

Lab Sample ID: 480-200014-16 MS
Matrix: Solid
Analysis Batch: 635040

Client Sample ID: H067-EX4-COMP
Prep Type: TCLP
Prep Batch: 634892

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Arsenic	ND		1.00	0.989		mg/L		99	75 - 125
Barium	ND		1.00	1.56		mg/L		92	75 - 125
Cadmium	0.42		1.00	1.33		mg/L		91	75 - 125
Chromium	ND		1.00	0.916		mg/L		92	75 - 125
Lead	ND		1.00	0.945		mg/L		93	75 - 125
Selenium	ND		1.00	1.01		mg/L		101	75 - 125
Silver	ND		1.00	0.946		mg/L		95	75 - 125

Lab Sample ID: 480-200014-16 MSD
Matrix: Solid
Analysis Batch: 635040

Client Sample ID: H067-EX4-COMP
Prep Type: TCLP
Prep Batch: 634892

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Arsenic	ND		1.00	1.07		mg/L		107	75 - 125	8	20
Barium	ND		1.00	1.66		mg/L		102	75 - 125	6	20
Cadmium	0.42		1.00	1.34		mg/L		92	75 - 125	1	20
Chromium	ND		1.00	0.984		mg/L		98	75 - 125	7	20
Lead	ND		1.00	1.02		mg/L		100	75 - 125	7	20
Selenium	ND		1.00	1.08		mg/L		108	75 - 125	7	20
Silver	ND		1.00	1.01		mg/L		101	75 - 125	7	20

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 480-634966/2-A
Matrix: Solid
Analysis Batch: 635187

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 634966

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00020		mg/L		07/27/22 10:23	07/27/22 14:52	1

Lab Sample ID: LCS 480-634966/3-A
Matrix: Solid
Analysis Batch: 635187

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 634966

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	0.00678	0.00542		mg/L		80	80 - 120

Lab Sample ID: MB 480-634967/2-A
Matrix: Solid
Analysis Batch: 635187

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 634967

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00020		mg/L		07/27/22 10:23	07/27/22 15:05	1

Lab Sample ID: LCS 480-634967/3-A
Matrix: Solid
Analysis Batch: 635187

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 634967

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	0.00678	0.00600		mg/L		89	80 - 120

Lab Sample ID: LB2 480-634779/1-D
Matrix: Solid
Analysis Batch: 635187

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 634966

Analyte	LB2 Result	LB2 Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00020		mg/L		07/27/22 10:23	07/27/22 14:51	1

Lab Sample ID: 480-200014-16 MS
Matrix: Solid
Analysis Batch: 635187

Client Sample ID: H067-EX4-COMP
Prep Type: TCLP
Prep Batch: 634966

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	ND		0.00678	0.00625		mg/L		92	80 - 120

Lab Sample ID: 480-200014-16 MSD
Matrix: Solid
Analysis Batch: 635187

Client Sample ID: H067-EX4-COMP
Prep Type: TCLP
Prep Batch: 634966

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Mercury	ND		0.00678	0.00600		mg/L		89	80 - 120	4	20

Lab Sample ID: LB 480-634721/1-D
Matrix: Solid
Analysis Batch: 635187

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 634967

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00020		mg/L		07/27/22 10:23	07/27/22 15:01	1

GC/MS VOA

Leach Batch: 634728

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200014-6	H067-EX3-COMP	TCLP	Solid	1311	
480-200014-16	H067-EX4-COMP	TCLP	Solid	1311	
LB 480-634728/1-A	Method Blank	TCLP	Solid	1311	
480-200014-16 MS	H067-EX4-COMP	TCLP	Solid	1311	
480-200014-16 MSD	H067-EX4-COMP	TCLP	Solid	1311	

Analysis Batch: 634938

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200014-6	H067-EX3-COMP	TCLP	Solid	8260C	634728
480-200014-16	H067-EX4-COMP	TCLP	Solid	8260C	634728
LB 480-634728/1-A	Method Blank	TCLP	Solid	8260C	634728
MB 480-634938/8	Method Blank	Total/NA	Solid	8260C	
LCS 480-634938/6	Lab Control Sample	Total/NA	Solid	8260C	
480-200014-16 MS	H067-EX4-COMP	TCLP	Solid	8260C	634728
480-200014-16 MSD	H067-EX4-COMP	TCLP	Solid	8260C	634728

GC/MS Semi VOA

Leach Batch: 634721

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200014-6	H067-EX3-COMP	TCLP	Solid	1311	
LB 480-634721/1-E	Method Blank	TCLP	Solid	1311	

Leach Batch: 634779

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200014-16	H067-EX4-COMP	TCLP	Solid	1311	
LB2 480-634779/1-E	Method Blank	TCLP	Solid	1311	
480-200014-16 MS	H067-EX4-COMP	TCLP	Solid	1311	
480-200014-16 MSD	H067-EX4-COMP	TCLP	Solid	1311	

Prep Batch: 635440

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200014-6	H067-EX3-COMP	TCLP	Solid	3510C	634721
480-200014-16	H067-EX4-COMP	TCLP	Solid	3510C	634779
LB 480-634721/1-E	Method Blank	TCLP	Solid	3510C	634721
LB2 480-634779/1-E	Method Blank	TCLP	Solid	3510C	634779
MB 480-635440/1-A	Method Blank	Total/NA	Solid	3510C	
LCS 480-635440/2-A	Lab Control Sample	Total/NA	Solid	3510C	
480-200014-16 MS	H067-EX4-COMP	TCLP	Solid	3510C	634779
480-200014-16 MSD	H067-EX4-COMP	TCLP	Solid	3510C	634779

Analysis Batch: 635692

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200014-16	H067-EX4-COMP	TCLP	Solid	8270D	635440
LB 480-634721/1-E	Method Blank	TCLP	Solid	8270D	635440
LB2 480-634779/1-E	Method Blank	TCLP	Solid	8270D	635440
MB 480-635440/1-A	Method Blank	Total/NA	Solid	8270D	635440
LCS 480-635440/2-A	Lab Control Sample	Total/NA	Solid	8270D	635440
480-200014-16 MS	H067-EX4-COMP	TCLP	Solid	8270D	635440
480-200014-16 MSD	H067-EX4-COMP	TCLP	Solid	8270D	635440

GC/MS Semi VOA

Analysis Batch: 635864

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200014-6	H067-EX3-COMP	TCLP	Solid	8270D	635440

GC Semi VOA

Prep Batch: 634713

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200014-6	H067-EX3-COMP	Total/NA	Solid	3550C	
480-200014-16	H067-EX4-COMP	Total/NA	Solid	3550C	
MB 480-634713/1-A	Method Blank	Total/NA	Solid	3550C	
LCS 480-634713/2-A	Lab Control Sample	Total/NA	Solid	3550C	
480-200014-16 MS	H067-EX4-COMP	Total/NA	Solid	3550C	
480-200014-16 MSD	H067-EX4-COMP	Total/NA	Solid	3550C	

Analysis Batch: 634933

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200014-6	H067-EX3-COMP	Total/NA	Solid	8082A	634713
480-200014-16	H067-EX4-COMP	Total/NA	Solid	8082A	634713
MB 480-634713/1-A	Method Blank	Total/NA	Solid	8082A	634713
LCS 480-634713/2-A	Lab Control Sample	Total/NA	Solid	8082A	634713
480-200014-16 MS	H067-EX4-COMP	Total/NA	Solid	8082A	634713
480-200014-16 MSD	H067-EX4-COMP	Total/NA	Solid	8082A	634713

Metals

Leach Batch: 634721

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200014-6	H067-EX3-COMP	TCLP	Solid	1311	
LB 480-634721/1-B	Method Blank	TCLP	Solid	1311	
LB 480-634721/1-D	Method Blank	TCLP	Solid	1311	

Leach Batch: 634779

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200014-16	H067-EX4-COMP	TCLP	Solid	1311	
LB2 480-634779/1-B	Method Blank	TCLP	Solid	1311	
LB2 480-634779/1-D	Method Blank	TCLP	Solid	1311	
480-200014-16 MS	H067-EX4-COMP	TCLP	Solid	1311	
480-200014-16 MSD	H067-EX4-COMP	TCLP	Solid	1311	

Prep Batch: 634888

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200014-6	H067-EX3-COMP	TCLP	Solid	3010A	634721
LB 480-634721/1-B	Method Blank	TCLP	Solid	3010A	634721
MB 480-634888/2-A	Method Blank	Total/NA	Solid	3010A	
LCS 480-634888/3-A	Lab Control Sample	Total/NA	Solid	3010A	

Prep Batch: 634892

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200014-16	H067-EX4-COMP	TCLP	Solid	3010A	634779
LB2 480-634779/1-B	Method Blank	TCLP	Solid	3010A	634779
MB 480-634892/2-A	Method Blank	Total/NA	Solid	3010A	
LCS 480-634892/3-A	Lab Control Sample	Total/NA	Solid	3010A	
480-200014-16 MS	H067-EX4-COMP	TCLP	Solid	3010A	634779

Metals (Continued)

Prep Batch: 634892 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200014-16 MSD	H067-EX4-COMP	TCLP	Solid	3010A	634779

Prep Batch: 634966

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200014-16	H067-EX4-COMP	TCLP	Solid	7470A	634779
LB2 480-634779/1-D	Method Blank	TCLP	Solid	7470A	634779
MB 480-634966/2-A	Method Blank	Total/NA	Solid	7470A	
LCS 480-634966/3-A	Lab Control Sample	Total/NA	Solid	7470A	
480-200014-16 MS	H067-EX4-COMP	TCLP	Solid	7470A	634779
480-200014-16 MSD	H067-EX4-COMP	TCLP	Solid	7470A	634779

Prep Batch: 634967

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200014-6	H067-EX3-COMP	TCLP	Solid	7470A	634721
LB 480-634721/1-D	Method Blank	TCLP	Solid	7470A	634721
MB 480-634967/2-A	Method Blank	Total/NA	Solid	7470A	
LCS 480-634967/3-A	Lab Control Sample	Total/NA	Solid	7470A	

Analysis Batch: 635040

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200014-16	H067-EX4-COMP	TCLP	Solid	6010C	634892
LB2 480-634779/1-B	Method Blank	TCLP	Solid	6010C	634892
MB 480-634892/2-A	Method Blank	Total/NA	Solid	6010C	634892
LCS 480-634892/3-A	Lab Control Sample	Total/NA	Solid	6010C	634892
480-200014-16 MS	H067-EX4-COMP	TCLP	Solid	6010C	634892
480-200014-16 MSD	H067-EX4-COMP	TCLP	Solid	6010C	634892

Analysis Batch: 635183

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200014-6	H067-EX3-COMP	TCLP	Solid	6010C	634888
LB 480-634721/1-B	Method Blank	TCLP	Solid	6010C	634888
MB 480-634888/2-A	Method Blank	Total/NA	Solid	6010C	634888
LCS 480-634888/3-A	Lab Control Sample	Total/NA	Solid	6010C	634888

Analysis Batch: 635187

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200014-6	H067-EX3-COMP	TCLP	Solid	7470A	634967
480-200014-16	H067-EX4-COMP	TCLP	Solid	7470A	634966
LB 480-634721/1-D	Method Blank	TCLP	Solid	7470A	634967
LB2 480-634779/1-D	Method Blank	TCLP	Solid	7470A	634966
MB 480-634966/2-A	Method Blank	Total/NA	Solid	7470A	634966
MB 480-634967/2-A	Method Blank	Total/NA	Solid	7470A	634967
LCS 480-634966/3-A	Lab Control Sample	Total/NA	Solid	7470A	634966
LCS 480-634967/3-A	Lab Control Sample	Total/NA	Solid	7470A	634967
480-200014-16 MS	H067-EX4-COMP	TCLP	Solid	7470A	634966
480-200014-16 MSD	H067-EX4-COMP	TCLP	Solid	7470A	634966

General Chemistry

Analysis Batch: 634682

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200014-6	H067-EX3-COMP	Total/NA	Solid	Moisture	
480-200014-16	H067-EX4-COMP	Total/NA	Solid	Moisture	
480-200014-16 MS	H067-EX4-COMP	Total/NA	Solid	Moisture	
480-200014-16 MSD	H067-EX4-COMP	Total/NA	Solid	Moisture	

Client Sample ID: H067-EX3-COMP

Lab Sample ID: 480-200014-6

Date Collected: 07/20/22 11:30

Matrix: Solid

Date Received: 07/22/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
TCLP	Leach	1311			634728	07/25/22 11:20	BML	TAL BUF
TCLP	Analysis	8260C		10	634938	07/27/22 07:29	CB	TAL BUF
TCLP	Leach	1311			634721	07/25/22 09:37	BML	TAL BUF
TCLP	Prep	3510C			635440	07/29/22 09:26	JMP	TAL BUF
TCLP	Analysis	8270D		1	635864	08/02/22 16:22	PJQ	TAL BUF
TCLP	Leach	1311			634721	07/25/22 09:37	BML	TAL BUF
TCLP	Prep	3010A			634888	07/26/22 11:22	NVK	TAL BUF
TCLP	Analysis	6010C		1	635183	07/27/22 13:04	LMH	TAL BUF
TCLP	Leach	1311			634721	07/25/22 09:37	BML	TAL BUF
TCLP	Prep	7470A			634967	07/27/22 10:23	NVK	TAL BUF
TCLP	Analysis	7470A		1	635187	07/27/22 15:21	NVK	TAL BUF
Total/NA	Analysis	Moisture		1	634682	07/24/22 17:53	DSC	TAL BUF

Client Sample ID: H067-EX3-COMP

Lab Sample ID: 480-200014-6

Date Collected: 07/20/22 11:30

Matrix: Solid

Date Received: 07/22/22 09:30

Percent Solids: 77.4

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			634713	07/25/22 09:14	JMP	TAL BUF
Total/NA	Analysis	8082A		1	634933	07/26/22 18:00	NC	TAL BUF

Client Sample ID: H067-EX4-COMP

Lab Sample ID: 480-200014-16

Date Collected: 07/21/22 11:30

Matrix: Solid

Date Received: 07/22/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
TCLP	Leach	1311			634728	07/25/22 10:20	BML	TAL BUF
TCLP	Analysis	8260C		10	634938	07/27/22 07:06	CB	TAL BUF
TCLP	Leach	1311			634779	07/25/22 13:45	BML	TAL BUF
TCLP	Prep	3510C			635440	07/29/22 09:26	JMP	TAL BUF
TCLP	Analysis	8270D		1	635692	08/01/22 16:36	PJQ	TAL BUF
TCLP	Leach	1311			634779	07/25/22 13:45	BML	TAL BUF
TCLP	Prep	3010A			634892	07/26/22 11:22	NVK	TAL BUF
TCLP	Analysis	6010C		1	635040	07/27/22 03:59	LMH	TAL BUF
TCLP	Leach	1311			634779	07/25/22 13:45	BML	TAL BUF
TCLP	Prep	7470A			634966	07/27/22 10:23	NVK	TAL BUF
TCLP	Analysis	7470A		1	635187	07/27/22 14:56	NVK	TAL BUF
Total/NA	Analysis	Moisture		1	634682	07/24/22 17:53	DSC	TAL BUF

Client Sample ID: H067-EX4-COMP

Lab Sample ID: 480-200014-16

Date Collected: 07/21/22 11:30

Matrix: Solid

Date Received: 07/22/22 09:30

Percent Solids: 81.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			634713	07/25/22 09:14	JMP	TAL BUF
Total/NA	Analysis	8082A		1	634933	07/26/22 17:46	NC	TAL BUF

Lab Chronicle

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200014-1

Laboratory References:

TAL BUF = Eurofins Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

Accreditation/Certification Summary

Client: ARCADIS U.S. Inc
Job ID: 480-200014-1
Project/Site: GTEOSI - Seneca Falls

Laboratory: Eurofins Buffalo

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
New York	NELAP	10026	03-31-23

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
7470A	7470A	Solid	Mercury
Moisture		Solid	Percent Moisture
Moisture		Solid	Percent Solids

Method Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200014-1

Method	Method Description	Protocol	Laboratory
8260C	Volatile Organic Compounds by GC/MS	SW846	TAL BUF
8270D	Semivolatile Organic Compounds (GC/MS)	SW846	TAL BUF
8082A	Polychlorinated Biphenyls (PCBs) by Gas Chromatography	SW846	TAL BUF
6010C	Metals (ICP)	SW846	TAL BUF
7470A	Mercury (CVAA)	SW846	TAL BUF
Moisture	Percent Moisture	EPA	TAL BUF
1311	TCLP Extraction	SW846	TAL BUF
3010A	Preparation, Total Metals	SW846	TAL BUF
3510C	Liquid-Liquid Extraction (Separatory Funnel)	SW846	TAL BUF
3550C	Ultrasonic Extraction	SW846	TAL BUF
5030C	Purge and Trap	SW846	TAL BUF
7470A	Preparation, Mercury	SW846	TAL BUF

Protocol References:

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL BUF = Eurofins Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

Sample Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200014-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
480-200014-6	H067-EX3-COMP	Solid	07/20/22 11:30	07/22/22 09:30
480-200014-16	H067-EX4-COMP	Solid	07/21/22 11:30	07/22/22 09:30

Eurofins TestAmerica, Buffalo
10 Hazelwood Drive

Amherst, NY 14228-2223
phone 716.691.2600 fax 716.691.7991

Chain of Custody Record

Syracuse #225

eurofins | Environment Testing America

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Test America Laboratories, Inc. d/b/a Eurofins TestAmerica

Client Contact	**Project Manager: Mark Flusche**	COC No: 4
Company: Arcadis of New York, Inc.	Email: mark.flusche@arcadis.com	Site Contact: Ryan Clare — Date: — ____ of ____ COCs
Address: 855 Route 146 Suite 210	Tel: 518-250-7322	Lab Contact: Schove, John R — Carrier: FedEx — TALS Project #:
Clifton Park, NY 12065	**Analysis Turnaround Time**	Sampler:
	☐ CALENDAR DAYS ☐ WORKING DAYS	**For Lab Use Only:**
	TAT if different from Below ____	
Project Name: GTEOSI - Seneca Falls	☑ 2 weeks	480-200014 Chain of Custody
Site:	☐ 1 week	
PO #: 30112357.00055 Project #:	☐ 2 days	
	☐ 1 day	

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	TCLP VOCs	TCLP SVOCs	TCLP Metals	PCBs	Pesticides/herbicides	HOLD at Lab	Total VOCs	Total SVOCs	Sample Specific Notes:
H067-EX3-01	7/20/22	0920	G	Soil	3					X			X	X	X	HOLD
H067-EX3-02	7/20/22	0930	G	Soil	3					X			X	X	X	HOLD
H067-EX3-03	7/20/22	1000	G	Soil	3					X			X	X	X	HOLD
H067-EX3-04	7/20/22	1015	G	Soil	3					X			✓	X	X	HOLD
H067-EX3-05	7/20/22	1110	G	Soil	3					X			✓	X	X	HOLD
H067-EX3-COMP	7/20/22	1130	C	Soil	5			X	X	X	X	X				
H067-EX4-01	7/20/22	1230	G	Soil	3					X			✓	X	X	HOLD
H067-EX4-02	7/20/22	1330	G	Soil	3					X			✓	X	X	HOLD
H067-EX4-03	7/20/22	1410	G	Soil	3					X			✓	X	X	HOLD
H067-EX4-04	7/21/22	0730	G	Soil	3					X			✓	X	X	HOLD
H067-EX4-05	7/21/22	0810	G	Soil	3					X			✓	X	X	HOLD
H067-EX4-06	7/21/22	0830	G	Soil	3					X			✓	X	X	HOLD
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other								1	1	1	1					

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☑ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☑ Disposal by Lab ☐ Archive for ____ Months

Special Instructions/QC Requirements & Comments:

4/10 4.6#1 ICE

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: ____ Corr'd: ____ Therm ID No.: ____

Relinquished by:	Company: Arcadis	Date/Time: 7/21/22 1502	Received by:	Company: ES-SYR	Date/Time: 7/21/22 1502
Relinquished by: R English	Company: Syr 7-21-22	Date/Time: 1800	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company: TA	Date/Time: 7/22/22 930

Form No. CA-C-WI-002, Rev. 4.34, dated 8/3/2020

8/4/2022

Eurofins TestAmerica, Buffalo
10 Hazelwood Drive

Amherst, NY 14228-2223
phone 716.691.2600 fax 716.691.7991

Chain of Custody Record

Syracuse #225 — eurofins | Environment Testing America

TestAmerica Laboratories, Inc. d/b/a Eurofins TestAmerica

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact	**Project Manager: Mark Flusche**	**Site Contact: Ryan Clare**	**Date:**
Company: Arcadis of New York, Inc.	**Email: mark.flusche@arcadis.com**	**Lab Contact: Schove, John R**	**Carrier: FedEx**
Address: 855 Route 146 Suite 210	**Tel: 518-250-7322**		
Clifton Park, NY 12065	**Analysis Turnaround Time**		
	☐ CALENDAR DAYS ☐ WORKING DAYS		
	TAT if different from Below _____		
	☑ 2 weeks		
Project Name: GTEOSI - Seneca Falls	☐ 1 week		
Site:	☐ 2 days		
PO #: 30112357.00055 Project #:	☐ 1 day		

COC No: 4 of _____ COCs

TALS Project #:

Sampler:

For Lab Use Only:
Walk-in Client:
Lab Sampling:

Job / SDG No.:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	TCLP VOCs	TCLP SVOCs	TCLP Metals	PCBs	Pesticides / Herbicides	HOLD at Lab	Total VOCs	Total SVOCs	Sample Specific Notes:
HO67 - EX4 - 07	7/21 /22	0900	G	Soil	3					X			X	X	X	HOLD
HO67 - EX4 - 08	7/21 /22	0930	G	Soil	3					X			X	X	X	HOLD
HO67 - EX4 - 09	7/21 /22	1000	G	Soil	3					X			X	X	X	HOLD
HO67 - EX4 - comp	7/21 /22	1130	C	Soil	10		Y	X	X	X	X	X				MS/MSD here
HO67 - EX5 - 03	7/21 /22	1210	G	Soil	3					X			X	X	X	HOLD
HO67 - EX5 - 04	7/21 /22	1220	G	Soil	3					X			X	X	X	HOLD
HO67 - EX5 - 05	7/21 /22	1300	G	Soil	3					X			X	X	X	HOLD
	/22			Soil												
	/22			Soil												
	/22			Soil												
	/22			Soil												
	/22			Soil												

Rec'd 7-21-22

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

	1	1	1	1

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☑ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☑ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: _____ Corr'd: _____ Therm ID No.: _____

Relinquished by:	Company: Arcadis	Date/Time: 7/21/22 1502	Received by:	Company: ES-SYR	Date/Time: 7/21/22 1502
Relinquished by:	Company: Syr 7-21-22	Date/Time: 1805	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by: PSL	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.34, dated 8/3/2020

Login Sample Receipt Checklist

Client: ARCADIS U.S. Inc

Job Number: 480-200014-1

Login Number: 200014
List Number: 1
Creator: Kolb, Chris M

List Source: Eurofins Buffalo

Question	Answer	Comment
Radioactivity either was not measured or, if measured, is at or below background	True	
The cooler's custody seal, if present, is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time (Excluding tests with immediate HTs)..	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	N/A	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Sampling Company provided.	True	ARCADIS
Samples received within 48 hours of sampling.	True	
Samples requiring field filtration have been filtered in the field.	True	
Chlorine Residual checked.	N/A	

eurofins | Environment Testing America



ANALYTICAL REPORT

Eurofins Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Tel: (716)691-2600

Laboratory Job ID: 480-200015-1
Client Project/Site: GTEOSI - Seneca Falls

For:
ARCADIS U.S. Inc
855 Route 146
Suite 210
Clifton Park, New York 12065

Attn: Mark Flusche

Authorized for release by:
7/29/2022 1:17:28 PM
Rebecca Jones, Project Management Assistant I
(716)504-9884
Rebecca.Jones@et.eurofinsus.com

Designee for

John Schove, Project Manager II
(716)504-9838
John.Schove@et.eurofinsus.com

LINKS

Review your project results through my EOL

Have a Question? Ask The Expert

Visit us at: www.eurofinsus.com/Env

The test results in this report meet all 2003 NELAC, 2009 TNI, and 2016 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Cover Page 1
Table of Contents 2
Definitions/Glossary 3
Case Narrative 4
Detection Summary 5
Client Sample Results 6
Surrogate Summary 10
QC Sample Results 11
QC Association Summary 16
Lab Chronicle 18
Certification Summary 19
Method Summary 21
Sample Summary 22
Chain of Custody 23
Receipt Checklists 25

Definitions/Glossary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200015-1

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
*+	LCS and/or LCSD is outside acceptance limits, high biased.
*3	ISTD response or retention time outside acceptable limits.
vs	Reported analyte concentrations are below 200 ug/kg and may be biased low due to the sample not being collected according to 5035A-L low-level specifications.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 480-200015-1

Laboratory: Eurofins Buffalo

Narrative

Job Narrative
480-200015-1

Comments
No additional comments.

Receipt
The samples were received on 7/22/2022 9:30 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 4.0º C.

GC/MS VOA
Method 8260C: The continuing calibration verification (CCV) associated with batch 480-634831 recovered outside acceptance criteria, low biased, for Carbon disulfide and Ethyl ether. A reporting limit (RL) standard was analyzed, and the target analytes are detected. Since the associated sample was non-detect for the analytes, the data is reported. The associated sample is: H067-EX4-01 (480-200015-2).

Method 8260C: The laboratory control sample (LCS) and / or laboratory control sample duplicate (LCSD) for preparation batch 480-634829 and analytical batch 480-634831 recovered outside control limits for the following analytes: Ethyl acetate and Isobutyl alcohol. These analytes were biased high in the LCS and were not detected in the associated sample; therefore, the data has been reported.The associated sample is: H067-EX4-01 (480-200015-2)

Method 8260C: Internal standard (ISTD) response for the following sample was outside control limits: H067-EX3-02 (480-200015-1). The sample(s) was re-extracted and/or re-analyzed and ISTD response was outside control limits.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

GC/MS Semi VOA
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

GC VOA
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Organic Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Detection Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200015-1

Client Sample ID: H067-EX3-02 — Lab Sample ID: 480-200015-1

No Detections.

Client Sample ID: H067-EX4-01 — Lab Sample ID: 480-200015-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Methylene Chloride	14	vs	5.8		ug/Kg	1	☼	8260C	Total/NA

This Detection Summary does not include radiochemical test results.

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200015-1

Client Sample ID: H067-EX3-02
Date Collected: 07/20/22 09:30
Date Received: 07/22/22 09:30

Lab Sample ID: 480-200015-1
Matrix: Solid
Percent Solids: 51.8

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND	vs	9.3		ug/Kg	☼	07/26/22 17:43	07/27/22 00:24	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	vs	9.3		ug/Kg	☼	07/26/22 17:43	07/27/22 00:24	1
1,1,2-Trichloroethane	ND	vs	9.3		ug/Kg	☼	07/26/22 17:43	07/27/22 00:24	1
1,2-Dichlorobenzene	ND	*3 vs	9.3		ug/Kg	☼	07/26/22 17:43	07/27/22 00:24	1
Acetone	ND	vs	47		ug/Kg	☼	07/26/22 17:43	07/27/22 00:24	1
Benzene	ND	vs	9.3		ug/Kg	☼	07/26/22 17:43	07/27/22 00:24	1
Carbon disulfide	ND	vs	9.3		ug/Kg	☼	07/26/22 17:43	07/27/22 00:24	1
Carbon tetrachloride	ND	vs	9.3		ug/Kg	☼	07/26/22 17:43	07/27/22 00:24	1
Chlorobenzene	ND	vs	9.3		ug/Kg	☼	07/26/22 17:43	07/27/22 00:24	1
Cyclohexanone	ND	*3 vs	93		ug/Kg	☼	07/26/22 17:43	07/27/22 00:24	1
Ethyl acetate	ND	vs	9.3		ug/Kg	☼	07/26/22 17:43	07/27/22 00:24	1
Ethyl ether	ND	vs	47		ug/Kg	☼	07/26/22 17:43	07/27/22 00:24	1
Ethylbenzene	ND	vs	9.3		ug/Kg	☼	07/26/22 17:43	07/27/22 00:24	1
Isobutyl alcohol	ND	vs	370		ug/Kg	☼	07/26/22 17:43	07/27/22 00:24	1
Methyl ethyl ketone (MEK)	ND	vs	47		ug/Kg	☼	07/26/22 17:43	07/27/22 00:24	1
Methyl isobutyl ketone (MIBK)	ND	vs	47		ug/Kg	☼	07/26/22 17:43	07/27/22 00:24	1
Methylene Chloride	ND	vs	9.3		ug/Kg	☼	07/26/22 17:43	07/27/22 00:24	1
n-Butanol	ND	vs	93		ug/Kg	☼	07/26/22 17:43	07/27/22 00:24	1
Tetrachloroethene	ND	vs	9.3		ug/Kg	☼	07/26/22 17:43	07/27/22 00:24	1
Toluene	ND	vs	9.3		ug/Kg	☼	07/26/22 17:43	07/27/22 00:24	1
Trichloroethene	ND	vs	9.3		ug/Kg	☼	07/26/22 17:43	07/27/22 00:24	1
Trichlorofluoromethane	ND	vs	9.3		ug/Kg	☼	07/26/22 17:43	07/27/22 00:24	1
Xylenes, Total	ND	vs	19		ug/Kg	☼	07/26/22 17:43	07/27/22 00:24	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*103*		*64 - 126*	*07/26/22 17:43*	*07/27/22 00:24*	*1*
4-Bromofluorobenzene (Surr)	*73*		*72 - 126*	*07/26/22 17:43*	*07/27/22 00:24*	*1*
Dibromofluoromethane (Surr)	*105*		*60 - 140*	*07/26/22 17:43*	*07/27/22 00:24*	*1*
Toluene-d8 (Surr)	*106*		*71 - 125*	*07/26/22 17:43*	*07/27/22 00:24*	*1*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m & p - Cresol	ND		620		ug/Kg	☼	07/22/22 15:34	07/25/22 20:38	1
Nitrobenzene	ND		320		ug/Kg	☼	07/22/22 15:34	07/25/22 20:38	1
o-Cresol	ND		320		ug/Kg	☼	07/22/22 15:34	07/25/22 20:38	1
Pyridine	ND		620		ug/Kg	☼	07/22/22 15:34	07/25/22 20:38	1
Total Cresols	ND		620		ug/Kg	☼	07/22/22 15:34	07/25/22 20:38	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*91*		*54 - 120*	*07/22/22 15:34*	*07/25/22 20:38*	*1*
2-Fluorobiphenyl (Surr)	*87*		*60 - 120*	*07/22/22 15:34*	*07/25/22 20:38*	*1*
2-Fluorophenol (Surr)	*76*		*52 - 120*	*07/22/22 15:34*	*07/25/22 20:38*	*1*
Nitrobenzene-d5 (Surr)	*78*		*53 - 120*	*07/22/22 15:34*	*07/25/22 20:38*	*1*
Phenol-d5 (Surr)	*83*		*54 - 120*	*07/22/22 15:34*	*07/25/22 20:38*	*1*
p-Terphenyl-d14 (Surr)	*93*		*79 - 130*	*07/22/22 15:34*	*07/25/22 20:38*	*1*

Method: 8015D - Nonhalogenated Organic Compounds - Direct Injection (GC) - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methanol	ND		1900		ug/Kg	☼		07/25/22 18:19	1

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200015-1

Client Sample ID: H067-EX3-02
Date Collected: 07/20/22 09:30
Date Received: 07/22/22 09:30

Lab Sample ID: 480-200015-1
Matrix: Solid
Percent Solids: 51.8

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Acetone	72		43 - 129		07/25/22 18:19	1
Acetone	65		43 - 129		07/25/22 18:19	1

Client Sample ID: H067-EX4-01
Date Collected: 07/20/22 12:30
Date Received: 07/22/22 09:30

Lab Sample ID: 480-200015-2
Matrix: Solid
Percent Solids: 86.7

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND	vs	5.8		ug/Kg	☼	07/25/22 16:58	07/26/22 05:36	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	vs	5.8		ug/Kg	☼	07/25/22 16:58	07/26/22 05:36	1
1,1,2-Trichloroethane	ND	vs	5.8		ug/Kg	☼	07/25/22 16:58	07/26/22 05:36	1
1,2-Dichlorobenzene	ND	vs	5.8		ug/Kg	☼	07/25/22 16:58	07/26/22 05:36	1
Acetone	ND	vs	29		ug/Kg	☼	07/25/22 16:58	07/26/22 05:36	1
Benzene	ND	vs	5.8		ug/Kg	☼	07/25/22 16:58	07/26/22 05:36	1
Carbon disulfide	ND	vs	5.8		ug/Kg	☼	07/25/22 16:58	07/26/22 05:36	1
Carbon tetrachloride	ND	vs	5.8		ug/Kg	☼	07/25/22 16:58	07/26/22 05:36	1
Chlorobenzene	ND	vs	5.8		ug/Kg	☼	07/25/22 16:58	07/26/22 05:36	1
Cyclohexanone	ND	vs	58		ug/Kg	☼	07/25/22 16:58	07/26/22 05:36	1
Ethyl acetate	ND	*+ vs	5.8		ug/Kg	☼	07/25/22 16:58	07/26/22 05:36	1
Ethyl ether	ND	vs	29		ug/Kg	☼	07/25/22 16:58	07/26/22 05:36	1
Ethylbenzene	ND	vs	5.8		ug/Kg	☼	07/25/22 16:58	07/26/22 05:36	1
Isobutyl alcohol	ND	*+ vs	230		ug/Kg	☼	07/25/22 16:58	07/26/22 05:36	1
Methyl ethyl ketone (MEK)	ND	vs	29		ug/Kg	☼	07/25/22 16:58	07/26/22 05:36	1
Methyl isobutyl ketone (MIBK)	ND	vs	29		ug/Kg	☼	07/25/22 16:58	07/26/22 05:36	1
Methylene Chloride	**14**	**vs**	5.8		ug/Kg	☼	07/25/22 16:58	07/26/22 05:36	1
n-Butanol	ND	vs	58		ug/Kg	☼	07/25/22 16:58	07/26/22 05:36	1
Tetrachloroethene	ND	vs	5.8		ug/Kg	☼	07/25/22 16:58	07/26/22 05:36	1
Toluene	ND	vs	5.8		ug/Kg	☼	07/25/22 16:58	07/26/22 05:36	1
Trichloroethene	ND	vs	5.8		ug/Kg	☼	07/25/22 16:58	07/26/22 05:36	1
Trichlorofluoromethane	ND	vs	5.8		ug/Kg	☼	07/25/22 16:58	07/26/22 05:36	1
Xylenes, Total	ND	vs	12		ug/Kg	☼	07/25/22 16:58	07/26/22 05:36	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*100*		*64 - 126*	*07/25/22 16:58*	*07/26/22 05:36*	*1*
4-Bromofluorobenzene (Surr)	*85*		*72 - 126*	*07/25/22 16:58*	*07/26/22 05:36*	*1*
Dibromofluoromethane (Surr)	*101*		*60 - 140*	*07/25/22 16:58*	*07/26/22 05:36*	*1*
Toluene-d8 (Surr)	*97*		*71 - 125*	*07/25/22 16:58*	*07/26/22 05:36*	*1*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m & p - Cresol	ND		370		ug/Kg	☼	07/22/22 15:34	07/25/22 21:03	1
Nitrobenzene	ND		190		ug/Kg	☼	07/22/22 15:34	07/25/22 21:03	1
o-Cresol	ND		190		ug/Kg	☼	07/22/22 15:34	07/25/22 21:03	1
Pyridine	ND		370		ug/Kg	☼	07/22/22 15:34	07/25/22 21:03	1
Total Cresols	ND		370		ug/Kg	☼	07/22/22 15:34	07/25/22 21:03	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*98*		*54 - 120*	*07/22/22 15:34*	*07/25/22 21:03*	*1*
2-Fluorobiphenyl (Surr)	*99*		*60 - 120*	*07/22/22 15:34*	*07/25/22 21:03*	*1*
2-Fluorophenol (Surr)	*81*		*52 - 120*	*07/22/22 15:34*	*07/25/22 21:03*	*1*
Nitrobenzene-d5 (Surr)	*89*		*53 - 120*	*07/22/22 15:34*	*07/25/22 21:03*	*1*
Phenol-d5 (Surr)	*85*		*54 - 120*	*07/22/22 15:34*	*07/25/22 21:03*	*1*
p-Terphenyl-d14 (Surr)	*106*		*79 - 130*	*07/22/22 15:34*	*07/25/22 21:03*	*1*

Method: 8015D - Nonhalogenated Organic Compounds - Direct Injection (GC) - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methanol	ND		1200		ug/Kg	☼		07/25/22 18:39	1

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200015-1

Client Sample ID: H067-EX4-01
Date Collected: 07/20/22 12:30
Date Received: 07/22/22 09:30

Lab Sample ID: 480-200015-2
Matrix: Solid
Percent Solids: 86.7

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Acetone	82		43 - 129		07/25/22 18:39	1
Acetone	74		43 - 129		07/25/22 18:39	1

Surrogate Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200015-1

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(64-126)	(72-126)	(60-140)	(71-125)
480-200015-1	H067-EX3-02	103	73	105	106
480-200015-2	H067-EX4-01	100	85	101	97
LCS 480-634829/1-A	Lab Control Sample	101	94	99	93
LCS 480-634984/1-A	Lab Control Sample	94	93	98	95
LCSD 480-634829/2-A	Lab Control Sample Dup	100	95	99	94
MB 480-634829/3-A	Method Blank	97	95	101	92
MB 480-634984/2-A	Method Blank	100	96	105	90

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHd14
Lab Sample ID	Client Sample ID	(54-120)	(60-120)	(52-120)	(53-120)	(54-120)	(79-130)
480-200015-1	H067-EX3-02	91	87	76	78	83	93
480-200015-2	H067-EX4-01	98	99	81	89	85	106
LCS 480-634627/2-A	Lab Control Sample	92	77	74	75	75	100
MB 480-634627/1-A	Method Blank	81	83	76	82	81	102

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHd14 = p-Terphenyl-d14 (Surr)

Method: 8015D - Nonhalogenated Organic Compounds - Direct Injection (GC)

Matrix: Solid **Prep Type: Soluble**

		Percent Surrogate Recovery (Acceptance Limits)	
		Acetone1	Acetone2
Lab Sample ID	Client Sample ID	(43-129)	(43-129)
480-200015-1	H067-EX3-02	72	65
480-200015-2	H067-EX4-01	82	74
LCS 410-279143/2-A	Lab Control Sample	97	99
MB 410-279143/1-A	Method Blank	112	108

Surrogate Legend

Acetone = Acetone

Method: 8260C - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 480-634829/3-A
Matrix: Solid
Analysis Batch: 634831

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 634829

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		5.0		ug/Kg		07/25/22 16:58	07/25/22 21:49	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		5.0		ug/Kg		07/25/22 16:58	07/25/22 21:49	1
1,1,2-Trichloroethane	ND		5.0		ug/Kg		07/25/22 16:58	07/25/22 21:49	1
1,2-Dichlorobenzene	ND		5.0		ug/Kg		07/25/22 16:58	07/25/22 21:49	1
Acetone	ND		25		ug/Kg		07/25/22 16:58	07/25/22 21:49	1
Benzene	ND		5.0		ug/Kg		07/25/22 16:58	07/25/22 21:49	1
Carbon disulfide	ND		5.0		ug/Kg		07/25/22 16:58	07/25/22 21:49	1
Carbon tetrachloride	ND		5.0		ug/Kg		07/25/22 16:58	07/25/22 21:49	1
Chlorobenzene	ND		5.0		ug/Kg		07/25/22 16:58	07/25/22 21:49	1
Cyclohexanone	ND		50		ug/Kg		07/25/22 16:58	07/25/22 21:49	1
Ethyl acetate	ND		5.0		ug/Kg		07/25/22 16:58	07/25/22 21:49	1
Ethyl ether	ND		25		ug/Kg		07/25/22 16:58	07/25/22 21:49	1
Ethylbenzene	ND		5.0		ug/Kg		07/25/22 16:58	07/25/22 21:49	1
Isobutyl alcohol	ND		200		ug/Kg		07/25/22 16:58	07/25/22 21:49	1
Methyl ethyl ketone (MEK)	ND		25		ug/Kg		07/25/22 16:58	07/25/22 21:49	1
Methyl isobutyl ketone (MIBK)	ND		25		ug/Kg		07/25/22 16:58	07/25/22 21:49	1
Methylene Chloride	ND		5.0		ug/Kg		07/25/22 16:58	07/25/22 21:49	1
n-Butanol	ND		50		ug/Kg		07/25/22 16:58	07/25/22 21:49	1
Tetrachloroethene	ND		5.0		ug/Kg		07/25/22 16:58	07/25/22 21:49	1
Toluene	ND		5.0		ug/Kg		07/25/22 16:58	07/25/22 21:49	1
Trichloroethene	ND		5.0		ug/Kg		07/25/22 16:58	07/25/22 21:49	1
Trichlorofluoromethane	ND		5.0		ug/Kg		07/25/22 16:58	07/25/22 21:49	1
Xylenes, Total	ND		10		ug/Kg		07/25/22 16:58	07/25/22 21:49	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*97*		*64 - 126*	*07/25/22 16:58*	*07/25/22 21:49*	*1*
4-Bromofluorobenzene (Surr)	*95*		*72 - 126*	*07/25/22 16:58*	*07/25/22 21:49*	*1*
Dibromofluoromethane (Surr)	*101*		*60 - 140*	*07/25/22 16:58*	*07/25/22 21:49*	*1*
Toluene-d8 (Surr)	*92*		*71 - 125*	*07/25/22 16:58*	*07/25/22 21:49*	*1*

Lab Sample ID: LCS 480-634829/1-A
Matrix: Solid
Analysis Batch: 634831

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 634829

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
1,1,1-Trichloroethane	50.0	52.7		ug/Kg		105	77 - 121
1,1,2-Trichloro-1,2,2-trifluoroethane	50.0	55.4		ug/Kg		111	60 - 140
1,1,2-Trichloroethane	50.0	52.0		ug/Kg		104	78 - 122
1,2-Dichlorobenzene	50.0	50.0		ug/Kg		100	75 - 120
Acetone	250	247		ug/Kg		99	61 - 137
Benzene	50.0	51.5		ug/Kg		103	79 - 127
Carbon disulfide	50.0	52.4		ug/Kg		105	64 - 131
Carbon tetrachloride	50.0	55.5		ug/Kg		111	75 - 135
Chlorobenzene	50.0	50.6		ug/Kg		101	76 - 124
Ethyl ether	50.0	43.9		ug/Kg		88	55 - 120
Ethylbenzene	50.0	52.1		ug/Kg		104	80 - 120
Isobutyl alcohol	1250	3040	*+	ug/Kg		243	71 - 140

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 480-634829/1-A
Matrix: Solid
Analysis Batch: 634831

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 634829

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Methyl ethyl ketone (MEK)	250	243		ug/Kg		97	70 - 134
Methyl isobutyl ketone (MIBK)	250	271		ug/Kg		108	65 - 133
Methylene Chloride	50.0	54.7		ug/Kg		109	61 - 127
Tetrachloroethene	50.0	55.6		ug/Kg		111	74 - 122
Toluene	50.0	49.9		ug/Kg		100	74 - 128
Trichloroethene	50.0	52.2		ug/Kg		104	77 - 129
Trichlorofluoromethane	50.0	51.0		ug/Kg		102	65 - 146

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*101*		*64 - 126*
4-Bromofluorobenzene (Surr)	*94*		*72 - 126*
Dibromofluoromethane (Surr)	*99*		*60 - 140*
Toluene-d8 (Surr)	*93*		*71 - 125*

Lab Sample ID: LCSD 480-634829/2-A
Matrix: Solid
Analysis Batch: 634831

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 634829

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
1,1,1-Trichloroethane	50.0	51.1		ug/Kg		102	77 - 121	3	20
1,1,2-Trichloro-1,2,2-trifluoroethane	50.0	50.1		ug/Kg		100	60 - 140	10	20
1,1,2-Trichloroethane	50.0	52.9		ug/Kg		106	78 - 122	2	20
1,2-Dichlorobenzene	50.0	49.5		ug/Kg		99	75 - 120	1	20
Acetone	250	249		ug/Kg		100	61 - 137	1	20
Benzene	50.0	50.8		ug/Kg		102	79 - 127	1	20
Carbon disulfide	50.0	50.8		ug/Kg		102	64 - 131	3	20
Carbon tetrachloride	50.0	54.5		ug/Kg		109	75 - 135	2	20
Chlorobenzene	50.0	50.9		ug/Kg		102	76 - 124	1	20
Ethyl ether	50.0	39.3		ug/Kg		79	55 - 120	11	20
Ethylbenzene	50.0	51.1		ug/Kg		102	80 - 120	2	20
Isobutyl alcohol	1250	2910	*+	ug/Kg		233	71 - 140	4	20
Methyl ethyl ketone (MEK)	250	247		ug/Kg		99	70 - 134	2	20
Methyl isobutyl ketone (MIBK)	250	279		ug/Kg		111	65 - 133	3	20
Methylene Chloride	50.0	54.4		ug/Kg		109	61 - 127	1	20
Tetrachloroethene	50.0	55.3		ug/Kg		111	74 - 122	1	20
Toluene	50.0	49.2		ug/Kg		98	74 - 128	1	20
Trichloroethene	50.0	51.5		ug/Kg		103	77 - 129	1	20
Trichlorofluoromethane	50.0	49.1		ug/Kg		98	65 - 146	4	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*100*		*64 - 126*
4-Bromofluorobenzene (Surr)	*95*		*72 - 126*
Dibromofluoromethane (Surr)	*99*		*60 - 140*
Toluene-d8 (Surr)	*94*		*71 - 125*

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: MB 480-634984/2-A
Matrix: Solid
Analysis Batch: 634986

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 634984

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		5.0		ug/Kg		07/26/22 17:43	07/26/22 21:01	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		5.0		ug/Kg		07/26/22 17:43	07/26/22 21:01	1
1,1,2-Trichloroethane	ND		5.0		ug/Kg		07/26/22 17:43	07/26/22 21:01	1
1,2-Dichlorobenzene	ND		5.0		ug/Kg		07/26/22 17:43	07/26/22 21:01	1
Acetone	ND		25		ug/Kg		07/26/22 17:43	07/26/22 21:01	1
Benzene	ND		5.0		ug/Kg		07/26/22 17:43	07/26/22 21:01	1
Carbon disulfide	ND		5.0		ug/Kg		07/26/22 17:43	07/26/22 21:01	1
Carbon tetrachloride	ND		5.0		ug/Kg		07/26/22 17:43	07/26/22 21:01	1
Chlorobenzene	ND		5.0		ug/Kg		07/26/22 17:43	07/26/22 21:01	1
Cyclohexanone	ND		50		ug/Kg		07/26/22 17:43	07/26/22 21:01	1
Ethyl acetate	ND		5.0		ug/Kg		07/26/22 17:43	07/26/22 21:01	1
Ethyl ether	ND		25		ug/Kg		07/26/22 17:43	07/26/22 21:01	1
Ethylbenzene	ND		5.0		ug/Kg		07/26/22 17:43	07/26/22 21:01	1
Isobutyl alcohol	ND		200		ug/Kg		07/26/22 17:43	07/26/22 21:01	1
Methyl ethyl ketone (MEK)	ND		25		ug/Kg		07/26/22 17:43	07/26/22 21:01	1
Methyl isobutyl ketone (MIBK)	ND		25		ug/Kg		07/26/22 17:43	07/26/22 21:01	1
Methylene Chloride	ND		5.0		ug/Kg		07/26/22 17:43	07/26/22 21:01	1
n-Butanol	ND		50		ug/Kg		07/26/22 17:43	07/26/22 21:01	1
Tetrachloroethene	ND		5.0		ug/Kg		07/26/22 17:43	07/26/22 21:01	1
Toluene	ND		5.0		ug/Kg		07/26/22 17:43	07/26/22 21:01	1
Trichloroethene	ND		5.0		ug/Kg		07/26/22 17:43	07/26/22 21:01	1
Trichlorofluoromethane	ND		5.0		ug/Kg		07/26/22 17:43	07/26/22 21:01	1
Xylenes, Total	ND		10		ug/Kg		07/26/22 17:43	07/26/22 21:01	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*100*		*64 - 126*	*07/26/22 17:43*	*07/26/22 21:01*	*1*
4-Bromofluorobenzene (Surr)	*96*		*72 - 126*	*07/26/22 17:43*	*07/26/22 21:01*	*1*
Dibromofluoromethane (Surr)	*105*		*60 - 140*	*07/26/22 17:43*	*07/26/22 21:01*	*1*
Toluene-d8 (Surr)	*90*		*71 - 125*	*07/26/22 17:43*	*07/26/22 21:01*	*1*

Lab Sample ID: LCS 480-634984/1-A
Matrix: Solid
Analysis Batch: 634986

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 634984

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
1,1,1-Trichloroethane	50.0	53.9		ug/Kg		108	77 - 121
1,1,2-Trichloro-1,2,2-trifluoroethane	50.0	56.9		ug/Kg		114	60 - 140
1,1,2-Trichloroethane	50.0	52.0		ug/Kg		104	78 - 122
1,2-Dichlorobenzene	50.0	50.8		ug/Kg		102	75 - 120
Acetone	250	248		ug/Kg		99	61 - 137
Benzene	50.0	52.1		ug/Kg		104	79 - 127
Carbon disulfide	50.0	53.8		ug/Kg		108	64 - 131
Carbon tetrachloride	50.0	57.6		ug/Kg		115	75 - 135
Chlorobenzene	50.0	52.0		ug/Kg		104	76 - 124
Ethyl ether	50.0	43.8		ug/Kg		88	55 - 120
Ethylbenzene	50.0	53.1		ug/Kg		106	80 - 120
Isobutyl alcohol	1250	1300		ug/Kg		104	71 - 140

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 480-634984/1-A
Matrix: Solid
Analysis Batch: 634986

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 634984

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Methyl ethyl ketone (MEK)	250	263		ug/Kg		105	70 - 134
Methyl isobutyl ketone (MIBK)	250	285		ug/Kg		114	65 - 133
Methylene Chloride	50.0	55.2		ug/Kg		110	61 - 127
Tetrachloroethene	50.0	54.7		ug/Kg		109	74 - 122
Toluene	50.0	51.6		ug/Kg		103	74 - 128
Trichloroethene	50.0	52.5		ug/Kg		105	77 - 129
Trichlorofluoromethane	50.0	40.1		ug/Kg		80	65 - 146

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*94*		*64 - 126*
4-Bromofluorobenzene (Surr)	*93*		*72 - 126*
Dibromofluoromethane (Surr)	*98*		*60 - 140*
Toluene-d8 (Surr)	*95*		*71 - 125*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 480-634627/1-A
Matrix: Solid
Analysis Batch: 634771

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 634627

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m & p - Cresol	ND		320		ug/Kg		07/22/22 15:34	07/25/22 14:37	1
Nitrobenzene	ND		170		ug/Kg		07/22/22 15:34	07/25/22 14:37	1
o-Cresol	ND		170		ug/Kg		07/22/22 15:34	07/25/22 14:37	1
Pyridine	ND		320		ug/Kg		07/22/22 15:34	07/25/22 14:37	1
Total Cresols	ND		320		ug/Kg		07/22/22 15:34	07/25/22 14:37	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*81*		*54 - 120*	*07/22/22 15:34*	*07/25/22 14:37*	*1*
2-Fluorobiphenyl (Surr)	*83*		*60 - 120*	*07/22/22 15:34*	*07/25/22 14:37*	*1*
2-Fluorophenol (Surr)	*76*		*52 - 120*	*07/22/22 15:34*	*07/25/22 14:37*	*1*
Nitrobenzene-d5 (Surr)	*82*		*53 - 120*	*07/22/22 15:34*	*07/25/22 14:37*	*1*
Phenol-d5 (Surr)	*81*		*54 - 120*	*07/22/22 15:34*	*07/25/22 14:37*	*1*
p-Terphenyl-d14 (Surr)	*102*		*79 - 130*	*07/22/22 15:34*	*07/25/22 14:37*	*1*

Lab Sample ID: LCS 480-634627/2-A
Matrix: Solid
Analysis Batch: 634771

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 634627

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Nitrobenzene	1630	1270		ug/Kg		78	54 - 120
o-Cresol	1630	1310		ug/Kg		80	54 - 120
Pyridine	3270	1900		ug/Kg		58	23 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*92*		*54 - 120*
2-Fluorobiphenyl (Surr)	*77*		*60 - 120*
2-Fluorophenol (Surr)	*74*		*52 - 120*

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 480-634627/2-A
Matrix: Solid
Analysis Batch: 634771

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 634627

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Nitrobenzene-d5 (Surr)	*75*		*53 - 120*
Phenol-d5 (Surr)	*75*		*54 - 120*
p-Terphenyl-d14 (Surr)	*100*		*79 - 130*

Method: 8015D - Nonhalogenated Organic Compounds - Direct Injection (GC)

Lab Sample ID: MB 410-279143/1-A
Matrix: Solid
Analysis Batch: 279146

Client Sample ID: Method Blank
Prep Type: Soluble

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methanol	ND		1000		ug/Kg			07/25/22 16:01	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Acetone	*112*		*43 - 129*		*07/25/22 16:01*	*1*
Acetone	*108*		*43 - 129*		*07/25/22 16:01*	*1*

Lab Sample ID: LCS 410-279143/2-A
Matrix: Solid
Analysis Batch: 279146

Client Sample ID: Lab Control Sample
Prep Type: Soluble

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Methanol			2510	2510		ug/Kg		100	72 - 134		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Acetone	*97*		*43 - 129*
Acetone	*99*		*43 - 129*

GC/MS VOA

Prep Batch: 634829

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200015-2	H067-EX4-01	Total/NA	Solid	5035A_L	
MB 480-634829/3-A	Method Blank	Total/NA	Solid	5035A_L	
LCS 480-634829/1-A	Lab Control Sample	Total/NA	Solid	5035A_L	
LCSD 480-634829/2-A	Lab Control Sample Dup	Total/NA	Solid	5035A_L	

Analysis Batch: 634831

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200015-2	H067-EX4-01	Total/NA	Solid	8260C	634829
MB 480-634829/3-A	Method Blank	Total/NA	Solid	8260C	634829
LCS 480-634829/1-A	Lab Control Sample	Total/NA	Solid	8260C	634829
LCSD 480-634829/2-A	Lab Control Sample Dup	Total/NA	Solid	8260C	634829

Prep Batch: 634984

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200015-1	H067-EX3-02	Total/NA	Solid	5035A_L	
MB 480-634984/2-A	Method Blank	Total/NA	Solid	5035A_L	
LCS 480-634984/1-A	Lab Control Sample	Total/NA	Solid	5035A_L	

Analysis Batch: 634986

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200015-1	H067-EX3-02	Total/NA	Solid	8260C	634984
MB 480-634984/2-A	Method Blank	Total/NA	Solid	8260C	634984
LCS 480-634984/1-A	Lab Control Sample	Total/NA	Solid	8260C	634984

GC/MS Semi VOA

Prep Batch: 634627

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200015-1	H067-EX3-02	Total/NA	Solid	3550C	
480-200015-2	H067-EX4-01	Total/NA	Solid	3550C	
MB 480-634627/1-A	Method Blank	Total/NA	Solid	3550C	
LCS 480-634627/2-A	Lab Control Sample	Total/NA	Solid	3550C	

Analysis Batch: 634771

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200015-1	H067-EX3-02	Total/NA	Solid	8270D	634627
480-200015-2	H067-EX4-01	Total/NA	Solid	8270D	634627
MB 480-634627/1-A	Method Blank	Total/NA	Solid	8270D	634627
LCS 480-634627/2-A	Lab Control Sample	Total/NA	Solid	8270D	634627

GC Semi VOA

Leach Batch: 279143

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200015-1	H067-EX3-02	Soluble	Solid	DI Leach	
480-200015-2	H067-EX4-01	Soluble	Solid	DI Leach	
MB 410-279143/1-A	Method Blank	Soluble	Solid	DI Leach	
LCS 410-279143/2-A	Lab Control Sample	Soluble	Solid	DI Leach	

Analysis Batch: 279146

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200015-1	H067-EX3-02	Soluble	Solid	8015D	279143

GC Semi VOA (Continued)

Analysis Batch: 279146 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200015-2	H067-EX4-01	Soluble	Solid	8015D	279143
MB 410-279143/1-A	Method Blank	Soluble	Solid	8015D	279143
LCS 410-279143/2-A	Lab Control Sample	Soluble	Solid	8015D	279143

General Chemistry

Analysis Batch: 634682

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200015-1	H067-EX3-02	Total/NA	Solid	Moisture	
480-200015-2	H067-EX4-01	Total/NA	Solid	Moisture	

Lab Chronicle

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200015-1

Client Sample ID: H067-EX3-02
Date Collected: 07/20/22 09:30
Date Received: 07/22/22 09:30

Lab Sample ID: 480-200015-1
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	634682	07/24/22 17:53	DSC	TAL BUF

Client Sample ID: H067-EX3-02
Date Collected: 07/20/22 09:30
Date Received: 07/22/22 09:30

Lab Sample ID: 480-200015-1
Matrix: Solid
Percent Solids: 51.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035A_L			634984	07/26/22 17:43	CDC	TAL BUF
Total/NA	Analysis	8260C		1	634986	07/27/22 00:24	CDC	TAL BUF
Total/NA	Prep	3550C			634627	07/22/22 15:34	SJM	TAL BUF
Total/NA	Analysis	8270D		1	634771	07/25/22 20:38	PJQ	TAL BUF
Soluble	Leach	DI Leach			279143	07/25/22 11:25	LXF2	ELLE
Soluble	Analysis	8015D		1	279146	07/25/22 18:19	LXF2	ELLE

Client Sample ID: H067-EX4-01
Date Collected: 07/20/22 12:30
Date Received: 07/22/22 09:30

Lab Sample ID: 480-200015-2
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	634682	07/24/22 17:53	DSC	TAL BUF

Client Sample ID: H067-EX4-01
Date Collected: 07/20/22 12:30
Date Received: 07/22/22 09:30

Lab Sample ID: 480-200015-2
Matrix: Solid
Percent Solids: 86.7

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035A_L			634829	07/25/22 16:58	CDC	TAL BUF
Total/NA	Analysis	8260C		1	634831	07/26/22 05:36	CDC	TAL BUF
Total/NA	Prep	3550C			634627	07/22/22 15:34	SJM	TAL BUF
Total/NA	Analysis	8270D		1	634771	07/25/22 21:03	PJQ	TAL BUF
Soluble	Leach	DI Leach			279143	07/25/22 11:25	LXF2	ELLE
Soluble	Analysis	8015D		1	279146	07/25/22 18:39	LXF2	ELLE

Laboratory References:

ELLE = Eurofins Lancaster Laboratories Environment Testing, LLC, 2425 New Holland Pike, Lancaster, PA 17601, TEL (717)656-2300

TAL BUF = Eurofins Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

Accreditation/Certification Summary

Client: ARCADIS U.S. Inc
Job ID: 480-200015-1
Project/Site: GTEOSI - Seneca Falls

Laboratory: Eurofins Buffalo

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
New York	NELAP	10026	03-31-23

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
8260C	5035A_L	Solid	Cyclohexanone
8270D	3550C	Solid	m & p - Cresol
8270D	3550C	Solid	Total Cresols
Moisture		Solid	Percent Moisture
Moisture		Solid	Percent Solids

Laboratory: Eurofins Lancaster Laboratories Environment Testing, LLC

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
A2LA	Dept. of Defense ELAP	1.01	11-30-22
A2LA	ISO/IEC 17025	0001.01	11-30-22
Alaska	State	PA00009	07-01-23
Alaska (UST)	State	17-027	02-28-23
Arizona	State	AZ0780	03-12-23
Arkansas DEQ	State	88-0660	08-10-22
California	State	2792	11-30-22
Colorado	State	PA00009	06-30-23
Connecticut	State	PH-0746	06-30-23
DE Haz. Subst. Cleanup Act (HSCA)	State	019-006 (PA cert)	01-31-23
Delaware (DW)	State	N/A	01-31-23
Florida	NELAP	E87997	06-30-22 *
Georgia (DW)	State	C048	01-31-23
Hawaii	State	N/A	01-31-23
Illinois	NELAP	200027	01-31-23
Iowa	State	361	03-02-22 *
Kansas	NELAP	E-10151	10-31-22
Kentucky (DW)	State	KY90088	12-31-22
Kentucky (UST)	State	1.01	11-30-22
Kentucky (WW)	State	KY90088	01-01-23
Louisiana	NELAP	02055	06-30-23
Maine	State	2019012	03-12-23
Maryland	State	100	06-30-23
Massachusetts	State	M-PA009	06-30-23
Michigan	State	9930	01-31-23
Minnesota	NELAP	042-999-487	12-31-22
Missouri	State	450	01-31-25
Montana (DW)	State	0098	01-01-23
Montana (UST)	State	<cert No.>	02-01-23
Nebraska	State	NE-OS-32-17	01-31-23
New Hampshire	NELAP	2730	01-10-23
New Jersey	NELAP	PA011	06-30-23
New York	NELAP	10670	04-01-23
North Carolina (DW)	State	42705	07-31-23
North Carolina (WW/SW)	State	521	12-31-22
North Dakota	State	R-205	01-31-23

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Accreditation/Certification Summary

Client: ARCADIS U.S. Inc
Job ID: 480-200015-1
Project/Site: GTEOSI - Seneca Falls

Laboratory: Eurofins Lancaster Laboratories Environment Testing, LLC (Continued)

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Oklahoma	NELAP	R-205	08-31-22
Oregon	NELAP	PA200001	09-11-22
PALA	Canada	1978	09-16-24
Pennsylvania	NELAP	36-00037	01-31-23
Rhode Island	State	LAO00338	12-30-22
South Carolina	State	89002	01-31-23
Tennessee	State	02838	01-31-23
Texas	NELAP	T104704194-21-40	08-31-22
Vermont	State	VT - 36037	10-28-22
Virginia	NELAP	460182	06-15-23
Washington	State	C457	04-11-23
West Virginia (DW)	State	9906 C	12-31-22
West Virginia DEP	State	055	07-31-22
Wyoming	State	8TMS-L	01-31-23
Wyoming (UST)	A2LA	1.01	11-30-22

Method Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200015-1

Method	Method Description	Protocol	Laboratory
8260C	Volatile Organic Compounds by GC/MS	SW846	TAL BUF
8270D	Semivolatile Organic Compounds (GC/MS)	SW846	TAL BUF
8015D	Nonhalogenated Organic Compounds - Direct Injection (GC)	SW846	ELLE
Moisture	Percent Moisture	EPA	TAL BUF
3550C	Ultrasonic Extraction	SW846	TAL BUF
5035A_L	Closed System Purge and Trap	SW846	TAL BUF
DI Leach	Deionized Water Leaching Procedure	ASTM	ELLE

Protocol References:

ASTM = ASTM International

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

ELLE = Eurofins Lancaster Laboratories Environment Testing, LLC, 2425 New Holland Pike, Lancaster, PA 17601, TEL (717)656-2300

TAL BUF = Eurofins Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

Sample Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200015-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
480-200015-1	H067-EX3-02	Solid	07/20/22 09:30	07/22/22 09:30
480-200015-2	H067-EX4-01	Solid	07/20/22 12:30	07/22/22 09:30

Eurofins TestAmerica, Buffalo
10 Hazelwood Drive

Amherst, NY 14228-2223
phone 716.691.2600 fax 716.691.7991

Chain of Custody Record

Syracuse #225

eurofins | Environment Testing America

TestAmerica Laboratories, Inc. d/b/a Eurofins TestAmerica

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact	**Project Manager: Mark Flusche**		COC No:
Company: Arcadis of New York, Inc.	Email: mark.flusche@arcadis.com	Site Contact: Ryan Clare	Date:	___/___ of ___ COCs
Address: 855 Route 146 Suite 210	Tel: 518-250-7322	Lab Contact: Schove, John R	Carrier: FedEx	TALS Project #:
Clifton Park, NY 12065	**Analysis Turnaround Time**			Sampler:
	☐ CALENDAR DAYS ☐ WORKING DAYS			**For Lab Use Only:**
	TAT if different from Below ___			Walk-in Client:
Project Name: GTEOSI - Seneca Falls	☑ 2 weeks			Lab Sampling:
Site:	☐ 1 week			
PO #: 30112357.00055 Project #:	☐ 2 days ☐ 1 day			Job / SDG No.:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	TAGM (30 TAGM compounds only)	Sample Specific Notes:
H067-EX3-02	7/20/22	0930	Grab	Soil	3			X	
H067-EX4-01	7/20/22	1230	Grab	Soil	3			X	
	/22		Grab	Soil					
	/22		Grab	Soil					
	/22		Grab	Soil					
	/22		Grab	Soil					
	/22		Grab	Soil					
	/22		Grab	Soil					
	/22		Grab	Soil					
	/22		Grab	Soil					
	/22		Grab	Soil					
	/22		Grab	Soil					
	/22		Grab	Soil					

Rec 7-21-22

480-200015 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ___ 1

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☑ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☑ Disposal by Lab ☐ Archive for ___ Months

Special Instructions/QC Requirements & Comments:

4:0 # 1 ICE

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:		Cooler Temp. (°C): Obs'd: ___ Corr'd: ___		Therm ID No.: ___
Relinquished by:	Company: Arcadis	Date/Time: 7/21/22 1502	Received by:	Company: FS-SYR	Date/Time: 7/21/22 1502
Relinquished by:	Company: SYR 7-21-22	Date/Time: 1900	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company: TA	Date/Time: 7/22/22 930

Form No. CA-C-WI-002, Rev. 4.34, dated 8/3/2020

7/29/2022

Eurofins Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Phone: 716-691-2600 Fax: 716-691-7991

Chain of Custody Record

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Client Information (Sub Contract Lab)	Sampler:	Lab PM: Schove, John R	Carrier Tracking No(s):	COC No: 480-73866.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: John.Schove@et.eurofinsus.com	State of Origin: New York	Page: Page 1 of 1
Company: Eurofins Lancaster Laboratories Environm		Accreditations Required (See note): NELAP - New York		Job #: 480-200015-1
Address: 2425 New Holland Pike, ,	Due Date Requested: 8/4/2022			
City: Lancaster	TAT Requested (days):			
State, Zip: PA, 17601				
Phone: 717-656-2300(Tel)	PO #:			
Email:	WO #:			
Project Name: GTEOSI - Seneca Falls	Project #: 48005146			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Y - Trizma, Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8015D_DAUDI_LEACH_GCV TAGM List Methanol	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
H067-EX3-02 (480-200015-1)	7/20/22	09:30 Eastern		Solid			X	1	
H067-EX4-01 (480-200015-2)	7/20/22	12:30 Eastern		Solid			X	1	

Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing Northeast, LLC places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing Northeast, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Environment Testing Northeast, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins Environment Testing Northeast, LLC.

Possible Hazard Identification	*Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)*
Unconfirmed	☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
		7-22-22 1600	TAB			
	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	Relinquished by:	Date/Time:	Company	Received by:	Date/Time: 7/23/22 0959	Company

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks: 1.9

Ver: 06/08/2021

Login Sample Receipt Checklist

Client: ARCADIS U.S. Inc

Job Number: 480-200015-1

Login Number: 200015
List Number: 1
Creator: Kolb, Chris M

List Source: Eurofins Buffalo

Question	Answer	Comment
Radioactivity either was not measured or, if measured, is at or below background	True	
The cooler's custody seal, if present, is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time (Excluding tests with immediate HTs)..	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	N/A	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Sampling Company provided.	True	ARCADIS
Samples received within 48 hours of sampling.	True	
Samples requiring field filtration have been filtered in the field.	True	
Chlorine Residual checked.	N/A	

Login Sample Receipt Checklist

Client: ARCADIS U.S. Inc

Job Number: 480-200015-1

Login Number: 200015
List Number: 2
Creator: McBeth, Jessica

List Source: Eurofins Lancaster Laboratories Environment Testing, LLC
List Creation: 07/23/22 10:39 AM

Question	Answer	Comment
The cooler's custody seal is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable (</=6C, not frozen).	True	
Cooler Temperature is recorded.	True	
WV: Container Temperature is acceptable (</=6C, not frozen).	N/A	
WV: Container Temperature is recorded.	N/A	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
There are no discrepancies between the containers received and the COC.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
There is sufficient vol. for all requested analyses.	True	
Is the Field Sampler's name present on COC?	False	Received project as a subcontract.
Sample custody seals are intact.	N/A	
VOA sample vials do not have headspace >6mm in diameter (none, if from WV)?	True	

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ANALYTICAL REPORT

PREPARED FOR

Attn: Mark Flusche
ARCADIS U.S. Inc
855 Route 146
Suite 210
Clifton Park, New York 12065

Generated 12/13/2022 3:10:00 PM

JOB DESCRIPTION

GTEOSI - Seneca Falls

JOB NUMBER

480-200053-6

Eurofins Buffalo
10 Hazelwood Drive
Amherst NY 14228-2298

See page two for job notes and contact information.

Job Notes

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory. This report is confidential and is intended for the sole use of Eurofins Environment Testing Northeast, LLC Buffalo and its client. All questions regarding this report should be directed to the Eurofins Environment Testing Northeast, LLC Buffalo Project Manager or designee who has signed this report.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Northeast, LLC Project Manager.

Authorization



Generated
12/13/2022 3:10:00 PM

Authorized for release by
Judy Stone, Senior Project Manager
Judy.Stone@et.eurofinsus.com
Designee for
John Schove, Project Manager II
John.Schove@et.eurofinsus.com
(716)504-9838

Table of Contents

Cover Page 1
Table of Contents 3
Definitions/Glossary 4
Case Narrative 5
Detection Summary 6
Client Sample Results 7
Surrogate Summary 9
QC Sample Results 10
QC Association Summary 14
Lab Chronicle 15
Certification Summary 16
Method Summary 17
Sample Summary 18
Chain of Custody 19
Receipt Checklists 21

Definitions/Glossary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200053-6

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
*+	LCS and/or LCSD is outside acceptance limits, high biased.
vs	Reported analyte concentrations are below 200 ug/kg and may be biased low due to the sample not being collected according to 5035A-L low-level specifications.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 480-200053-6

Laboratory: Eurofins Buffalo

Narrative

Job Narrative
480-200053-6

Comments
No additional comments.

Receipt
The samples were received on 7/23/2022 11:30 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 2.8º C.

GC/MS VOA
Method 8260C: The continuing calibration verification (CCV) associated with batch 480-634831 recovered outside acceptance criteria, low biased, for Carbon disulfide and Ethyl ether. A reporting limit (RL) standard was analyzed, and the target analytes are detected. Since the associated sample was non-detect for the analytes, the data is reported. The associated sample is: H067-EX5-01 (480-200053-12).

Method 8260C: Due to the coelution of Ethyl Acetate with 2-Butanone and Isobutyl alcohol with Tert-amyl methyl ether in the full spike solution, these analytes exceeded control limits in the laboratory control sample (LCS) and/or laboratory control sample duplicate (LCSD) associated with batch 480-634831 . The following sample was affected : H067-EX5-01 (480-200053-12).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

GC/MS Semi VOA
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

GC VOA
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Organic Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Detection Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200053-6

Client Sample ID: H067-EX5-01

Lab Sample ID: 480-200053-12

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample ID: H067-EX5-01
Date Collected: 07/22/22 07:20
Date Received: 07/23/22 11:30

Lab Sample ID: 480-200053-12
Matrix: Solid
Percent Solids: 84.5

Method: SW846 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND	vs	5.8		ug/Kg	☼	07/25/22 16:58	07/26/22 06:00	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	vs	5.8		ug/Kg	☼	07/25/22 16:58	07/26/22 06:00	1
1,1,2-Trichloroethane	ND	vs	5.8		ug/Kg	☼	07/25/22 16:58	07/26/22 06:00	1
1,2-Dichlorobenzene	ND	vs	5.8		ug/Kg	☼	07/25/22 16:58	07/26/22 06:00	1
Acetone	ND	vs	29		ug/Kg	☼	07/25/22 16:58	07/26/22 06:00	1
Benzene	ND	vs	5.8		ug/Kg	☼	07/25/22 16:58	07/26/22 06:00	1
Carbon disulfide	ND	vs	5.8		ug/Kg	☼	07/25/22 16:58	07/26/22 06:00	1
Carbon tetrachloride	ND	vs	5.8		ug/Kg	☼	07/25/22 16:58	07/26/22 06:00	1
Chlorobenzene	ND	vs	5.8		ug/Kg	☼	07/25/22 16:58	07/26/22 06:00	1
Cyclohexanone	ND	vs	58		ug/Kg	☼	07/25/22 16:58	07/26/22 06:00	1
Ethyl acetate	ND	vs *+	5.8		ug/Kg	☼	07/25/22 16:58	07/26/22 06:00	1
Ethyl ether	ND	vs	29		ug/Kg	☼	07/25/22 16:58	07/26/22 06:00	1
Ethylbenzene	ND	vs	5.8		ug/Kg	☼	07/25/22 16:58	07/26/22 06:00	1
Isobutyl alcohol	ND	vs *+	230		ug/Kg	☼	07/25/22 16:58	07/26/22 06:00	1
2-Butanone (MEK)	ND	vs	29		ug/Kg	☼	07/25/22 16:58	07/26/22 06:00	1
4-Methyl-2-pentanone (MIBK)	ND	vs	29		ug/Kg	☼	07/25/22 16:58	07/26/22 06:00	1
Methylene Chloride	ND	vs	5.8		ug/Kg	☼	07/25/22 16:58	07/26/22 06:00	1
n-Butanol	ND	vs	58		ug/Kg	☼	07/25/22 16:58	07/26/22 06:00	1
Tetrachloroethene	ND	vs	5.8		ug/Kg	☼	07/25/22 16:58	07/26/22 06:00	1
Toluene	ND	vs	5.8		ug/Kg	☼	07/25/22 16:58	07/26/22 06:00	1
Trichloroethene	ND	vs	5.8		ug/Kg	☼	07/25/22 16:58	07/26/22 06:00	1
Trichlorofluoromethane	ND	vs	5.8		ug/Kg	☼	07/25/22 16:58	07/26/22 06:00	1
Xylenes, Total	ND	vs	12		ug/Kg	☼	07/25/22 16:58	07/26/22 06:00	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*102*		*64 - 126*	*07/25/22 16:58*	*07/26/22 06:00*	*1*
4-Bromofluorobenzene (Surr)	*90*		*72 - 126*	*07/25/22 16:58*	*07/26/22 06:00*	*1*
Dibromofluoromethane (Surr)	*105*		*60 - 140*	*07/25/22 16:58*	*07/26/22 06:00*	*1*
Toluene-d8 (Surr)	*94*		*71 - 125*	*07/25/22 16:58*	*07/26/22 06:00*	*1*

Method: SW846 8270D - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m & p - Cresol	ND		390		ug/Kg	☼	07/25/22 09:06	07/27/22 02:17	1
Nitrobenzene	ND		200		ug/Kg	☼	07/25/22 09:06	07/27/22 02:17	1
2-Methylphenol	ND		200		ug/Kg	☼	07/25/22 09:06	07/27/22 02:17	1
Pyridine	ND		390		ug/Kg	☼	07/25/22 09:06	07/27/22 02:17	1
Total Cresols	ND		390		ug/Kg	☼	07/25/22 09:06	07/27/22 02:17	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*97*		*54 - 120*	*07/25/22 09:06*	*07/27/22 02:17*	*1*
2-Fluorobiphenyl (Surr)	*77*		*60 - 120*	*07/25/22 09:06*	*07/27/22 02:17*	*1*
2-Fluorophenol (Surr)	*62*		*52 - 120*	*07/25/22 09:06*	*07/27/22 02:17*	*1*
Nitrobenzene-d5 (Surr)	*67*		*53 - 120*	*07/25/22 09:06*	*07/27/22 02:17*	*1*
Phenol-d5 (Surr)	*64*		*54 - 120*	*07/25/22 09:06*	*07/27/22 02:17*	*1*
p-Terphenyl-d14 (Surr)	*91*		*79 - 130*	*07/25/22 09:06*	*07/27/22 02:17*	*1*

Method: SW846 8015D - Nonhalogenated Organic Compounds - Direct Injection (GC) - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methanol	ND		1200		ug/Kg	☼		07/27/22 13:09	1

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200053-6

Client Sample ID: H067-EX5-01
Date Collected: 07/22/22 07:20
Date Received: 07/23/22 11:30

Lab Sample ID: 480-200053-12
Matrix: Solid
Percent Solids: 84.5

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Acetone	86		43 - 129		07/27/22 13:09	1
Acetone	83		43 - 129		07/27/22 13:09	1

Surrogate Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200053-6

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Solid — **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(64-126)	(72-126)	(60-140)	(71-125)
480-200053-12	H067-EX5-01	102	90	105	94
LCS 480-634829/1-A	Lab Control Sample	101	94	99	93
LCSD 480-634829/2-A	Lab Control Sample Dup	100	95	99	94
MB 480-634829/3-A	Method Blank	97	95	101	92

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Solid — **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHd14
Lab Sample ID	Client Sample ID	(54-120)	(60-120)	(52-120)	(53-120)	(54-120)	(79-130)
480-200053-12	H067-EX5-01	97	77	62	67	64	91
LCS 480-634707/2-A	Lab Control Sample	98	97	80	84	79	105
MB 480-634707/1-A	Method Blank	82	95	79	81	78	110

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHd14 = p-Terphenyl-d14 (Surr)

Method: 8015D - Nonhalogenated Organic Compounds - Direct Injection (GC)

Matrix: Solid — **Prep Type: Soluble**

		Percent Surrogate Recovery (Acceptance Limits)	
		Acetone1	Acetone2
Lab Sample ID	Client Sample ID	(43-129)	(43-129)
480-200053-12	H067-EX5-01	86	83
480-200053-12 MS	H067-EX5-01	82	85
480-200053-12 MSD	H067-EX5-01	72	81
LCS 410-279966/2-A	Lab Control Sample	91	90
MB 410-279966/1-A	Method Blank	93	89

Surrogate Legend

Acetone = Acetone

Method: 8260C - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 480-634829/3-A
Matrix: Solid
Analysis Batch: 634831

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 634829

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		5.0		ug/Kg		07/25/22 16:58	07/25/22 21:49	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		5.0		ug/Kg		07/25/22 16:58	07/25/22 21:49	1
1,1,2-Trichloroethane	ND		5.0		ug/Kg		07/25/22 16:58	07/25/22 21:49	1
1,2-Dichlorobenzene	ND		5.0		ug/Kg		07/25/22 16:58	07/25/22 21:49	1
Acetone	ND		25		ug/Kg		07/25/22 16:58	07/25/22 21:49	1
Benzene	ND		5.0		ug/Kg		07/25/22 16:58	07/25/22 21:49	1
Carbon disulfide	ND		5.0		ug/Kg		07/25/22 16:58	07/25/22 21:49	1
Carbon tetrachloride	ND		5.0		ug/Kg		07/25/22 16:58	07/25/22 21:49	1
Chlorobenzene	ND		5.0		ug/Kg		07/25/22 16:58	07/25/22 21:49	1
Cyclohexanone	ND		50		ug/Kg		07/25/22 16:58	07/25/22 21:49	1
Ethyl acetate	ND		5.0		ug/Kg		07/25/22 16:58	07/25/22 21:49	1
Ethyl ether	ND		25		ug/Kg		07/25/22 16:58	07/25/22 21:49	1
Ethylbenzene	ND		5.0		ug/Kg		07/25/22 16:58	07/25/22 21:49	1
Isobutyl alcohol	ND		200		ug/Kg		07/25/22 16:58	07/25/22 21:49	1
2-Butanone (MEK)	ND		25		ug/Kg		07/25/22 16:58	07/25/22 21:49	1
4-Methyl-2-pentanone (MIBK)	ND		25		ug/Kg		07/25/22 16:58	07/25/22 21:49	1
Methylene Chloride	ND		5.0		ug/Kg		07/25/22 16:58	07/25/22 21:49	1
n-Butanol	ND		50		ug/Kg		07/25/22 16:58	07/25/22 21:49	1
Tetrachloroethene	ND		5.0		ug/Kg		07/25/22 16:58	07/25/22 21:49	1
Toluene	ND		5.0		ug/Kg		07/25/22 16:58	07/25/22 21:49	1
Trichloroethene	ND		5.0		ug/Kg		07/25/22 16:58	07/25/22 21:49	1
Trichlorofluoromethane	ND		5.0		ug/Kg		07/25/22 16:58	07/25/22 21:49	1
Xylenes, Total	ND		10		ug/Kg		07/25/22 16:58	07/25/22 21:49	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*97*		*64 - 126*	*07/25/22 16:58*	*07/25/22 21:49*	*1*
4-Bromofluorobenzene (Surr)	*95*		*72 - 126*	*07/25/22 16:58*	*07/25/22 21:49*	*1*
Dibromofluoromethane (Surr)	*101*		*60 - 140*	*07/25/22 16:58*	*07/25/22 21:49*	*1*
Toluene-d8 (Surr)	*92*		*71 - 125*	*07/25/22 16:58*	*07/25/22 21:49*	*1*

Lab Sample ID: LCS 480-634829/1-A
Matrix: Solid
Analysis Batch: 634831

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 634829

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
1,1,1-Trichloroethane	50.0	52.7		ug/Kg		105	77 - 121
1,1,2-Trichloro-1,2,2-trifluoroethane	50.0	55.4		ug/Kg		111	60 - 140
1,1,2-Trichloroethane	50.0	52.0		ug/Kg		104	78 - 122
1,2-Dichlorobenzene	50.0	50.0		ug/Kg		100	75 - 120
Acetone	250	247		ug/Kg		99	61 - 137
Benzene	50.0	51.5		ug/Kg		103	79 - 127
Carbon disulfide	50.0	52.4		ug/Kg		105	64 - 131
Carbon tetrachloride	50.0	55.5		ug/Kg		111	75 - 135
Chlorobenzene	50.0	50.6		ug/Kg		101	76 - 124
Ethyl ether	50.0	43.9		ug/Kg		88	55 - 120
Ethylbenzene	50.0	52.1		ug/Kg		104	80 - 120
Isobutyl alcohol	1250	3040	*+	ug/Kg		243	71 - 140

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 480-634829/1-A
Matrix: Solid
Analysis Batch: 634831

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 634829

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
2-Butanone (MEK)			250	243		ug/Kg		97	70 - 134		
4-Methyl-2-pentanone (MIBK)			250	271		ug/Kg		108	65 - 133		
Methylene Chloride			50.0	54.7		ug/Kg		109	61 - 127		
Tetrachloroethene			50.0	55.6		ug/Kg		111	74 - 122		
Toluene			50.0	49.9		ug/Kg		100	74 - 128		
Trichloroethene			50.0	52.2		ug/Kg		104	77 - 129		
Trichlorofluoromethane			50.0	51.0		ug/Kg		102	65 - 146		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*101*		*64 - 126*
4-Bromofluorobenzene (Surr)	*94*		*72 - 126*
Dibromofluoromethane (Surr)	*99*		*60 - 140*
Toluene-d8 (Surr)	*93*		*71 - 125*

Lab Sample ID: LCSD 480-634829/2-A
Matrix: Solid
Analysis Batch: 634831

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 634829

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
1,1,1-Trichloroethane			50.0	51.1		ug/Kg		102	77 - 121	3	20
1,1,2-Trichloro-1,2,2-trifluoroethane			50.0	50.1		ug/Kg		100	60 - 140	10	20
1,1,2-Trichloroethane			50.0	52.9		ug/Kg		106	78 - 122	2	20
1,2-Dichlorobenzene			50.0	49.5		ug/Kg		99	75 - 120	1	20
Acetone			250	249		ug/Kg		100	61 - 137	1	20
Benzene			50.0	50.8		ug/Kg		102	79 - 127	1	20
Carbon disulfide			50.0	50.8		ug/Kg		102	64 - 131	3	20
Carbon tetrachloride			50.0	54.5		ug/Kg		109	75 - 135	2	20
Chlorobenzene			50.0	50.9		ug/Kg		102	76 - 124	1	20
Ethyl ether			50.0	39.3		ug/Kg		79	55 - 120	11	20
Ethylbenzene			50.0	51.1		ug/Kg		102	80 - 120	2	20
Isobutyl alcohol			1250	2910	*+	ug/Kg		233	71 - 140	4	20
2-Butanone (MEK)			250	247		ug/Kg		99	70 - 134	2	20
4-Methyl-2-pentanone (MIBK)			250	279		ug/Kg		111	65 - 133	3	20
Methylene Chloride			50.0	54.4		ug/Kg		109	61 - 127	1	20
Tetrachloroethene			50.0	55.3		ug/Kg		111	74 - 122	1	20
Toluene			50.0	49.2		ug/Kg		98	74 - 128	1	20
Trichloroethene			50.0	51.5		ug/Kg		103	77 - 129	1	20
Trichlorofluoromethane			50.0	49.1		ug/Kg		98	65 - 146	4	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*100*		*64 - 126*
4-Bromofluorobenzene (Surr)	*95*		*72 - 126*
Dibromofluoromethane (Surr)	*99*		*60 - 140*
Toluene-d8 (Surr)	*94*		*71 - 125*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 480-634707/1-A
Matrix: Solid
Analysis Batch: 634951

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 634707

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m & p - Cresol	ND		330		ug/Kg		07/25/22 09:06	07/26/22 17:09	1
Nitrobenzene	ND		170		ug/Kg		07/25/22 09:06	07/26/22 17:09	1
2-Methylphenol	ND		170		ug/Kg		07/25/22 09:06	07/26/22 17:09	1
Pyridine	ND		330		ug/Kg		07/25/22 09:06	07/26/22 17:09	1
Total Cresols	ND		330		ug/Kg		07/25/22 09:06	07/26/22 17:09	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*82*		*54 - 120*	*07/25/22 09:06*	*07/26/22 17:09*	*1*
2-Fluorobiphenyl (Surr)	*95*		*60 - 120*	*07/25/22 09:06*	*07/26/22 17:09*	*1*
2-Fluorophenol (Surr)	*79*		*52 - 120*	*07/25/22 09:06*	*07/26/22 17:09*	*1*
Nitrobenzene-d5 (Surr)	*81*		*53 - 120*	*07/25/22 09:06*	*07/26/22 17:09*	*1*
Phenol-d5 (Surr)	*78*		*54 - 120*	*07/25/22 09:06*	*07/26/22 17:09*	*1*
p-Terphenyl-d14 (Surr)	*110*		*79 - 130*	*07/25/22 09:06*	*07/26/22 17:09*	*1*

Lab Sample ID: LCS 480-634707/2-A
Matrix: Solid
Analysis Batch: 634951

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 634707

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Nitrobenzene			1650	1440		ug/Kg		87	54 - 120		
2-Methylphenol			1650	1340		ug/Kg		81	54 - 120		
Pyridine			3310	1840		ug/Kg		56	23 - 120		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*98*		*54 - 120*
2-Fluorobiphenyl (Surr)	*97*		*60 - 120*
2-Fluorophenol (Surr)	*80*		*52 - 120*
Nitrobenzene-d5 (Surr)	*84*		*53 - 120*
Phenol-d5 (Surr)	*79*		*54 - 120*
p-Terphenyl-d14 (Surr)	*105*		*79 - 130*

Method: 8015D - Nonhalogenated Organic Compounds - Direct Injection (GC)

Lab Sample ID: MB 410-279966/1-A
Matrix: Solid
Analysis Batch: 279969

Client Sample ID: Method Blank
Prep Type: Soluble

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methanol	ND		1000		ug/Kg			07/27/22 11:51	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Acetone	*93*		*43 - 129*		*07/27/22 11:51*	*1*
Acetone	*89*		*43 - 129*		*07/27/22 11:51*	*1*

Method: 8015D - Nonhalogenated Organic Compounds - Direct Injection (GC) (Continued)

Lab Sample ID: LCS 410-279966/2-A
Matrix: Solid
Analysis Batch: 279969

Client Sample ID: Lab Control Sample
Prep Type: Soluble

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Methanol			2510	2470		ug/Kg		98	72 - 134		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Acetone	*91*		*43 - 129*
Acetone	*90*		*43 - 129*

Lab Sample ID: 480-200053-12 MS
Matrix: Solid
Analysis Batch: 279969

Client Sample ID: H067-EX5-01
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
Methanol	ND		2970	2410		ug/Kg	☼	81	72 - 134		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Acetone	*82*		*43 - 129*
Acetone	*85*		*43 - 129*

Lab Sample ID: 480-200053-12 MSD
Matrix: Solid
Analysis Batch: 279969

Client Sample ID: H067-EX5-01
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Methanol	ND		2970	2850		ug/Kg	☼	96	72 - 134	16	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
Acetone	*72*		*43 - 129*
Acetone	*81*		*43 - 129*

QC Association Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200053-6

GC/MS VOA

Prep Batch: 634829

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200053-12	H067-EX5-01	Total/NA	Solid	5035A_L	
MB 480-634829/3-A	Method Blank	Total/NA	Solid	5035A_L	
LCS 480-634829/1-A	Lab Control Sample	Total/NA	Solid	5035A_L	
LCSD 480-634829/2-A	Lab Control Sample Dup	Total/NA	Solid	5035A_L	

Analysis Batch: 634831

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200053-12	H067-EX5-01	Total/NA	Solid	8260C	634829
MB 480-634829/3-A	Method Blank	Total/NA	Solid	8260C	634829
LCS 480-634829/1-A	Lab Control Sample	Total/NA	Solid	8260C	634829
LCSD 480-634829/2-A	Lab Control Sample Dup	Total/NA	Solid	8260C	634829

GC/MS Semi VOA

Prep Batch: 634707

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200053-12	H067-EX5-01	Total/NA	Solid	3550C	
MB 480-634707/1-A	Method Blank	Total/NA	Solid	3550C	
LCS 480-634707/2-A	Lab Control Sample	Total/NA	Solid	3550C	

Analysis Batch: 634951

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200053-12	H067-EX5-01	Total/NA	Solid	8270D	634707
MB 480-634707/1-A	Method Blank	Total/NA	Solid	8270D	634707
LCS 480-634707/2-A	Lab Control Sample	Total/NA	Solid	8270D	634707

GC Semi VOA

Leach Batch: 279966

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200053-12	H067-EX5-01	Soluble	Solid	DI Leach	
MB 410-279966/1-A	Method Blank	Soluble	Solid	DI Leach	
LCS 410-279966/2-A	Lab Control Sample	Soluble	Solid	DI Leach	
480-200053-12 MS	H067-EX5-01	Soluble	Solid	DI Leach	
480-200053-12 MSD	H067-EX5-01	Soluble	Solid	DI Leach	

Analysis Batch: 279969

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200053-12	H067-EX5-01	Soluble	Solid	8015D	279966
MB 410-279966/1-A	Method Blank	Soluble	Solid	8015D	279966
LCS 410-279966/2-A	Lab Control Sample	Soluble	Solid	8015D	279966
480-200053-12 MS	H067-EX5-01	Soluble	Solid	8015D	279966
480-200053-12 MSD	H067-EX5-01	Soluble	Solid	8015D	279966

General Chemistry

Analysis Batch: 634683

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200053-12	H067-EX5-01	Total/NA	Solid	Moisture	

Lab Chronicle

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200053-6

Client Sample ID: H067-EX5-01
Date Collected: 07/22/22 07:20
Date Received: 07/23/22 11:30

Lab Sample ID: 480-200053-12
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	Moisture		1	634683	DSC	EET BUF	07/24/22 18:01

Client Sample ID: H067-EX5-01
Date Collected: 07/22/22 07:20
Date Received: 07/23/22 11:30

Lab Sample ID: 480-200053-12
Matrix: Solid
Percent Solids: 84.5

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	5035A_L			634829	CDC	EET BUF	07/25/22 16:58
Total/NA	Analysis	8260C		1	634831	CDC	EET BUF	07/26/22 06:00
Total/NA	Prep	3550C			634707	JMP	EET BUF	07/25/22 09:06
Total/NA	Analysis	8270D		1	634951	PJQ	EET BUF	07/27/22 02:17
Soluble	Leach	DI Leach			279966	LXF2	ELLE	07/27/22 09:51
Soluble	Analysis	8015D		1	279969	LXF2	ELLE	07/27/22 13:09

Laboratory References:

EET BUF = Eurofins Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

ELLE = Eurofins Lancaster Laboratories Environment Testing, LLC, 2425 New Holland Pike, Lancaster, PA 17601, TEL (717)656-2300

Accreditation/Certification Summary

Client: ARCADIS U.S. Inc
Job ID: 480-200053-6
Project/Site: GTEOSI - Seneca Falls

Laboratory: Eurofins Buffalo

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
New York	NELAP	10026	09-05-22

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
8260C	5035A_L	Solid	Cyclohexanone
8270D	3550C	Solid	m & p - Cresol
8270D	3550C	Solid	Total Cresols
Moisture		Solid	Percent Moisture
Moisture		Solid	Percent Solids

Laboratory: Eurofins Lancaster Laboratories Environment Testing, LLC

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
New York	NELAP	10670	09-20-22

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
8015D		Solid	Methanol

Method Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200053-6

Method	Method Description	Protocol	Laboratory
8260C	Volatile Organic Compounds by GC/MS	SW846	EET BUF
8270D	Semivolatile Organic Compounds (GC/MS)	SW846	EET BUF
8015D	Nonhalogenated Organic Compounds - Direct Injection (GC)	SW846	ELLE
Moisture	Percent Moisture	EPA	EET BUF
3550C	Ultrasonic Extraction	SW846	EET BUF
5035A_L	Closed System Purge and Trap	SW846	EET BUF
DI Leach	Deionized Water Leaching Procedure	ASTM	ELLE

Protocol References:

ASTM = ASTM International

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EET BUF = Eurofins Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

ELLE = Eurofins Lancaster Laboratories Environment Testing, LLC, 2425 New Holland Pike, Lancaster, PA 17601, TEL (717)656-2300

Sample Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200053-6

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
480-200053-12	H067-EX5-01	Solid	07/22/22 07:20	07/23/22 11:30

Eurofins TestAmerica, Buffalo
10 Hazelwood Drive

Amherst, NY 14228-2223
phone 716.691.2600 fax 716.691.7991

Chain of Custody Record

eurofins | Environment Testing America

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc. d/b/a Eurofins TestAmerica

Client Contact	Project Manager: Mark Flusche	Site Contact: Ryan Clare	Date:	COC No:
Company: Arcadis of New York, Inc.	Email: mark.flusche@arcadis.com	Lab Contact: Schove, John R	Carrier: FedEx	3 of 3 COCs
Address: 855 Route 146 Suite 210	Tel: 518-250-7322			TALS Project #:
Clifton Park, NY 12065	Analysis Turnaround Time			Sampler: Kaitlyn Fleming
	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
	TAT if different from Below _____			Walk-in Client:
Project Name: GTEOSI - Seneca Falls	☑ 2 weeks			Lab Sampling:
Site:	☐ 1 week			
PO #: 30112357.00055 Project #:	☐ 2 days			Job / SDG No.:
	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	TAGM (30 TAGM compounds only)	Sample Specific Notes:
SO67-EX5-01	7/22/22	0720	Grab	Soil	3			X	
[redacted]	[redacted]	[redacted]	Grab	Soil	[redacted]			[redacted]	
	/22		Grab	Soil					
	/22		Grab	Soil					
	/22		Grab	Soil					
	/22		Grab	Soil					
	/22		Grab	Soil					
	/22		Grab	Soil					
	/22		Grab	Soil					
	/22		Grab	Soil					
	/22		Grab	Soil					
								1	

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☑ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☑ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: _____ Corr'd: _____ Therm ID No.: _____

Relinquished by: Kaitlyn Fleming	Company: Arcadis	Date/Time: 7/22/22 1200	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by: See PS1	Company:	Date/Time:

Eurofins Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Phone: 716-691-2600 Fax: 716-691-7991

Chain of Custody Record

eurofins | Environment Testing America

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Schove, John R	Carrier Tracking No(s):	COC No: 480-73914.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: John.Schove@et.eurofinsus.com	State of Origin: New York	Page: Page 1 of 1
Company: Eurofins Lancaster Laboratories Environm		Accreditations Required (See note): NELAP - New York		Job #: 480-200053-1
Address: 2425 New Holland Pike, ,	Due Date Requested: 8/4/2022			
City: Lancaster	TAT Requested (days):			
State, Zip: PA, 17601				
Phone: 717-656-2300(Tel)	PO #:			
Email:	WO #:			
Project Name: GTEOSI - Seneca Falls	Project #: 48005146			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Y - Trizma, Z - other (specify)
Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8015D_DAI/DI_LEACH_GCV TAGM List Methanol	Total Number of containers	Special Instructions/Note:
			Preservation Code:		X	X		X	
H067-EX5-01 (480-200053-12)	7/22/22	07:20 Eastern		Solid			X	1	

Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing Northeast, LLC places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing Northeast, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Environment Testing Northeast, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins Environment Testing Northeast, LLC.

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:		
Relinquished by:	Date/Time: 7-25-22 1600	Company THB	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time: 7/26/22 1047	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: 1.8

Ver: 06/08/2021

MB

Login Sample Receipt Checklist

Client: ARCADIS U.S. Inc

Job Number: 480-200053-6

Login Number: 200053
List Number: 1
Creator: Kolb, Chris M

List Source: Eurofins Buffalo

Question	Answer	Comment
Radioactivity either was not measured or, if measured, is at or below background	True	
The cooler's custody seal, if present, is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time (Excluding tests with immediate HTs)..	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	N/A	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Sampling Company provided.	True	ARCADIS
Samples received within 48 hours of sampling.	True	
Samples requiring field filtration have been filtered in the field.	True	
Chlorine Residual checked.	N/A	

Login Sample Receipt Checklist

Client: ARCADIS U.S. Inc

Job Number: 480-200053-6

Login Number: 200053
List Number: 2
Creator: Ballard, Megan

List Source: Eurofins Lancaster Laboratories Environment Testing, LLC
List Creation: 07/26/22 02:29 PM

Question	Answer	Comment
The cooler's custody seal is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable (</=6C, not frozen).	True	
Cooler Temperature is recorded.	True	
WV: Container Temperature is acceptable (</=6C, not frozen).	N/A	
WV: Container Temperature is recorded.	N/A	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
There are no discrepancies between the containers received and the COC.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
There is sufficient vol. for all requested analyses.	True	
Is the Field Sampler's name present on COC?	False	Received project as a subcontract.
Sample custody seals are intact.	N/A	
VOA sample vials do not have headspace >6mm in diameter (none, if from WV)?	True	

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ANALYTICAL REPORT

Eurofins Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Tel: (716)691-2600

Laboratory Job ID: 480-200135-1
Client Project/Site: GTEOSI - Seneca Falls

For:
ARCADIS U.S. Inc
855 Route 146
Suite 210
Clifton Park, New York 12065

Attn: Mark Flusche

Authorized for release by:
8/5/2022 5:04:59 PM
Judy Stone, Senior Project Manager
(484)685-0868
Judy.Stone@et.eurofinsus.com

Designee for

John Schove, Project Manager II
(716)504-9838
John.Schove@et.eurofinsus.com

LINKS

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The test results in this report meet all 2003 NELAC, 2009 TNI, and 2016 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Cover Page 1
Table of Contents 2
Definitions/Glossary 3
Case Narrative 4
Detection Summary 5
Client Sample Results 6
Surrogate Summary 10
QC Sample Results 11
QC Association Summary 16
Lab Chronicle 18
Certification Summary 19
Method Summary 21
Sample Summary 22
Chain of Custody 23
Receipt Checklists 25

Definitions/Glossary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200135-1

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
vs	Reported analyte concentrations are below 200 ug/kg and may be biased low due to the sample not being collected according to 5035A-L low-level specifications.

GC/MS Semi VOA

Qualifier	Qualifier Description
S1-	Surrogate recovery exceeds control limits, low biased.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 480-200135-1

Laboratory: Eurofins Buffalo

Narrative

Job Narrative
480-200135-1

Comments
No additional comments.

Receipt
The samples were received on 7/27/2022 10:00 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 2.7º C.

GC/MS VOA
Method 8260C: The continuing calibration verification (CCV) associated with batch 480-635513 recovered outside acceptance criteria, low biased, for Ethyl ether. A reporting limit (RL) standard was analyzed, and the target analyte was detected. Since the associated samples were non-detect for the analyte, the data are reported. The associated samples are: H067-EX6-04 (480-200135-1) and H067-EX7-02 (480-200135-2).

Method 8260C: The continuing calibration verification (CCV) associated with batch 480-635513 recovered above the upper control limit for 1,1,1-Trichloroethane, Carbon tetrachloride, Tetrachloroethene and Trichlorofluoromethane. The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported. The associated samples are impacted: H067-EX6-04 (480-200135-1) and H067-EX7-02 (480-200135-2).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

GC/MS Semi VOA
Method 8270D: Surrogate recovery was outside acceptance limits for the following matrix spike duplicate (MSD) sample: (480-200135-A-1-B MSD). The parent sample's surrogate recovery was within limits. The MS/MSD sample has been qualified and reported.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

GC VOA
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Organic Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Detection Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200135-1

Client Sample ID: H067-EX6-04 — Lab Sample ID: 480-200135-1

No Detections.

Client Sample ID: H067-EX7-02 — Lab Sample ID: 480-200135-2

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample ID: H067-EX6-04
Date Collected: 07/25/22 09:30
Date Received: 07/27/22 10:00

Lab Sample ID: 480-200135-1
Matrix: Solid
Percent Solids: 81.8

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND	vs	6.0		ug/Kg	☼	07/28/22 13:43	07/29/22 23:26	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	vs	6.0		ug/Kg	☼	07/28/22 13:43	07/29/22 23:26	1
1,1,2-Trichloroethane	ND	vs	6.0		ug/Kg	☼	07/28/22 13:43	07/29/22 23:26	1
1,2-Dichlorobenzene	ND	vs	6.0		ug/Kg	☼	07/28/22 13:43	07/29/22 23:26	1
Acetone	ND	vs	30		ug/Kg	☼	07/28/22 13:43	07/29/22 23:26	1
Benzene	ND	vs	6.0		ug/Kg	☼	07/28/22 13:43	07/29/22 23:26	1
Carbon disulfide	ND	vs	6.0		ug/Kg	☼	07/28/22 13:43	07/29/22 23:26	1
Carbon tetrachloride	ND	vs	6.0		ug/Kg	☼	07/28/22 13:43	07/29/22 23:26	1
Chlorobenzene	ND	vs	6.0		ug/Kg	☼	07/28/22 13:43	07/29/22 23:26	1
Cyclohexanone	ND	vs	60		ug/Kg	☼	07/28/22 13:43	07/29/22 23:26	1
Ethyl acetate	ND	vs	6.0		ug/Kg	☼	07/28/22 13:43	07/29/22 23:26	1
Ethyl ether	ND	vs	30		ug/Kg	☼	07/28/22 13:43	07/29/22 23:26	1
Ethylbenzene	ND	vs	6.0		ug/Kg	☼	07/28/22 13:43	07/29/22 23:26	1
Isobutyl alcohol	ND	vs	240		ug/Kg	☼	07/28/22 13:43	07/29/22 23:26	1
Methyl ethyl ketone (MEK)	ND	vs	30		ug/Kg	☼	07/28/22 13:43	07/29/22 23:26	1
Methyl isobutyl ketone (MIBK)	ND	vs	30		ug/Kg	☼	07/28/22 13:43	07/29/22 23:26	1
Methylene Chloride	ND	vs	6.0		ug/Kg	☼	07/28/22 13:43	07/29/22 23:26	1
n-Butanol	ND	vs	60		ug/Kg	☼	07/28/22 13:43	07/29/22 23:26	1
Tetrachloroethene	ND	vs	6.0		ug/Kg	☼	07/28/22 13:43	07/29/22 23:26	1
Toluene	ND	vs	6.0		ug/Kg	☼	07/28/22 13:43	07/29/22 23:26	1
Trichloroethene	ND	vs	6.0		ug/Kg	☼	07/28/22 13:43	07/29/22 23:26	1
Trichlorofluoromethane	ND	vs	6.0		ug/Kg	☼	07/28/22 13:43	07/29/22 23:26	1
Xylenes, Total	ND	vs	12		ug/Kg	☼	07/28/22 13:43	07/29/22 23:26	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*108*		*64 - 126*	*07/28/22 13:43*	*07/29/22 23:26*	*1*
4-Bromofluorobenzene (Surr)	*109*		*72 - 126*	*07/28/22 13:43*	*07/29/22 23:26*	*1*
Dibromofluoromethane (Surr)	*114*		*60 - 140*	*07/28/22 13:43*	*07/29/22 23:26*	*1*
Toluene-d8 (Surr)	*98*		*71 - 125*	*07/28/22 13:43*	*07/29/22 23:26*	*1*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m & p - Cresol	ND		400		ug/Kg	☼	07/29/22 15:47	08/02/22 21:17	1
Nitrobenzene	ND		200		ug/Kg	☼	07/29/22 15:47	08/02/22 21:17	1
o-Cresol	ND		200		ug/Kg	☼	07/29/22 15:47	08/02/22 21:17	1
Pyridine	ND		400		ug/Kg	☼	07/29/22 15:47	08/02/22 21:17	1
Total Cresols	ND		400		ug/Kg	☼	07/29/22 15:47	08/02/22 21:17	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*93*		*54 - 120*	*07/29/22 15:47*	*08/02/22 21:17*	*1*
2-Fluorobiphenyl (Surr)	*80*		*60 - 120*	*07/29/22 15:47*	*08/02/22 21:17*	*1*
2-Fluorophenol (Surr)	*73*		*52 - 120*	*07/29/22 15:47*	*08/02/22 21:17*	*1*
Nitrobenzene-d5 (Surr)	*71*		*53 - 120*	*07/29/22 15:47*	*08/02/22 21:17*	*1*
Phenol-d5 (Surr)	*74*		*54 - 120*	*07/29/22 15:47*	*08/02/22 21:17*	*1*
p-Terphenyl-d14 (Surr)	*87*		*79 - 130*	*07/29/22 15:47*	*08/02/22 21:17*	*1*

Method: 8015D - Nonhalogenated Organic Compounds - Direct Injection (GC) - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methanol	ND		1200		ug/Kg	☼		07/29/22 12:56	1

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200135-1

Client Sample ID: H067-EX6-04
Date Collected: 07/25/22 09:30
Date Received: 07/27/22 10:00

Lab Sample ID: 480-200135-1
Matrix: Solid
Percent Solids: 81.8

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Acetone	74		43 - 129		07/29/22 12:56	1
Acetone	68		43 - 129		07/29/22 12:56	1

Client Sample ID: H067-EX7-02
Date Collected: 07/25/22 11:30
Date Received: 07/27/22 10:00

Lab Sample ID: 480-200135-2
Matrix: Solid
Percent Solids: 83.6

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND	vs	5.8		ug/Kg	☼	07/28/22 13:43	07/29/22 23:50	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	vs	5.8		ug/Kg	☼	07/28/22 13:43	07/29/22 23:50	1
1,1,2-Trichloroethane	ND	vs	5.8		ug/Kg	☼	07/28/22 13:43	07/29/22 23:50	1
1,2-Dichlorobenzene	ND	vs	5.8		ug/Kg	☼	07/28/22 13:43	07/29/22 23:50	1
Acetone	ND	vs	29		ug/Kg	☼	07/28/22 13:43	07/29/22 23:50	1
Benzene	ND	vs	5.8		ug/Kg	☼	07/28/22 13:43	07/29/22 23:50	1
Carbon disulfide	ND	vs	5.8		ug/Kg	☼	07/28/22 13:43	07/29/22 23:50	1
Carbon tetrachloride	ND	vs	5.8		ug/Kg	☼	07/28/22 13:43	07/29/22 23:50	1
Chlorobenzene	ND	vs	5.8		ug/Kg	☼	07/28/22 13:43	07/29/22 23:50	1
Cyclohexanone	ND	vs	58		ug/Kg	☼	07/28/22 13:43	07/29/22 23:50	1
Ethyl acetate	ND	vs	5.8		ug/Kg	☼	07/28/22 13:43	07/29/22 23:50	1
Ethyl ether	ND	vs	29		ug/Kg	☼	07/28/22 13:43	07/29/22 23:50	1
Ethylbenzene	ND	vs	5.8		ug/Kg	☼	07/28/22 13:43	07/29/22 23:50	1
Isobutyl alcohol	ND	vs	230		ug/Kg	☼	07/28/22 13:43	07/29/22 23:50	1
Methyl ethyl ketone (MEK)	ND	vs	29		ug/Kg	☼	07/28/22 13:43	07/29/22 23:50	1
Methyl isobutyl ketone (MIBK)	ND	vs	29		ug/Kg	☼	07/28/22 13:43	07/29/22 23:50	1
Methylene Chloride	ND	vs	5.8		ug/Kg	☼	07/28/22 13:43	07/29/22 23:50	1
n-Butanol	ND	vs	58		ug/Kg	☼	07/28/22 13:43	07/29/22 23:50	1
Tetrachloroethene	ND	vs	5.8		ug/Kg	☼	07/28/22 13:43	07/29/22 23:50	1
Toluene	ND	vs	5.8		ug/Kg	☼	07/28/22 13:43	07/29/22 23:50	1
Trichloroethene	ND	vs	5.8		ug/Kg	☼	07/28/22 13:43	07/29/22 23:50	1
Trichlorofluoromethane	ND	vs	5.8		ug/Kg	☼	07/28/22 13:43	07/29/22 23:50	1
Xylenes, Total	ND	vs	12		ug/Kg	☼	07/28/22 13:43	07/29/22 23:50	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*106*		*64 - 126*	*07/28/22 13:43*	*07/29/22 23:50*	*1*
4-Bromofluorobenzene (Surr)	*106*		*72 - 126*	*07/28/22 13:43*	*07/29/22 23:50*	*1*
Dibromofluoromethane (Surr)	*114*		*60 - 140*	*07/28/22 13:43*	*07/29/22 23:50*	*1*
Toluene-d8 (Surr)	*100*		*71 - 125*	*07/28/22 13:43*	*07/29/22 23:50*	*1*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m & p - Cresol	ND		390		ug/Kg	☼	07/29/22 15:47	08/02/22 21:41	1
Nitrobenzene	ND		200		ug/Kg	☼	07/29/22 15:47	08/02/22 21:41	1
o-Cresol	ND		200		ug/Kg	☼	07/29/22 15:47	08/02/22 21:41	1
Pyridine	ND		390		ug/Kg	☼	07/29/22 15:47	08/02/22 21:41	1
Total Cresols	ND		390		ug/Kg	☼	07/29/22 15:47	08/02/22 21:41	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*96*		*54 - 120*	*07/29/22 15:47*	*08/02/22 21:41*	*1*
2-Fluorobiphenyl (Surr)	*78*		*60 - 120*	*07/29/22 15:47*	*08/02/22 21:41*	*1*
2-Fluorophenol (Surr)	*68*		*52 - 120*	*07/29/22 15:47*	*08/02/22 21:41*	*1*
Nitrobenzene-d5 (Surr)	*61*		*53 - 120*	*07/29/22 15:47*	*08/02/22 21:41*	*1*
Phenol-d5 (Surr)	*68*		*54 - 120*	*07/29/22 15:47*	*08/02/22 21:41*	*1*
p-Terphenyl-d14 (Surr)	*93*		*79 - 130*	*07/29/22 15:47*	*08/02/22 21:41*	*1*

Method: 8015D - Nonhalogenated Organic Compounds - Direct Injection (GC) - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methanol	ND		1200		ug/Kg	☼		07/29/22 13:55	1

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200135-1

Client Sample ID: H067-EX7-02
Date Collected: 07/25/22 11:30
Date Received: 07/27/22 10:00

Lab Sample ID: 480-200135-2
Matrix: Solid
Percent Solids: 83.6

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Acetone	88		43 - 129		07/29/22 13:55	1
Acetone	80		43 - 129		07/29/22 13:55	1

Surrogate Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200135-1

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(64-126)	(72-126)	(60-140)	(71-125)
480-200135-1	H067-EX6-04	108	109	114	98
480-200135-2	H067-EX7-02	106	106	114	100
LCS 480-635335/1-A	Lab Control Sample	106	110	112	97
LCSD 480-635335/2-A	Lab Control Sample Dup	112	114	117	98
MB 480-635335/3-A	Method Blank	113	111	117	93

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHd14
Lab Sample ID	Client Sample ID	(54-120)	(60-120)	(52-120)	(53-120)	(54-120)	(79-130)
480-200135-1	H067-EX6-04	93	80	73	71	74	87
480-200135-1 MS	H067-EX6-04	101	68	55	58	58	88
480-200135-1 MSD	H067-EX6-04	105	71	55	56	53 S1-	97
480-200135-2	H067-EX7-02	96	78	68	61	68	93
LCS 480-635559/2-A	Lab Control Sample	89	83	68	67	70	88
MB 480-635559/1-A	Method Blank	95	80	68	67	73	97

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHd14 = p-Terphenyl-d14 (Surr)

Method: 8015D - Nonhalogenated Organic Compounds - Direct Injection (GC)

Matrix: Solid **Prep Type: Soluble**

		Percent Surrogate Recovery (Acceptance Limits)	
		Acetone1	Acetone2
Lab Sample ID	Client Sample ID	(43-129)	(43-129)
480-200135-1	H067-EX6-04	74	68
480-200135-1 MS	H067-EX6-04	68	69
480-200135-1 MSD	H067-EX6-04	74	72
480-200135-2	H067-EX7-02	88	80
LCS 410-280888/2-A	Lab Control Sample	82	81
MB 410-280888/1-A	Method Blank	85	78

Surrogate Legend

Acetone = Acetone

Method: 8260C - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 480-635335/3-A
Matrix: Solid
Analysis Batch: 635513

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 635335

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		5.0		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		5.0		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
1,1,2-Trichloroethane	ND		5.0		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
1,2-Dichlorobenzene	ND		5.0		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
Acetone	ND		25		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
Benzene	ND		5.0		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
Carbon disulfide	ND		5.0		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
Carbon tetrachloride	ND		5.0		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
Chlorobenzene	ND		5.0		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
Cyclohexanone	ND		50		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
Ethyl acetate	ND		5.0		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
Ethyl ether	ND		25		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
Ethylbenzene	ND		5.0		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
Isobutyl alcohol	ND		200		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
Methyl ethyl ketone (MEK)	ND		25		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
Methyl isobutyl ketone (MIBK)	ND		25		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
Methylene Chloride	ND		5.0		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
n-Butanol	ND		50		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
Tetrachloroethene	ND		5.0		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
Toluene	ND		5.0		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
Trichloroethene	ND		5.0		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
Trichlorofluoromethane	ND		5.0		ug/Kg		07/28/22 13:43	07/29/22 16:36	1
Xylenes, Total	ND		10		ug/Kg		07/28/22 13:43	07/29/22 16:36	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*113*		*64 - 126*	*07/28/22 13:43*	*07/29/22 16:36*	*1*
4-Bromofluorobenzene (Surr)	*111*		*72 - 126*	*07/28/22 13:43*	*07/29/22 16:36*	*1*
Dibromofluoromethane (Surr)	*117*		*60 - 140*	*07/28/22 13:43*	*07/29/22 16:36*	*1*
Toluene-d8 (Surr)	*93*		*71 - 125*	*07/28/22 13:43*	*07/29/22 16:36*	*1*

Lab Sample ID: LCS 480-635335/1-A
Matrix: Solid
Analysis Batch: 635513

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 635335

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
1,1,1-Trichloroethane	50.0	60.3		ug/Kg		121	77 - 121
1,1,2-Trichloro-1,2,2-trifluoroethane	50.0	45.5		ug/Kg		91	60 - 140
1,1,2-Trichloroethane	50.0	47.0		ug/Kg		94	78 - 122
1,2-Dichlorobenzene	50.0	48.9		ug/Kg		98	75 - 120
Acetone	250	245		ug/Kg		98	61 - 137
Benzene	50.0	45.2		ug/Kg		90	79 - 127
Carbon disulfide	50.0	44.3		ug/Kg		89	64 - 131
Carbon tetrachloride	50.0	66.3		ug/Kg		133	75 - 135
Chlorobenzene	50.0	52.4		ug/Kg		105	76 - 124
Ethyl ether	50.0	38.1		ug/Kg		76	55 - 120
Ethylbenzene	50.0	49.9		ug/Kg		100	80 - 120
Isobutyl alcohol	1250	1240		ug/Kg		100	71 - 140

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 480-635335/1-A
Matrix: Solid
Analysis Batch: 635513

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 635335

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Methyl ethyl ketone (MEK)	250	244		ug/Kg		98	70 - 134
Methyl isobutyl ketone (MIBK)	250	241		ug/Kg		96	65 - 133
Methylene Chloride	50.0	48.7		ug/Kg		97	61 - 127
Tetrachloroethene	50.0	58.7		ug/Kg		117	74 - 122
Toluene	50.0	47.5		ug/Kg		95	74 - 128
Trichloroethene	50.0	51.5		ug/Kg		103	77 - 129
Trichlorofluoromethane	50.0	60.4		ug/Kg		121	65 - 146

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*106*		*64 - 126*
4-Bromofluorobenzene (Surr)	*110*		*72 - 126*
Dibromofluoromethane (Surr)	*112*		*60 - 140*
Toluene-d8 (Surr)	*97*		*71 - 125*

Lab Sample ID: LCSD 480-635335/2-A
Matrix: Solid
Analysis Batch: 635513

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 635335

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
1,1,1-Trichloroethane	50.0	56.6		ug/Kg		113	77 - 121	6	20
1,1,2-Trichloro-1,2,2-trifluoroethane	50.0	43.0		ug/Kg		86	60 - 140	6	20
1,1,2-Trichloroethane	50.0	46.1		ug/Kg		92	78 - 122	2	20
1,2-Dichlorobenzene	50.0	47.0		ug/Kg		94	75 - 120	4	20
Acetone	250	220		ug/Kg		88	61 - 137	11	20
Benzene	50.0	43.6		ug/Kg		87	79 - 127	4	20
Carbon disulfide	50.0	41.0		ug/Kg		82	64 - 131	8	20
Carbon tetrachloride	50.0	63.2		ug/Kg		126	75 - 135	5	20
Chlorobenzene	50.0	50.5		ug/Kg		101	76 - 124	4	20
Ethyl ether	50.0	37.1		ug/Kg		74	55 - 120	3	20
Ethylbenzene	50.0	47.7		ug/Kg		95	80 - 120	5	20
Isobutyl alcohol	1250	1200		ug/Kg		96	71 - 140	4	20
Methyl ethyl ketone (MEK)	250	231		ug/Kg		92	70 - 134	5	20
Methyl isobutyl ketone (MIBK)	250	239		ug/Kg		96	65 - 133	1	20
Methylene Chloride	50.0	47.6		ug/Kg		95	61 - 127	2	20
Tetrachloroethene	50.0	54.5		ug/Kg		109	74 - 122	7	20
Toluene	50.0	44.8		ug/Kg		90	74 - 128	6	20
Trichloroethene	50.0	49.3		ug/Kg		99	77 - 129	4	20
Trichlorofluoromethane	50.0	57.1		ug/Kg		114	65 - 146	6	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*112*		*64 - 126*
4-Bromofluorobenzene (Surr)	*114*		*72 - 126*
Dibromofluoromethane (Surr)	*117*		*60 - 140*
Toluene-d8 (Surr)	*98*		*71 - 125*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 480-635559/1-A
Matrix: Solid
Analysis Batch: 635875

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 635559

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m & p - Cresol	ND		320		ug/Kg		07/29/22 15:47	08/02/22 19:41	1
Nitrobenzene	ND		170		ug/Kg		07/29/22 15:47	08/02/22 19:41	1
o-Cresol	ND		170		ug/Kg		07/29/22 15:47	08/02/22 19:41	1
Pyridine	ND		320		ug/Kg		07/29/22 15:47	08/02/22 19:41	1
Total Cresols	ND		320		ug/Kg		07/29/22 15:47	08/02/22 19:41	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*95*		*54 - 120*	*07/29/22 15:47*	*08/02/22 19:41*	*1*
2-Fluorobiphenyl (Surr)	*80*		*60 - 120*	*07/29/22 15:47*	*08/02/22 19:41*	*1*
2-Fluorophenol (Surr)	*68*		*52 - 120*	*07/29/22 15:47*	*08/02/22 19:41*	*1*
Nitrobenzene-d5 (Surr)	*67*		*53 - 120*	*07/29/22 15:47*	*08/02/22 19:41*	*1*
Phenol-d5 (Surr)	*73*		*54 - 120*	*07/29/22 15:47*	*08/02/22 19:41*	*1*
p-Terphenyl-d14 (Surr)	*97*		*79 - 130*	*07/29/22 15:47*	*08/02/22 19:41*	*1*

Lab Sample ID: LCS 480-635559/2-A
Matrix: Solid
Analysis Batch: 636030

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 635559

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Nitrobenzene			1640	1140		ug/Kg		70	54 - 120		
o-Cresol			1640	1260		ug/Kg		77	54 - 120		
Pyridine			3280	1480		ug/Kg		45	23 - 120		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*89*		*54 - 120*
2-Fluorobiphenyl (Surr)	*83*		*60 - 120*
2-Fluorophenol (Surr)	*68*		*52 - 120*
Nitrobenzene-d5 (Surr)	*67*		*53 - 120*
Phenol-d5 (Surr)	*70*		*54 - 120*
p-Terphenyl-d14 (Surr)	*88*		*79 - 130*

Lab Sample ID: 480-200135-1 MS
Matrix: Solid
Analysis Batch: 635875

Client Sample ID: H067-EX6-04
Prep Type: Total/NA
Prep Batch: 635559

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
Nitrobenzene	ND		1990	1170		ug/Kg	☼	59	49 - 120		
o-Cresol	ND		1990	1290		ug/Kg	☼	65	48 - 120		
Pyridine	ND		3980	1760		ug/Kg	☼	44	20 - 120		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*101*		*54 - 120*
2-Fluorobiphenyl (Surr)	*68*		*60 - 120*
2-Fluorophenol (Surr)	*55*		*52 - 120*
Nitrobenzene-d5 (Surr)	*58*		*53 - 120*
Phenol-d5 (Surr)	*58*		*54 - 120*
p-Terphenyl-d14 (Surr)	*88*		*79 - 130*

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 480-200135-1 MSD
Matrix: Solid
Analysis Batch: 635875

Client Sample ID: H067-EX6-04
Prep Type: Total/NA
Prep Batch: 635559

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Nitrobenzene	ND		2000	1160		ug/Kg	☼	58	49 - 120	1	24
o-Cresol	ND		2000	1210		ug/Kg	☼	61	48 - 120	7	27
Pyridine	ND		3990	1520		ug/Kg	☼	38	20 - 120	15	49

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*105*		*54 - 120*
2-Fluorobiphenyl (Surr)	*71*		*60 - 120*
2-Fluorophenol (Surr)	*55*		*52 - 120*
Nitrobenzene-d5 (Surr)	*56*		*53 - 120*
Phenol-d5 (Surr)	*53*	*S1-*	*54 - 120*
p-Terphenyl-d14 (Surr)	*97*		*79 - 130*

Method: 8015D - Nonhalogenated Organic Compounds - Direct Injection (GC)

Lab Sample ID: MB 410-280888/1-A
Matrix: Solid
Analysis Batch: 280889

Client Sample ID: Method Blank
Prep Type: Soluble

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methanol	ND		1000		ug/Kg			07/29/22 11:58	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Acetone	*85*		*43 - 129*		*07/29/22 11:58*	*1*
Acetone	*78*		*43 - 129*		*07/29/22 11:58*	*1*

Lab Sample ID: LCS 410-280888/2-A
Matrix: Solid
Analysis Batch: 280889

Client Sample ID: Lab Control Sample
Prep Type: Soluble

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Methanol			2510	2330		ug/Kg		93	72 - 134		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Acetone	*82*		*43 - 129*
Acetone	*81*		*43 - 129*

Lab Sample ID: 480-200135-1 MS
Matrix: Solid
Analysis Batch: 280889

Client Sample ID: H067-EX6-04
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
Methanol	ND		3060	2420		ug/Kg	☼	79	72 - 134		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Acetone	*68*		*43 - 129*
Acetone	*69*		*43 - 129*

Method: 8015D - Nonhalogenated Organic Compounds - Direct Injection (GC) (Continued)

Lab Sample ID: 480-200135-1 MSD
Matrix: Solid
Analysis Batch: 280889

Client Sample ID: H067-EX6-04
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Methanol	ND		3070	2300		ug/Kg	☼	75	72 - 134	3	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
Acetone	*74*		*43 - 129*
Acetone	*72*		*43 - 129*

QC Association Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200135-1

GC/MS VOA

Prep Batch: 635335

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200135-1	H067-EX6-04	Total/NA	Solid	5035A_L	
480-200135-2	H067-EX7-02	Total/NA	Solid	5035A_L	
MB 480-635335/3-A	Method Blank	Total/NA	Solid	5035A_L	
LCS 480-635335/1-A	Lab Control Sample	Total/NA	Solid	5035A_L	
LCSD 480-635335/2-A	Lab Control Sample Dup	Total/NA	Solid	5035A_L	

Analysis Batch: 635513

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200135-1	H067-EX6-04	Total/NA	Solid	8260C	635335
480-200135-2	H067-EX7-02	Total/NA	Solid	8260C	635335
MB 480-635335/3-A	Method Blank	Total/NA	Solid	8260C	635335
LCS 480-635335/1-A	Lab Control Sample	Total/NA	Solid	8260C	635335
LCSD 480-635335/2-A	Lab Control Sample Dup	Total/NA	Solid	8260C	635335

GC/MS Semi VOA

Prep Batch: 635559

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200135-1	H067-EX6-04	Total/NA	Solid	3550C	
480-200135-2	H067-EX7-02	Total/NA	Solid	3550C	
MB 480-635559/1-A	Method Blank	Total/NA	Solid	3550C	
LCS 480-635559/2-A	Lab Control Sample	Total/NA	Solid	3550C	
480-200135-1 MS	H067-EX6-04	Total/NA	Solid	3550C	
480-200135-1 MSD	H067-EX6-04	Total/NA	Solid	3550C	

Analysis Batch: 635875

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200135-1	H067-EX6-04	Total/NA	Solid	8270D	635559
480-200135-2	H067-EX7-02	Total/NA	Solid	8270D	635559
MB 480-635559/1-A	Method Blank	Total/NA	Solid	8270D	635559
480-200135-1 MS	H067-EX6-04	Total/NA	Solid	8270D	635559
480-200135-1 MSD	H067-EX6-04	Total/NA	Solid	8270D	635559

Analysis Batch: 636030

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 480-635559/2-A	Lab Control Sample	Total/NA	Solid	8270D	635559

GC Semi VOA

Leach Batch: 280888

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200135-1	H067-EX6-04	Soluble	Solid	DI Leach	
480-200135-2	H067-EX7-02	Soluble	Solid	DI Leach	
MB 410-280888/1-A	Method Blank	Soluble	Solid	DI Leach	
LCS 410-280888/2-A	Lab Control Sample	Soluble	Solid	DI Leach	
480-200135-1 MS	H067-EX6-04	Soluble	Solid	DI Leach	
480-200135-1 MSD	H067-EX6-04	Soluble	Solid	DI Leach	

Analysis Batch: 280889

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200135-1	H067-EX6-04	Soluble	Solid	8015D	280888
480-200135-2	H067-EX7-02	Soluble	Solid	8015D	280888

GC Semi VOA (Continued)

Analysis Batch: 280889 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 410-280888/1-A	Method Blank	Soluble	Solid	8015D	280888
LCS 410-280888/2-A	Lab Control Sample	Soluble	Solid	8015D	280888
480-200135-1 MS	H067-EX6-04	Soluble	Solid	8015D	280888
480-200135-1 MSD	H067-EX6-04	Soluble	Solid	8015D	280888

General Chemistry

Analysis Batch: 635192

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-200135-1	H067-EX6-04	Total/NA	Solid	Moisture	
480-200135-2	H067-EX7-02	Total/NA	Solid	Moisture	

Lab Chronicle

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200135-1

Client Sample ID: H067-EX6-04
Date Collected: 07/25/22 09:30
Date Received: 07/27/22 10:00

Lab Sample ID: 480-200135-1
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	635192	07/27/22 16:36	KER	EETNE BUF

Client Sample ID: H067-EX6-04
Date Collected: 07/25/22 09:30
Date Received: 07/27/22 10:00

Lab Sample ID: 480-200135-1
Matrix: Solid
Percent Solids: 81.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035A_L			635335	07/28/22 13:43	AXK	EETNE BUF
Total/NA	Analysis	8260C		1	635513	07/29/22 23:26	CDC	EETNE BUF
Total/NA	Prep	3550C			635559	07/29/22 15:47	SJM	EETNE BUF
Total/NA	Analysis	8270D		1	635875	08/02/22 21:17	PJQ	EETNE BUF
Soluble	Leach	DI Leach			280888	07/29/22 09:52	LXF2	ELLE
Soluble	Analysis	8015D		1	280889	07/29/22 12:56	LXF2	ELLE

Client Sample ID: H067-EX7-02
Date Collected: 07/25/22 11:30
Date Received: 07/27/22 10:00

Lab Sample ID: 480-200135-2
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	635192	07/27/22 16:36	KER	EETNE BUF

Client Sample ID: H067-EX7-02
Date Collected: 07/25/22 11:30
Date Received: 07/27/22 10:00

Lab Sample ID: 480-200135-2
Matrix: Solid
Percent Solids: 83.6

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035A_L			635335	07/28/22 13:43	AXK	EETNE BUF
Total/NA	Analysis	8260C		1	635513	07/29/22 23:50	CDC	EETNE BUF
Total/NA	Prep	3550C			635559	07/29/22 15:47	SJM	EETNE BUF
Total/NA	Analysis	8270D		1	635875	08/02/22 21:41	PJQ	EETNE BUF
Soluble	Leach	DI Leach			280888	07/29/22 09:52	LXF2	ELLE
Soluble	Analysis	8015D		1	280889	07/29/22 13:55	LXF2	ELLE

Laboratory References:

EETNE BUF = Eurofins Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

ELLE = Eurofins Lancaster Laboratories Environment Testing, LLC, 2425 New Holland Pike, Lancaster, PA 17601, TEL (717)656-2300

Accreditation/Certification Summary

Client: ARCADIS U.S. Inc
Job ID: 480-200135-1
Project/Site: GTEOSI - Seneca Falls

Laboratory: Eurofins Buffalo

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
New York	NELAP	10026	03-31-23

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
8260C	5035A_L	Solid	Cyclohexanone
8270D	3550C	Solid	m & p - Cresol
8270D	3550C	Solid	Total Cresols
Moisture		Solid	Percent Moisture
Moisture		Solid	Percent Solids

Laboratory: Eurofins Lancaster Laboratories Environment Testing, LLC

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
A2LA	Dept. of Defense ELAP	1.01	11-30-22
A2LA	ISO/IEC 17025	0001.01	11-30-22
Alaska	State	PA00009	07-01-23
Alaska (UST)	State	17-027	02-28-23
Arizona	State	AZ0780	03-12-23
Arkansas DEQ	State	88-0660	08-10-22
California	State	2792	11-30-22
Colorado	State	PA00009	06-30-23
Connecticut	State	PH-0746	06-30-23
DE Haz. Subst. Cleanup Act (HSCA)	State	019-006 (PA cert)	01-31-23
Delaware (DW)	State	N/A	01-31-23
Florida	NELAP	E87997	06-30-22 *
Georgia (DW)	State	C048	01-31-23
Hawaii	State	N/A	01-31-23
Illinois	NELAP	200027	01-31-23
Iowa	State	361	03-02-22 *
Kansas	NELAP	E-10151	10-31-22
Kentucky (DW)	State	KY90088	12-31-22
Kentucky (UST)	State	1.01	11-30-22
Kentucky (WW)	State	KY90088	01-01-23
Louisiana	NELAP	02055	06-30-23
Maine	State	2019012	03-12-23
Maryland	State	100	06-30-23
Massachusetts	State	M-PA009	06-30-23
Michigan	State	9930	01-31-23
Minnesota	NELAP	042-999-487	12-31-22
Missouri	State	450	01-31-25
Montana (DW)	State	0098	01-01-23
Montana (UST)	State	<cert No.>	02-01-23
Nebraska	State	NE-OS-32-17	01-31-23
New Hampshire	NELAP	2730	01-10-23
New Jersey	NELAP	PA011	06-30-23
New York	NELAP	10670	04-01-23
North Carolina (DW)	State	42705	07-31-23
North Carolina (WW/SW)	State	521	12-31-22
North Dakota	State	R-205	01-31-23

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Accreditation/Certification Summary

Client: ARCADIS U.S. Inc
Job ID: 480-200135-1
Project/Site: GTEOSI - Seneca Falls

Laboratory: Eurofins Lancaster Laboratories Environment Testing, LLC (Continued)

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Oklahoma	NELAP	R-205	08-31-22
Oregon	NELAP	PA200001	09-11-22
PALA	Canada	1978	09-16-24
Pennsylvania	NELAP	36-00037	01-31-23
Rhode Island	State	LAO00338	12-30-22
South Carolina	State	89002	01-31-23
Tennessee	State	02838	01-31-23
Texas	NELAP	T104704194-21-40	08-31-22
Vermont	State	VT - 36037	10-28-22
Virginia	NELAP	460182	06-15-23
Washington	State	C457	04-11-23
West Virginia (DW)	State	9906 C	12-31-22
West Virginia DEP	State	055	07-31-22
Wyoming	State	8TMS-L	01-31-23
Wyoming (UST)	A2LA	1.01	11-30-22

Method Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200135-1

Method	Method Description	Protocol	Laboratory
8260C	Volatile Organic Compounds by GC/MS	SW846	EETNE BUF
8270D	Semivolatile Organic Compounds (GC/MS)	SW846	EETNE BUF
8015D	Nonhalogenated Organic Compounds - Direct Injection (GC)	SW846	ELLE
Moisture	Percent Moisture	EPA	EETNE BUF
3550C	Ultrasonic Extraction	SW846	EETNE BUF
5035A_L	Closed System Purge and Trap	SW846	EETNE BUF
DI Leach	Deionized Water Leaching Procedure	ASTM	ELLE

Protocol References:

ASTM = ASTM International

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EETNE BUF = Eurofins Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

ELLE = Eurofins Lancaster Laboratories Environment Testing, LLC, 2425 New Holland Pike, Lancaster, PA 17601, TEL (717)656-2300

Sample Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-200135-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
480-200135-1	H067-EX6-04	Solid	07/25/22 09:30	07/27/22 10:00
480-200135-2	H067-EX7-02	Solid	07/25/22 11:30	07/27/22 10:00

Eurofins TestAmerica, Buffalo
10 Hazelwood Drive

Amherst, NY 14228-2223
phone 716.691.2600 fax 716.691.7991

Chain of Custody Record

eurofins | Environment Testing America

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc. d/b/a Eurofins TestAmerica

Client Contact	**Project Manager: Mark Flusche**		COC No: 1
Company: Arcadis of New York, Inc.	Email: mark.flusche@arcadis.com	Site Contact: Ryan Clare	Date: 7/26/22 — 1 of 1 COCs
Address: 855 Route 146 Suite 210	Tel: 518-250-7322	Lab Contact: Schove, John R	Carrier: FedEx — TALS Project #:
Clifton Park, NY 12065	**Analysis Turnaround Time**		Sampler:
	☐ CALENDAR DAYS ☐ WORKING DAYS		**For Lab Use Only:**
	TAT if different from Below ____		Walk-in Client:
Project Name: GTEOSI - Seneca Falls	☑ 2 weeks		Lab Sampling:
Site:	☐ 1 week		Job / SDG No.:
PO #: 30112357.00055 Project #:	☐ 2 days ☐ 1 day		

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS/MSD (Y/N)	TAGM (30 TAGM compounds only)	TAGM list Methanol	TAGM list VOCs	TAGM list SVOCs	Sample Specific Notes:
H067-EX6-04	7/25/22	0930	Grab	Soil	3				X	X	X	
H067-EX7-02	7/25/22	1130	Grab	Soil	3				X	X	X	
	/22		Grab	Soil								
	/22		Grab	Soil								
	/22		Grab	Soil								
	/22		Grab	Soil								
	/22		Grab	Soil								
	/22		Grab	Soil								
	/22		Grab	Soil								
	/22		Grab	Soil								
	/22		Grab	Soil								
	/22		Grab	Soil								
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other								1				

480-200135 Chain of Custody

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☑ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☑ Disposal by Lab ☐ Archive for ____ Months

Special Instructions/QC Requirements & Comments:

2.7 # ICE

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:		Cooler Temp. (°C): Obs'd:	Corr'd:	Therm ID No.:	
Relinquished by:	Company: Arcadis	Date/Time: 7/26/22 1600	Received by:	Company:	Date/Time:	
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:	
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company: TA	Date/Time: 7/27/22 1000	

Form No. CA-C-WI-002, Rev. 4.34, dated 8/3/2020

Eurofins Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Phone: 716-691-2600 Fax: 716-691-7991

Chain of Custody Record

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Client Information (Sub Contract Lab)	Sampler:	Lab PM: Schove, John R	Carrier Tracking No(s):	COC No: 480-73973.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: John.Schove@et.eurofinsus.com	State of Origin: New York	Page: Page 1 of 1
Company: Eurofins Lancaster Laboratories Environm		Accreditations Required (See note): NELAP - New York		Job #: 480-200135-1
Address: 2425 New Holland Pike, ,	Due Date Requested: 8/9/2022			
City: Lancaster	TAT Requested (days):			
State, Zip: PA, 17601				
Phone: 717-656-2300(Tel)	PO #:			
Email:	WO #:			
Project Name: GTEOSI - Seneca Falls	Project #: 48005146			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Y - Trizma, Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8015D_DAI/DI_LEACH_GCV TAGM List Methanol	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
H067-EX6-04 (480-200135-1)	7/25/22	09:30 Eastern		Solid			X	1	
H067-EX7-02 (480-200135-2)	7/25/22	11:30 Eastern		Solid			X	1	

Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing Northeast, LLC places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing Northeast, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Environment Testing Northeast, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins Environment Testing Northeast, LLC.

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	7-27-22 1800	TAB			
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time: 7/28/22 1051	Company

Custody Seals Intact: ☒ Yes ☐ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: 3.3

MB

Ver: 06/08/2021

Login Sample Receipt Checklist

Client: ARCADIS U.S. Inc

Job Number: 480-200135-1

Login Number: 200135
List Number: 1
Creator: Kolb, Chris M

List Source: Eurofins Buffalo

Question	Answer	Comment
Radioactivity either was not measured or, if measured, is at or below background	True	
The cooler's custody seal, if present, is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time (Excluding tests with immediate HTs)..	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	N/A	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Sampling Company provided.	True	ARCADIS
Samples received within 48 hours of sampling.	True	
Samples requiring field filtration have been filtered in the field.	True	
Chlorine Residual checked.	N/A	

Login Sample Receipt Checklist

Client: ARCADIS U.S. Inc

Job Number: 480-200135-1

Login Number: 200135
List Number: 2
Creator: Ballard, Megan

List Source: Eurofins Lancaster Laboratories Environment Testing, LLC
List Creation: 07/28/22 02:14 PM

Question	Answer	Comment
The cooler's custody seal is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable (</=6C, not frozen).	True	
Cooler Temperature is recorded.	True	
WV: Container Temperature is acceptable (</=6C, not frozen).	N/A	
WV: Container Temperature is recorded.	N/A	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
There are no discrepancies between the containers received and the COC.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
There is sufficient vol. for all requested analyses.	True	
Is the Field Sampler's name present on COC?	False	Received project as a subcontract.
Sample custody seals are intact.	N/A	
VOA sample vials do not have headspace >6mm in diameter (none, if from WV)?	True	

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ANALYTICAL REPORT

Eurofins Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Tel: (716)691-2600

Laboratory Job ID: 480-199963-1
Client Project/Site: GTEOSI - Seneca Falls

For:
ARCADIS U.S. Inc
855 Route 146
Suite 210
Clifton Park, New York 12065

Attn: Mark Flusche

Authorized for release by:
7/29/2022 2:01:07 PM
Rebecca Jones, Project Management Assistant I
(716)504-9884
Rebecca.Jones@et.eurofinsus.com

Designee for

John Schove, Project Manager II
(716)504-9838
John.Schove@et.eurofinsus.com

LINKS

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The test results in this report meet all 2003 NELAC, 2009 TNI, and 2016 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Cover Page 1
Table of Contents 2
Definitions/Glossary 3
Case Narrative 4
Detection Summary 5
Client Sample Results 6
Surrogate Summary 10
QC Sample Results 11
QC Association Summary 15
Lab Chronicle 17
Certification Summary 18
Method Summary 19
Sample Summary 20
Chain of Custody 21
Receipt Checklists 23

Definitions/Glossary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-199963-1

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
vs	Reported analyte concentrations are below 200 ug/kg and may be biased low due to the sample not being collected according to 5035A-L low-level specifications.

GC/MS Semi VOA

Qualifier	Qualifier Description
F2	MS/MSD RPD exceeds control limits
S1-	Surrogate recovery exceeds control limits, low biased.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 480-199963-1

Laboratory: Eurofins Buffalo

Narrative

Job Narrative
480-199963-1

Comments
No additional comments.

Receipt
The samples were received on 7/20/2022 10:00 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 2.8º C.

GC/MS VOA
Method 8260C: The continuing calibration verification (CCV) associated with batch 480-634301 recovered outside acceptance criteria, low biased, for Ethyl ether. A reporting limit (RL) standard was analyzed, and the target analyte is detected. Since the associated samples were non-detect for the analyte, the data are reported. The associated samples are: H067-EX1-01 (480-199963-1) and H067-EX2-01 (480-199963-2).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

GC/MS Semi VOA
Method 8270D: Surrogate recovery was outside acceptance limits for the following matrix spike/matrix spike duplicate (MS/MSD) sample: (480-199963-A-1-A MS). The parent sample's surrogate recovery was compliant. The MS/MSD sample has been qualified and reported.

Method 8270D: Six surrogates are used for this analysis. The laboratory's SOP allows one acid and one base of these surrogates to be outside acceptance criteria without performing re-extraction/re-analysis. The following sample contained an allowable number of surrogate compounds outside limits: H067-EX1-01 (480-199963-1). These results have been reported and qualified.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

GC VOA
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Organic Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Detection Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-199963-1

Client Sample ID: H067-EX1-01 — Lab Sample ID: 480-199963-1

No Detections.

Client Sample ID: H067-EX2-01 — Lab Sample ID: 480-199963-2

No Detections.

This Detection Summary does not include radiochemical test results.

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-199963-1

Client Sample ID: H067-EX1-01
Date Collected: 07/18/22 14:50
Date Received: 07/20/22 10:00

Lab Sample ID: 480-199963-1
Matrix: Solid
Percent Solids: 84.6

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND	vs	5.8		ug/Kg	☼	07/20/22 17:19	07/21/22 03:41	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	vs	5.8		ug/Kg	☼	07/20/22 17:19	07/21/22 03:41	1
1,1,2-Trichloroethane	ND	vs	5.8		ug/Kg	☼	07/20/22 17:19	07/21/22 03:41	1
1,2-Dichlorobenzene	ND	vs	5.8		ug/Kg	☼	07/20/22 17:19	07/21/22 03:41	1
Acetone	ND	vs	29		ug/Kg	☼	07/20/22 17:19	07/21/22 03:41	1
Benzene	ND	vs	5.8		ug/Kg	☼	07/20/22 17:19	07/21/22 03:41	1
Carbon disulfide	ND	vs	5.8		ug/Kg	☼	07/20/22 17:19	07/21/22 03:41	1
Carbon tetrachloride	ND	vs	5.8		ug/Kg	☼	07/20/22 17:19	07/21/22 03:41	1
Chlorobenzene	ND	vs	5.8		ug/Kg	☼	07/20/22 17:19	07/21/22 03:41	1
Cyclohexanone	ND	vs	58		ug/Kg	☼	07/20/22 17:19	07/21/22 03:41	1
Ethyl acetate	ND	vs	5.8		ug/Kg	☼	07/20/22 17:19	07/21/22 03:41	1
Ethyl ether	ND	vs	29		ug/Kg	☼	07/20/22 17:19	07/21/22 03:41	1
Ethylbenzene	ND	vs	5.8		ug/Kg	☼	07/20/22 17:19	07/21/22 03:41	1
Isobutyl alcohol	ND	vs	230		ug/Kg	☼	07/20/22 17:19	07/21/22 03:41	1
Methyl ethyl ketone (MEK)	ND	vs	29		ug/Kg	☼	07/20/22 17:19	07/21/22 03:41	1
Methyl isobutyl ketone (MIBK)	ND	vs	29		ug/Kg	☼	07/20/22 17:19	07/21/22 03:41	1
Methylene Chloride	ND	vs	5.8		ug/Kg	☼	07/20/22 17:19	07/21/22 03:41	1
n-Butanol	ND	vs	58		ug/Kg	☼	07/20/22 17:19	07/21/22 03:41	1
Tetrachloroethene	ND	vs	5.8		ug/Kg	☼	07/20/22 17:19	07/21/22 03:41	1
Toluene	ND	vs	5.8		ug/Kg	☼	07/20/22 17:19	07/21/22 03:41	1
Trichloroethene	ND	vs	5.8		ug/Kg	☼	07/20/22 17:19	07/21/22 03:41	1
Trichlorofluoromethane	ND	vs	5.8		ug/Kg	☼	07/20/22 17:19	07/21/22 03:41	1
Xylenes, Total	ND	vs	12		ug/Kg	☼	07/20/22 17:19	07/21/22 03:41	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*100*		*64 - 126*	*07/20/22 17:19*	*07/21/22 03:41*	*1*
4-Bromofluorobenzene (Surr)	*92*		*72 - 126*	*07/20/22 17:19*	*07/21/22 03:41*	*1*
Dibromofluoromethane (Surr)	*101*		*60 - 140*	*07/20/22 17:19*	*07/21/22 03:41*	*1*
Toluene-d8 (Surr)	*93*		*71 - 125*	*07/20/22 17:19*	*07/21/22 03:41*	*1*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m & p - Cresol	ND	F2	390		ug/Kg	☼	07/21/22 15:21	07/22/22 15:02	1
Nitrobenzene	ND		200		ug/Kg	☼	07/21/22 15:21	07/22/22 15:02	1
o-Cresol	ND	F2	200		ug/Kg	☼	07/21/22 15:21	07/22/22 15:02	1
Pyridine	ND		390		ug/Kg	☼	07/21/22 15:21	07/22/22 15:02	1
Total Cresols	ND		390		ug/Kg	☼	07/21/22 15:21	07/22/22 15:02	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*64*		*54 - 120*	*07/21/22 15:21*	*07/22/22 15:02*	*1*
2-Fluorobiphenyl (Surr)	*61*		*60 - 120*	*07/21/22 15:21*	*07/22/22 15:02*	*1*
2-Fluorophenol (Surr)	*51*	*S1-*	*52 - 120*	*07/21/22 15:21*	*07/22/22 15:02*	*1*
Nitrobenzene-d5 (Surr)	*53*		*53 - 120*	*07/21/22 15:21*	*07/22/22 15:02*	*1*
Phenol-d5 (Surr)	*57*		*54 - 120*	*07/21/22 15:21*	*07/22/22 15:02*	*1*
p-Terphenyl-d14 (Surr)	*78*	*S1-*	*79 - 130*	*07/21/22 15:21*	*07/22/22 15:02*	*1*

Method: 8015D - Nonhalogenated Organic Compounds - Direct Injection (GC) - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methanol	ND		1200		ug/Kg	☼		07/25/22 17:00	1

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-199963-1

Client Sample ID: H067-EX1-01
Date Collected: 07/18/22 14:50
Date Received: 07/20/22 10:00

Lab Sample ID: 480-199963-1
Matrix: Solid
Percent Solids: 84.6

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Acetone	96		43 - 129		07/25/22 17:00	1
Acetone	86		43 - 129		07/25/22 17:00	1

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-199963-1

Client Sample ID: H067-EX2-01
Date Collected: 07/19/22 13:00
Date Received: 07/20/22 10:00

Lab Sample ID: 480-199963-2
Matrix: Solid
Percent Solids: 80.6

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND	vs	6.0		ug/Kg	☼	07/20/22 17:19	07/21/22 04:06	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	vs	6.0		ug/Kg	☼	07/20/22 17:19	07/21/22 04:06	1
1,1,2-Trichloroethane	ND	vs	6.0		ug/Kg	☼	07/20/22 17:19	07/21/22 04:06	1
1,2-Dichlorobenzene	ND	vs	6.0		ug/Kg	☼	07/20/22 17:19	07/21/22 04:06	1
Acetone	ND	vs	30		ug/Kg	☼	07/20/22 17:19	07/21/22 04:06	1
Benzene	ND	vs	6.0		ug/Kg	☼	07/20/22 17:19	07/21/22 04:06	1
Carbon disulfide	ND	vs	6.0		ug/Kg	☼	07/20/22 17:19	07/21/22 04:06	1
Carbon tetrachloride	ND	vs	6.0		ug/Kg	☼	07/20/22 17:19	07/21/22 04:06	1
Chlorobenzene	ND	vs	6.0		ug/Kg	☼	07/20/22 17:19	07/21/22 04:06	1
Cyclohexanone	ND	vs	60		ug/Kg	☼	07/20/22 17:19	07/21/22 04:06	1
Ethyl acetate	ND	vs	6.0		ug/Kg	☼	07/20/22 17:19	07/21/22 04:06	1
Ethyl ether	ND	vs	30		ug/Kg	☼	07/20/22 17:19	07/21/22 04:06	1
Ethylbenzene	ND	vs	6.0		ug/Kg	☼	07/20/22 17:19	07/21/22 04:06	1
Isobutyl alcohol	ND	vs	240		ug/Kg	☼	07/20/22 17:19	07/21/22 04:06	1
Methyl ethyl ketone (MEK)	ND	vs	30		ug/Kg	☼	07/20/22 17:19	07/21/22 04:06	1
Methyl isobutyl ketone (MIBK)	ND	vs	30		ug/Kg	☼	07/20/22 17:19	07/21/22 04:06	1
Methylene Chloride	ND	vs	6.0		ug/Kg	☼	07/20/22 17:19	07/21/22 04:06	1
n-Butanol	ND	vs	60		ug/Kg	☼	07/20/22 17:19	07/21/22 04:06	1
Tetrachloroethene	ND	vs	6.0		ug/Kg	☼	07/20/22 17:19	07/21/22 04:06	1
Toluene	ND	vs	6.0		ug/Kg	☼	07/20/22 17:19	07/21/22 04:06	1
Trichloroethene	ND	vs	6.0		ug/Kg	☼	07/20/22 17:19	07/21/22 04:06	1
Trichlorofluoromethane	ND	vs	6.0		ug/Kg	☼	07/20/22 17:19	07/21/22 04:06	1
Xylenes, Total	ND	vs	12		ug/Kg	☼	07/20/22 17:19	07/21/22 04:06	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*97*		*64 - 126*	*07/20/22 17:19*	*07/21/22 04:06*	*1*
4-Bromofluorobenzene (Surr)	*84*		*72 - 126*	*07/20/22 17:19*	*07/21/22 04:06*	*1*
Dibromofluoromethane (Surr)	*98*		*60 - 140*	*07/20/22 17:19*	*07/21/22 04:06*	*1*
Toluene-d8 (Surr)	*98*		*71 - 125*	*07/20/22 17:19*	*07/21/22 04:06*	*1*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m & p - Cresol	ND		400		ug/Kg	☼	07/21/22 15:21	07/22/22 16:17	1
Nitrobenzene	ND		210		ug/Kg	☼	07/21/22 15:21	07/22/22 16:17	1
o-Cresol	ND		210		ug/Kg	☼	07/21/22 15:21	07/22/22 16:17	1
Pyridine	ND		400		ug/Kg	☼	07/21/22 15:21	07/22/22 16:17	1
Total Cresols	ND		400		ug/Kg	☼	07/21/22 15:21	07/22/22 16:17	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*77*		*54 - 120*	*07/21/22 15:21*	*07/22/22 16:17*	*1*
2-Fluorobiphenyl (Surr)	*70*		*60 - 120*	*07/21/22 15:21*	*07/22/22 16:17*	*1*
2-Fluorophenol (Surr)	*68*		*52 - 120*	*07/21/22 15:21*	*07/22/22 16:17*	*1*
Nitrobenzene-d5 (Surr)	*69*		*53 - 120*	*07/21/22 15:21*	*07/22/22 16:17*	*1*
Phenol-d5 (Surr)	*76*		*54 - 120*	*07/21/22 15:21*	*07/22/22 16:17*	*1*
p-Terphenyl-d14 (Surr)	*84*		*79 - 130*	*07/21/22 15:21*	*07/22/22 16:17*	*1*

Method: 8015D - Nonhalogenated Organic Compounds - Direct Injection (GC) - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methanol	ND		1200		ug/Kg	☼		07/25/22 18:00	1

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-199963-1

Client Sample ID: H067-EX2-01
Date Collected: 07/19/22 13:00
Date Received: 07/20/22 10:00

Lab Sample ID: 480-199963-2
Matrix: Solid
Percent Solids: 80.6

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Acetone	95		43 - 129		07/25/22 18:00	1
Acetone	86		43 - 129		07/25/22 18:00	1

Surrogate Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-199963-1

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(64-126)	(72-126)	(60-140)	(71-125)
480-199963-1	H067-EX1-01	100	92	101	93
480-199963-2	H067-EX2-01	97	84	98	98
LCS 480-634299/1-A	Lab Control Sample	94	93	95	94
MB 480-634299/2-A	Method Blank	99	94	100	91

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHd14
Lab Sample ID	Client Sample ID	(54-120)	(60-120)	(52-120)	(53-120)	(54-120)	(79-130)
480-199963-1	H067-EX1-01	64	61	51 S1-	53	57	78 S1-
480-199963-1 MS	H067-EX1-01	89	58 S1-	44 S1-	47 S1-	51 S1-	101
480-199963-1 MSD	H067-EX1-01	86	71	58	64	69	88
480-199963-2	H067-EX2-01	77	70	68	69	76	84
LCS 480-634462/2-A	Lab Control Sample	80	66	58	61	66	85
MB 480-634462/1-A	Method Blank	78	77	70	72	78	94

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHd14 = p-Terphenyl-d14 (Surr)

Method: 8015D - Nonhalogenated Organic Compounds - Direct Injection (GC)

Matrix: Solid **Prep Type: Soluble**

		Percent Surrogate Recovery (Acceptance Limits)	
		Acetone1	Acetone2
Lab Sample ID	Client Sample ID	(43-129)	(43-129)
480-199963-1	H067-EX1-01	96	86
480-199963-1 MS	H067-EX1-01	93	84
480-199963-1 MSD	H067-EX1-01	88	82
480-199963-2	H067-EX2-01	95	86
LCS 410-279143/2-A	Lab Control Sample	97	99
MB 410-279143/1-A	Method Blank	112	108

Surrogate Legend

Acetone = Acetone

Method: 8260C - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 480-634299/2-A
Matrix: Solid
Analysis Batch: 634301

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 634299

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		5.0		ug/Kg		07/20/22 17:19	07/20/22 20:38	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		5.0		ug/Kg		07/20/22 17:19	07/20/22 20:38	1
1,1,2-Trichloroethane	ND		5.0		ug/Kg		07/20/22 17:19	07/20/22 20:38	1
1,2-Dichlorobenzene	ND		5.0		ug/Kg		07/20/22 17:19	07/20/22 20:38	1
Acetone	ND		25		ug/Kg		07/20/22 17:19	07/20/22 20:38	1
Benzene	ND		5.0		ug/Kg		07/20/22 17:19	07/20/22 20:38	1
Carbon disulfide	ND		5.0		ug/Kg		07/20/22 17:19	07/20/22 20:38	1
Carbon tetrachloride	ND		5.0		ug/Kg		07/20/22 17:19	07/20/22 20:38	1
Chlorobenzene	ND		5.0		ug/Kg		07/20/22 17:19	07/20/22 20:38	1
Cyclohexanone	ND		50		ug/Kg		07/20/22 17:19	07/20/22 20:38	1
Ethyl acetate	ND		5.0		ug/Kg		07/20/22 17:19	07/20/22 20:38	1
Ethyl ether	ND		25		ug/Kg		07/20/22 17:19	07/20/22 20:38	1
Ethylbenzene	ND		5.0		ug/Kg		07/20/22 17:19	07/20/22 20:38	1
Isobutyl alcohol	ND		200		ug/Kg		07/20/22 17:19	07/20/22 20:38	1
Methyl ethyl ketone (MEK)	ND		25		ug/Kg		07/20/22 17:19	07/20/22 20:38	1
Methyl isobutyl ketone (MIBK)	ND		25		ug/Kg		07/20/22 17:19	07/20/22 20:38	1
Methylene Chloride	ND		5.0		ug/Kg		07/20/22 17:19	07/20/22 20:38	1
n-Butanol	ND		50		ug/Kg		07/20/22 17:19	07/20/22 20:38	1
Tetrachloroethene	ND		5.0		ug/Kg		07/20/22 17:19	07/20/22 20:38	1
Toluene	ND		5.0		ug/Kg		07/20/22 17:19	07/20/22 20:38	1
Trichloroethene	ND		5.0		ug/Kg		07/20/22 17:19	07/20/22 20:38	1
Trichlorofluoromethane	ND		5.0		ug/Kg		07/20/22 17:19	07/20/22 20:38	1
Xylenes, Total	ND		10		ug/Kg		07/20/22 17:19	07/20/22 20:38	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*99*		*64 - 126*	*07/20/22 17:19*	*07/20/22 20:38*	*1*
4-Bromofluorobenzene (Surr)	*94*		*72 - 126*	*07/20/22 17:19*	*07/20/22 20:38*	*1*
Dibromofluoromethane (Surr)	*100*		*60 - 140*	*07/20/22 17:19*	*07/20/22 20:38*	*1*
Toluene-d8 (Surr)	*91*		*71 - 125*	*07/20/22 17:19*	*07/20/22 20:38*	*1*

Lab Sample ID: LCS 480-634299/1-A
Matrix: Solid
Analysis Batch: 634301

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 634299

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
1,1,1-Trichloroethane	50.0	42.7		ug/Kg		85	77 - 121
1,1,2-Trichloro-1,2,2-trifluoroethane	50.0	39.1		ug/Kg		78	60 - 140
1,1,2-Trichloroethane	50.0	47.8		ug/Kg		96	78 - 122
1,2-Dichlorobenzene	50.0	44.3		ug/Kg		89	75 - 120
Acetone	250	223		ug/Kg		89	61 - 137
Benzene	50.0	43.3		ug/Kg		87	79 - 127
Carbon disulfide	50.0	39.1		ug/Kg		78	64 - 131
Carbon tetrachloride	50.0	45.1		ug/Kg		90	75 - 135
Chlorobenzene	50.0	44.6		ug/Kg		89	76 - 124
Ethyl ether	50.0	35.5		ug/Kg		71	55 - 120
Ethylbenzene	50.0	44.9		ug/Kg		90	80 - 120
Isobutyl alcohol	1250	1160		ug/Kg		93	71 - 140

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 480-634299/1-A
Matrix: Solid
Analysis Batch: 634301

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 634299

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Methyl ethyl ketone (MEK)	250	234		ug/Kg		94	70 - 134
Methyl isobutyl ketone (MIBK)	250	241		ug/Kg		97	65 - 133
Methylene Chloride	50.0	45.3		ug/Kg		91	61 - 127
Tetrachloroethene	50.0	45.6		ug/Kg		91	74 - 122
Toluene	50.0	43.8		ug/Kg		88	74 - 128
Trichloroethene	50.0	43.8		ug/Kg		88	77 - 129
Trichlorofluoromethane	50.0	44.0		ug/Kg		88	65 - 146

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*94*		*64 - 126*
4-Bromofluorobenzene (Surr)	*93*		*72 - 126*
Dibromofluoromethane (Surr)	*95*		*60 - 140*
Toluene-d8 (Surr)	*94*		*71 - 125*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 480-634462/1-A
Matrix: Solid
Analysis Batch: 634540

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 634462

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m & p - Cresol	ND		330		ug/Kg		07/21/22 15:21	07/22/22 13:24	1
Nitrobenzene	ND		170		ug/Kg		07/21/22 15:21	07/22/22 13:24	1
o-Cresol	ND		170		ug/Kg		07/21/22 15:21	07/22/22 13:24	1
Pyridine	ND		330		ug/Kg		07/21/22 15:21	07/22/22 13:24	1
Total Cresols	ND		330		ug/Kg		07/21/22 15:21	07/22/22 13:24	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*78*		*54 - 120*	*07/21/22 15:21*	*07/22/22 13:24*	*1*
2-Fluorobiphenyl (Surr)	*77*		*60 - 120*	*07/21/22 15:21*	*07/22/22 13:24*	*1*
2-Fluorophenol (Surr)	*70*		*52 - 120*	*07/21/22 15:21*	*07/22/22 13:24*	*1*
Nitrobenzene-d5 (Surr)	*72*		*53 - 120*	*07/21/22 15:21*	*07/22/22 13:24*	*1*
Phenol-d5 (Surr)	*78*		*54 - 120*	*07/21/22 15:21*	*07/22/22 13:24*	*1*
p-Terphenyl-d14 (Surr)	*94*		*79 - 130*	*07/21/22 15:21*	*07/22/22 13:24*	*1*

Lab Sample ID: LCS 480-634462/2-A
Matrix: Solid
Analysis Batch: 634540

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 634462

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Nitrobenzene	1640	1060		ug/Kg		65	54 - 120
o-Cresol	1640	1170		ug/Kg		71	54 - 120
Pyridine	3280	1470		ug/Kg		45	23 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*80*		*54 - 120*
2-Fluorobiphenyl (Surr)	*66*		*60 - 120*
2-Fluorophenol (Surr)	*58*		*52 - 120*

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 480-634462/2-A
Matrix: Solid
Analysis Batch: 634540

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 634462

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Nitrobenzene-d5 (Surr)	*61*		*53 - 120*
Phenol-d5 (Surr)	*66*		*54 - 120*
p-Terphenyl-d14 (Surr)	*85*		*79 - 130*

Lab Sample ID: 480-199963-1 MS
Matrix: Solid
Analysis Batch: 634540

Client Sample ID: H067-EX1-01
Prep Type: Total/NA
Prep Batch: 634462

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Nitrobenzene	ND		1950	1020		ug/Kg	☼	52	49 - 120
o-Cresol	ND	F2	1950	1040		ug/Kg	☼	54	48 - 120
Pyridine	ND		3900	1400		ug/Kg	☼	36	20 - 120

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*89*		*54 - 120*
2-Fluorobiphenyl (Surr)	*58*	*S1-*	*60 - 120*
2-Fluorophenol (Surr)	*44*	*S1-*	*52 - 120*
Nitrobenzene-d5 (Surr)	*47*	*S1-*	*53 - 120*
Phenol-d5 (Surr)	*51*	*S1-*	*54 - 120*
p-Terphenyl-d14 (Surr)	*101*		*79 - 130*

Lab Sample ID: 480-199963-1 MSD
Matrix: Solid
Analysis Batch: 634540

Client Sample ID: H067-EX1-01
Prep Type: Total/NA
Prep Batch: 634462

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Nitrobenzene	ND		1950	1280		ug/Kg	☼	66	49 - 120	23	24
o-Cresol	ND	F2	1950	1420	F2	ug/Kg	☼	73	48 - 120	31	27
Pyridine	ND		3900	1610		ug/Kg	☼	41	20 - 120	14	49

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*86*		*54 - 120*
2-Fluorobiphenyl (Surr)	*71*		*60 - 120*
2-Fluorophenol (Surr)	*58*		*52 - 120*
Nitrobenzene-d5 (Surr)	*64*		*53 - 120*
Phenol-d5 (Surr)	*69*		*54 - 120*
p-Terphenyl-d14 (Surr)	*88*		*79 - 130*

Method: 8015D - Nonhalogenated Organic Compounds - Direct Injection (GC)

Lab Sample ID: MB 410-279143/1-A
Matrix: Solid
Analysis Batch: 279146

Client Sample ID: Method Blank
Prep Type: Soluble

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methanol	ND		1000		ug/Kg			07/25/22 16:01	1

Method: 8015D - Nonhalogenated Organic Compounds - Direct Injection (GC) (Continued)

Lab Sample ID: MB 410-279143/1-A
Matrix: Solid
Analysis Batch: 279146

Client Sample ID: Method Blank
Prep Type: Soluble

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Acetone	112		43 - 129		07/25/22 16:01	1
Acetone	108		43 - 129		07/25/22 16:01	1

Lab Sample ID: LCS 410-279143/2-A
Matrix: Solid
Analysis Batch: 279146

Client Sample ID: Lab Control Sample
Prep Type: Soluble

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Methanol			2510	2510		ug/Kg		100	72 - 134		

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Acetone	97		43 - 129
Acetone	99		43 - 129

Lab Sample ID: 480-199963-1 MS
Matrix: Solid
Analysis Batch: 279146

Client Sample ID: H067-EX1-01
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
Methanol	ND		2970	2870		ug/Kg	☼	97	72 - 134		

Surrogate	MS %Recovery	MS Qualifier	Limits
Acetone	93		43 - 129
Acetone	84		43 - 129

Lab Sample ID: 480-199963-1 MSD
Matrix: Solid
Analysis Batch: 279146

Client Sample ID: H067-EX1-01
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Methanol	ND		2980	3250		ug/Kg	☼	109	72 - 134	12	20

Surrogate	MSD %Recovery	MSD Qualifier	Limits
Acetone	88		43 - 129
Acetone	82		43 - 129

QC Association Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-199963-1

GC/MS VOA

Prep Batch: 634299

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-199963-1	H067-EX1-01	Total/NA	Solid	5035A_L	
480-199963-2	H067-EX2-01	Total/NA	Solid	5035A_L	
MB 480-634299/2-A	Method Blank	Total/NA	Solid	5035A_L	
LCS 480-634299/1-A	Lab Control Sample	Total/NA	Solid	5035A_L	

Analysis Batch: 634301

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-199963-1	H067-EX1-01	Total/NA	Solid	8260C	634299
480-199963-2	H067-EX2-01	Total/NA	Solid	8260C	634299
MB 480-634299/2-A	Method Blank	Total/NA	Solid	8260C	634299
LCS 480-634299/1-A	Lab Control Sample	Total/NA	Solid	8260C	634299

GC/MS Semi VOA

Prep Batch: 634462

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-199963-1	H067-EX1-01	Total/NA	Solid	3550C	
480-199963-2	H067-EX2-01	Total/NA	Solid	3550C	
MB 480-634462/1-A	Method Blank	Total/NA	Solid	3550C	
LCS 480-634462/2-A	Lab Control Sample	Total/NA	Solid	3550C	
480-199963-1 MS	H067-EX1-01	Total/NA	Solid	3550C	
480-199963-1 MSD	H067-EX1-01	Total/NA	Solid	3550C	

Analysis Batch: 634540

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-199963-1	H067-EX1-01	Total/NA	Solid	8270D	634462
480-199963-2	H067-EX2-01	Total/NA	Solid	8270D	634462
MB 480-634462/1-A	Method Blank	Total/NA	Solid	8270D	634462
LCS 480-634462/2-A	Lab Control Sample	Total/NA	Solid	8270D	634462
480-199963-1 MS	H067-EX1-01	Total/NA	Solid	8270D	634462
480-199963-1 MSD	H067-EX1-01	Total/NA	Solid	8270D	634462

GC Semi VOA

Leach Batch: 279143

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-199963-1	H067-EX1-01	Soluble	Solid	DI Leach	
480-199963-2	H067-EX2-01	Soluble	Solid	DI Leach	
MB 410-279143/1-A	Method Blank	Soluble	Solid	DI Leach	
LCS 410-279143/2-A	Lab Control Sample	Soluble	Solid	DI Leach	
480-199963-1 MS	H067-EX1-01	Soluble	Solid	DI Leach	
480-199963-1 MSD	H067-EX1-01	Soluble	Solid	DI Leach	

Analysis Batch: 279146

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-199963-1	H067-EX1-01	Soluble	Solid	8015D	279143
480-199963-2	H067-EX2-01	Soluble	Solid	8015D	279143
MB 410-279143/1-A	Method Blank	Soluble	Solid	8015D	279143
LCS 410-279143/2-A	Lab Control Sample	Soluble	Solid	8015D	279143
480-199963-1 MS	H067-EX1-01	Soluble	Solid	8015D	279143
480-199963-1 MSD	H067-EX1-01	Soluble	Solid	8015D	279143

QC Association Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-199963-1

General Chemistry

Analysis Batch: 634392

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-199963-1	H067-EX1-01	Total/NA	Solid	Moisture	
480-199963-2	H067-EX2-01	Total/NA	Solid	Moisture	

Lab Chronicle

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-199963-1

Client Sample ID: H067-EX1-01
Date Collected: 07/18/22 14:50
Date Received: 07/20/22 10:00

Lab Sample ID: 480-199963-1
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	634392	07/21/22 10:56	CMK	TAL BUF

Client Sample ID: H067-EX1-01
Date Collected: 07/18/22 14:50
Date Received: 07/20/22 10:00

Lab Sample ID: 480-199963-1
Matrix: Solid
Percent Solids: 84.6

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035A_L			634299	07/20/22 17:19	CDC	TAL BUF
Total/NA	Analysis	8260C		1	634301	07/21/22 03:41	CDC	TAL BUF
Total/NA	Prep	3550C			634462	07/21/22 15:21	SJM	TAL BUF
Total/NA	Analysis	8270D		1	634540	07/22/22 15:02	JMM	TAL BUF
Soluble	Leach	DI Leach			279143	07/25/22 11:25	LXF2	ELLE
Soluble	Analysis	8015D		1	279146	07/25/22 17:00	LXF2	ELLE

Client Sample ID: H067-EX2-01
Date Collected: 07/19/22 13:00
Date Received: 07/20/22 10:00

Lab Sample ID: 480-199963-2
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	634392	07/21/22 10:56	CMK	TAL BUF

Client Sample ID: H067-EX2-01
Date Collected: 07/19/22 13:00
Date Received: 07/20/22 10:00

Lab Sample ID: 480-199963-2
Matrix: Solid
Percent Solids: 80.6

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035A_L			634299	07/20/22 17:19	CDC	TAL BUF
Total/NA	Analysis	8260C		1	634301	07/21/22 04:06	CDC	TAL BUF
Total/NA	Prep	3550C			634462	07/21/22 15:21	SJM	TAL BUF
Total/NA	Analysis	8270D		1	634540	07/22/22 16:17	JMM	TAL BUF
Soluble	Leach	DI Leach			279143	07/25/22 11:25	LXF2	ELLE
Soluble	Analysis	8015D		1	279146	07/25/22 18:00	LXF2	ELLE

Laboratory References:

ELLE = Eurofins Lancaster Laboratories Environment Testing, LLC, 2425 New Holland Pike, Lancaster, PA 17601, TEL (717)656-2300

TAL BUF = Eurofins Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

Accreditation/Certification Summary

Client: ARCADIS U.S. Inc
Job ID: 480-199963-1
Project/Site: GTEOSI - Seneca Falls

Laboratory: Eurofins Buffalo

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
New York	NELAP	10026	03-31-23

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
8260C	5035A_L	Solid	Cyclohexanone
8270D	3550C	Solid	m & p - Cresol
8270D	3550C	Solid	Total Cresols
Moisture		Solid	Percent Moisture
Moisture		Solid	Percent Solids

Laboratory: Eurofins Lancaster Laboratories Environment Testing, LLC

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
New York	NELAP	10670	04-01-23

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
8015D		Solid	Methanol

Method Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-199963-1

Method	Method Description	Protocol	Laboratory
8260C	Volatile Organic Compounds by GC/MS	SW846	TAL BUF
8270D	Semivolatile Organic Compounds (GC/MS)	SW846	TAL BUF
8015D	Nonhalogenated Organic Compounds - Direct Injection (GC)	SW846	ELLE
Moisture	Percent Moisture	EPA	TAL BUF
3550C	Ultrasonic Extraction	SW846	TAL BUF
5035A_L	Closed System Purge and Trap	SW846	TAL BUF
DI Leach	Deionized Water Leaching Procedure	ASTM	ELLE

Protocol References:

ASTM = ASTM International

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

ELLE = Eurofins Lancaster Laboratories Environment Testing, LLC, 2425 New Holland Pike, Lancaster, PA 17601, TEL (717)656-2300

TAL BUF = Eurofins Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

Sample Summary

Client: ARCADIS U.S. Inc
Project/Site: GTEOSI - Seneca Falls

Job ID: 480-199963-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
480-199963-1	H067-EX1-01	Solid	07/18/22 14:50	07/20/22 10:00
480-199963-2	H067-EX2-01	Solid	07/19/22 13:00	07/20/22 10:00

Eurofins TestAmerica, Buffalo
10 Hazelwood Drive

Amherst, NY 14228-2223
phone 716.691.2600 fax 716.691.7991

Chain of Custody Record

eurofins Environment Testing America

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc. d/b/a Eurofins TestAmerica

Client Contact	**Project Manager: Mark Flusche**		COC No: 1
Company: Arcadis of New York, Inc.	Email: mark.flusche@arcadis.com	Site Contact: Ryan Clare	Date: 7-19-22 — 1 of 1 COCs
Address: 855 Route 146 Suite 210	Tel: 518-250-7322	Lab Contact: Schove, John R	Carrier: — TALS Project #:
Clifton Park, NY 12065	**Analysis Turnaround Time**		Sampler:
	☐ CALENDAR DAYS ☐ WORKING DAYS		**For Lab Use Only:**
	TAT if different from Below		Walk-in Client:
	☑ 2 weeks		Lab Sampling:
Project Name: GTEOSI - Seneca Falls	☐ 1 week		
Site:	☐ 2 days		Job / SDG No.:
PO #: 30112357.00055 Project #:	☐ 1 day		

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	TAGM (30 TAGM compounds only)	TAGM list Methanol	TAGM list VOCs	TAGM list SVOCs	Sample Specific Notes:
H067-EX1-01	7/18 /22	1450	Grab	Soil	3				X	X	X	
H067-EX2-01	7/19 /22	1300	Grab	Soil	3				X	X	X	
	/22		Grab	Soil								
	/22		Grab	Soil								
	/22		Grab	Soil								
	/22		Grab	Soil								
	/22		Grab	Soil								
	/22		Grab	Soil								
	/22		Grab	Soil								
	/22		Grab	Soil								
	/22		Grab	Soil								
	/22		Grab	Soil								

480-199963 Chain of Custody

Syracuse #225

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____ — 1 | | | |

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☑ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☑ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:

2.8#1 ICE

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:		Cooler Temp. (°C): Obs'd:	Corr'd:	Therm ID No.:
Relinquished by:	Company: Arcadis	Date/Time: 7/19/22 1726	Received by:	Company:	Date/Time: 7-19-22, 1726
Relinquished by:	Company:	Date/Time: 7-19-22 1900	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company: TA	Date/Time: 7/20/22 1000

Form No. CA-C-WI-002, Rev. 4.34, dated 8/3/2020

Eurofins Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Phone: 716-691-2600 Fax: 716-691-7991

Chain of Custody Record

eurofins | Environment Testing America

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Schove, John R	Carrier Tracking No(s):	COC No: 480-73840.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: John.Schove@et.eurofinsus.com	State of Origin: New York	Page: Page 1 of 1
Company: Eurofins Lancaster Laboratories Environm		Accreditations Required (See note): NELAP - New York		Job #: 480-199963-1
Address: 2425 New Holland Pike, ,	Due Date Requested: 8/2/2022			
City: Lancaster	TAT Requested (days):			
State, Zip: PA, 17601				
Phone: 717-656-2300(Tel)	PO #:			
Email:	WO #:			
Project Name: GTEOSI - Seneca Falls	Project #: 48005146			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Y - Trizma, Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8015D_DAI/DI_LEACH_GCV TAGM List Methanol	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
H067-EX1-01 (480-199963-1)	7/18/22	14:50 Eastern		Solid			X	1	
H067-EX2-01 (480-199963-2)	7/19/22	13:00 Eastern		Solid			X	1	

Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing Northeast, LLC places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing Northeast, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Environment Testing Northeast, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins Environment Testing Northeast, LLC.

Possible Hazard Identification	*Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)*
Unconfirmed	☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:		
Relinquished by:	Date/Time: 7-21-22 1800	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by: Debra Bryan	Date/Time: 7-22-22 10:17	Company

Custody Seals Intact: ~~Yes~~ No	Custody Seal No.: 19797763	Cooler Temperature(s) °C and Other Remarks: 0.7

Ver: 06/08/2021

Login Sample Receipt Checklist

Client: ARCADIS U.S. Inc

Job Number: 480-199963-1

Login Number: 199963
List Number: 1
Creator: Kolb, Chris M

List Source: Eurofins Buffalo

Question	Answer	Comment
Radioactivity either was not measured or, if measured, is at or below background	True	
The cooler's custody seal, if present, is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time (Excluding tests with immediate HTs)..	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	N/A	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Sampling Company provided.	True	ARCADIS
Samples received within 48 hours of sampling.	True	
Samples requiring field filtration have been filtered in the field.	True	
Chlorine Residual checked.	N/A	

Login Sample Receipt Checklist

Client: ARCADIS U.S. Inc

Job Number: 480-199963-1

Login Number: 199963
List Number: 2
Creator: Metzger, Katherine A

List Source: Eurofins Lancaster Laboratories Environment Testing, LLC
List Creation: 07/22/22 05:31 PM

Question	Answer	Comment
The cooler's custody seal is intact.	N/A	Not present
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable (</=6C, not frozen).	True	
Cooler Temperature is recorded.	True	
WV: Container Temperature is acceptable (</=6C, not frozen).	N/A	
WV: Container Temperature is recorded.	N/A	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
There are no discrepancies between the containers received and the COC.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
There is sufficient vol. for all requested analyses.	True	
Is the Field Sampler's name present on COC?	False	Received project as a subcontract.
Sample custody seals are intact.	N/A	Not present.
VOA sample vials do not have headspace >6mm in diameter (none, if from WV)?	N/A	

Appendix B

Stormwater Pollution Prevention Plan

GTE Operations Support Incorporated

Stormwater Pollution Prevention Plan

Former Philips Display Components Facility
Seneca Falls, New York
USEPA ID No. NYD002246015
NYSDEC Site No. 850003 – G.T.E. Products Corporation

October 2, 2025

Stormwater Pollution Prevention Plan

Former Philips Display Components Facility
Seneca Falls, New York
USEPA ID No. NYD002246015
NYSDEC Site No. 850003 – G.T.E. Products Corporation

October 2, 2025

Prepared By:
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Prepared For:
GTE Operations Support Incorporated

Our Ref:
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Contents

Acronyms and Abbreviations iii
1 Introduction 1
1.1 Purpose 1
1.2 Revisions 1
2 Background 2
2.1 Location and Description 2
2.2 Site Operational History 2
2.3 Areas of Concern 3
2.4 Soils Information 3
2.5 Hydrology 4
2.6 Hydrogeology 4
2.7 Climate Change Consideration 4
3 Project Description 5
3.1 Phasing and Sequencing Plan 5
3.1.1 Phases 1 and 2 – AOC 3 Utilities Relocation and Abandonment 6
3.1.2 Phases 3, 4, and 5 – AOC 1 Utilities Relocation and Abandonment and AOC 1 Thermal Installation 6
3.1.3 Phases 6 and 7 – Utility Corridor Installation, Electrical Installation, and AOC 3 Thermal Installation 7
3.1.4 Phase 8 – No Activity 7
3.1.5 Phase 9 – Tree Removal 8
3.1.6 Phases 10, 11, and 12 – Historical Outfall Ditch Excavations 8
3.1.7 General Site Restoration 9
3.2 Non-Stormwater Discharges 9
4 Erosion and Sediment Controls 10
4.1 Design Components 10
4.2 Temporary Structural Measures 10
4.2.1 Silt Fencing and Straw Bale Dikes 10
4.2.2 Temporary Construction Entrance 10
4.2.3 Stormwater Diversions 10
4.2.4 Check Dams 10

4.2.5 Temporary Seeding 11
4.2.6 Permanent Seeding 11
4.3 Inspections 11
4.3.1 Daily Maintenance Inspections 11
4.3.2 Periodic Site Inspections 12
4.4 Site Restoration 12
4.5 Post-Construction Stormwater Management Controls 12
5 Pollution Prevention Practices 13
5.1 Impacted Material Handling, Transport, and Disposal 13
5.1.1 Soil 13
5.1.2 Construction-Related Water 13
5.2 Spill Prevention, Control, and Response 14
5.2.1 Spill Prevention 14
5.2.2 Spill Control and Response 14
5.3 Dust Controls 15
5.4 Good Housekeeping Practices 15
6 References 17

Tables (in-text)

Table 1 – Phasing Table 5
Table 2 – AOC 3 Utilities Relocation and Abandonment Activities 6
Table 3 – AOC 1 Utilities Relocation and Abandonment and AOC 1 Thermal Installation Activities 6
Table 4 – Utility Corridor Installation, Electrical Installation, and AOC 3 Thermal Installation Activities 7
Table 5 – Tree Removal Activities 8
Table 6 – Historical Outfall Ditch Excavations Activities 8
Table 7 – General Site Restoration Activities 9

Figures

Figure 1 SWPP Site Plan and Phasing Plan

Attachments

Attachment A NRCS Soil Maps

Acronyms and Abbreviations

AOC	Area of Concern
Arcadis	Arcadis of New York, Inc.
bgs	below ground surface
Canal	Cayuga-Seneca Canal
CAWP	Corrective Action Work Plan
COPC	constituent of potential concern
CY	cubic yards
DER-10	NYSDEC Division of Environmental Remediation Technical Guidance for Site Investigation and Remediation
ESC	Erosion and Sediment Control
GTEOSI	GTE Operations Support Incorporated
HASP	Health and Safety Plan
HO	historical outfall
ISTR	in situ thermal remediation
mg/kg	milligrams per kilogram
NYCRR	New York Codes, Rules, and Regulations
NYSDEC	New York State Department of Environmental Conservation
OU	Operable Unit
PDI	Pre-Design Investigation
RCRA	Resource Conservation Recovery Act
RDR	Remedial Design Report
SCO	Soil Cleanup Objective
SWPPP	Stormwater Pollution Prevention Plan
TCE	trichloroethene
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound
WWTP	wastewater treatment plant

1 Introduction

Arcadis of New York, Inc. (Arcadis) has prepared this *Stormwater Pollution Prevention Plan* (SWPPP) on behalf of GTE Operations Support Incorporated (GTEOSI) to support the implementation of remedial activities at the G.T.E. Products Corporation site (Former Philips Display Components Facility), New York State Department of Environmental Conservation (NYSDEC) Site #850003, at 50 Johnston Street, Seneca Falls, New York (the "Site"). Details regarding the required construction activities are presented in the October 2025 *100% Remedial Design Report* (RDR) prepared by Arcadis of New York, Inc. (Arcadis).

1.1 Purpose

This SWPPP has been prepared in accordance with the substantive requirements of the NYSDEC's SPDES General Permit for Stormwater Discharges from Construction Activity (General Permit; NYSDEC 2025) and the guidelines presented in the New York Standards and Specifications for Erosion and Sediment Control (ESC Standards; NYSDEC 2016).

This SWPPP summarizes the stormwater management practices that will be implemented during the construction activities to control potential impacts to Site-related stormwater runoff. The objectives of this SWPPP are to:

- Minimize soil erosion through application of runoff control and soil stabilization control measures to minimize pollutant discharge.
- Minimize the potential for erosion of exposed and/or disturbed soil and sediment.
- Minimize the potential for transport of suspended soil and sediment within surface water runoff.
- Minimize the potential for transport of suspended sediment outside of work areas.

1.2 Revisions

This SWPPP will be kept current so that, at all times, this plan accurately documents the erosion and sediment control practices that are being used or will be used during construction. At a minimum, this SWPPP will be amended:

- Whenever the current provisions prove to be ineffective in minimizing pollutants in stormwater discharges from the Site;
- Whenever there is a change in design, construction, operation, or maintenance at the Site that has or could have an effect on the discharge of pollutants;
- To address issues or deficiencies identified during an inspection by the qualified inspector, NYSDEC, or other regulatory authority having jurisdiction; and
- To document the final construction conditions.

2 Background

This section provides general information regarding the pre-remediation conditions for the Site.

2.1 Location and Description

The 64.2-acre Site includes an approximately 13-acre complex of interconnected buildings constructed between 1914 and the 1970s. The remaining 51 acres are primarily asphalt parking lots and roadways, grassy areas, and woods. An electrical substation owned by New York State Electric & Gas is located on a separate tax parcel in the southwest corner of the Site.

Residential and undeveloped properties surround the Site to the west, north, and east. Railroad tracks line the northeastern property boundary. The Cayuga-Seneca Canal (Canal), which includes Van Cleef Lake and portions of the Seneca River and is part of the New York State Barge Canal, is adjacent to and south of the Site. The Canal and the land between the Canal and the Site are owned by the New York State Canal Corporation. The first canal in the area opened in 1821. In the early 1900s, the mill area of Seneca Falls was submerged under what is now Van Cleef Lake after construction of the hydroelectric dam south of the Site.

2.2 Site Operational History

The following bullets summarize the Site history:

- Before 1914 – The Site was undeveloped.
- 1914 through the 1930s – Water pumps were manufactured in Site Buildings 1A through 5. Roof drainage, stormwater, and wastewater were managed in a combined system of floor drains that discharged to Van Cleef Lake via historical outfall (HO) 1 and HO 2.
- 1930s through the early 1950s – Black-and-white television components were manufactured at the Site. Buildings 6 through 10 were added to expand the complex of interconnected buildings. Terra cotta pipe underdrains were laid beneath Buildings 7 and 9 during construction. As manufacturing processes expanded, floor drains were cut into the concrete floors and connected to the underdrains. Roof drainage, stormwater, and wastewater from Buildings 7, 8, and 9 were combined into HO 3 and discharged to a ditch that ran to the Canal.
- Mid-1950s through the early 1970s – Manufacturing was converted to color television components in the early 1950s. Buildings 10A, 11, 11A, 12, 13, and 13A were added to the building complex. Similar to the drainage structures in Buildings 7 and 9, reinforced concrete pipe underdrains were constructed beneath Buildings 10, 10A, 11, 11A, 13, and 13A. Floor drains were connected to these underdrains, and combined roof drainage, stormwater, and process wastewater discharged via HOs 4 through 7 with overland flow to the Canal. Building 12 housed laboratories and corporate offices; no floor drains or underdrains have been identified at Building 12.
- 1970s to 1986 – Waste handling practices changed when an interceptor sewer and wastewater treatment plant (WWTP) were constructed in the early 1970s. The pipes for HOs 2 through 5 were rerouted to the interceptor sewer, and wastewater flow was conveyed to the WWTP for treatment. HOs 1, 6, and 7 were modified to convey stormwater only. A network of aboveground interior piping in the ceiling rafters was also installed to carry process wastes to the WWTP.

- 1986 to 1989 – Manufacturing operations ceased in 1986. With the cessation of manufacturing, the WWTP was decommissioned, and the interceptor sewer was rerouted to convey roof drainage and stormwater directly to the Canal at an interceptor trench outfall. In 1989, the Seneca County Industrial Development Agency acquired the Site.
- 1989 to 2018 – H.P. Neun Company, Inc. and later Viva Foam Products, Inc. leased the building complex from the Seneca County Industrial Development Agency for warehousing. Only roof drains and stormwater discharge to the interceptor trench outfall. Between 1993 and 1994, roof drain lines inside the buildings were identified and rerouted along the roof trusses and down the inside walls of the buildings. New roof drain lines were diverted just above the floor to the outside of the buildings and connected to newly constructed outside storm sewer lines. The original down spouts that drained to the former process sewers under the facility building floors were removed, and the associated process sewer piping and floor drains were sealed with concrete to the floor surface. After rerouting of the roof drain lines, the pipes for HOs 1, 6, and 7 no longer conveyed stormwater. The abandoned discharge piping for HOs 2 through 5 were located, identified to be free of debris, and filled with concrete (Chester Environmental 1995).
- 2018 to present – Seneca Fall Specialties and Logistics Company, Inc. purchased the property in 2018 and continues to perform warehouse operations in the buildings complex.

2.3 Areas of Concern

Previous environmental investigations conducted at the Site are summarized in the CAWP (Arcadis 2020). Based on the findings of these investigations, the following Areas of Concern (AOCs) and associated constituents of potential concern (COPCs) were identified and presented in the Corrective Measures Study Report (Arcadis 2013):

- AOC 1 (Building 2 area) – Volatile organic compounds (VOCs) in soil and groundwater south of Buildings 2 and 5;
- AOC 2 (Building 7 area) – VOCs in soil and groundwater south of Buildings 7 and 9;
- AOC 3 (Building 11 area) – VOCs in soil and groundwater at and south of Building 11A;
- AOC 4 (soil vapor intrusion pathways) – VOCs in sub-slab soil vapor beneath Buildings 1, 2, 3, 4, 6, 7, 8, 9, 10, 10A, 11, 11A, 13, and 13A; and
- AOC 5 (HOs) – Metals, primarily cadmium, in HO ditches both on-Site and off-Site.

For organization of the remedial program, the Site has been divided into two Operable Units (OUs). OU 1 consists of AOCs 1 through 4, and OU 2 consists of AOC 5 and Canal sediments.

2.4 Soils Information

Based on the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Web Soil Survey[1] results shown in Attachment A, the following soil series occur within the surface of the anticipated removal areas:

- Schoharie silt loam, 2 to 6 percent slopes: These soils consist of very deep, moderately well drained soils formed in clayey lacustrine sediments. They are on glacial lake plains and uplands mantled with lake sediments. Saturated hydraulic conductivity is moderately high or high in the mineral surface and subsurface

[1] Accessed online at: websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx on June 26,2023

and low through moderately high in the subsoil and substratum. This soil type is classified as hydrologic soil group D.

- Schoharie silty clay loam, 6 to 20 percent slopes: Similar to the above, these soils consist of very deep, moderately well drained soils formed in clayey lacustrine sediments. They are on glacial lake plains and uplands mantled with lake sediments. Saturated hydraulic conductivity is moderately high or high in the mineral surface and subsurface and low through moderately high in the subsoil and substratum. This soil type is classified as hydrologic soil group D.
- Shoreline areas are noted as “Made land, tillable”. This soil type is classified as hydrologic soil group B.

Additional Site-specific soils data can be found in the Corrective Measures Study Report (Arcadis 2013).

2.5 Hydrology

The Site generally drains from north to south towards the historical outfalls and out to the NYS Barge Canal and Van Cleef Lake. The unnamed tributary at the east side of the Site is the primary hydraulic feature in the area and runs in a general northwest to southeast direction from the east side of the Site to the NYS Barge Canal. Surface grades are generally flat (1 to 2 percent) at the north end of the Site (Plant Area). Grades adjacent to the canal, at the HO locations, slope up to approximately 50%. Refer to Design Drawing 2 (in Appendix H of the 100% Remedial Design Report, Arcadis 2025) and Figure 1 for additional information regarding existing topography and Site drainage.

2.6 Hydrogeology

The unconsolidated soils at the Site consist of a discontinuous and variably thick layer of urban fill (up to 8 feet but typically less than 1 foot thick) that overlies a low permeability till (up to 45 feet thick) across the site. The water table is present at around 3 to 5 feet bgs. The till is recharged by precipitation. The majority of the groundwater flow in the overburden at the Site is to the east and south along preferential horizontal flow paths towards the NYS Barge Canal and Van Cleef Lake. Vertical groundwater movement is limited by the low-permeability till.

2.7 Climate Change Consideration

Future risks due to climate change were considered during the development of this SWPPP, as well as design of the associated stormwater control measures in the Design Drawings and described in this document. In accordance with the New York State General Permit for Stormwater Discharges from Construction Activity, the following climate change related risks will be taken into consideration during project planning, implementation, and design of control measures: Increasing temperatures, increasing precipitation, increasing variability in precipitation, rising sea level, increasing storm surge, and shifting ecological conditions.

The design results in minimal impervious surface and seeks to reduce runoff curve number to reduce runoff rate and volume. Design considerations included acknowledging that future storm events may become more intense and/or more frequent and will require increased inspection and maintenance of control measures. Additionally, the site layout avoids high flood risk areas where applicable and utilizes measures such as shoreline protection to minimize flooding within the site limits.

All design items for stormwater conveyance and erosion and sediment control were chosen to ensure durability, resilience, and long-term performance throughout the life of the project.

3 Project Description

The purpose of this section is to outline the general project and the sequence of erosion and sediment control measures that will be implemented before, during, and after the Site remediation activities in accordance with the requirements of the General Permit.

In general, the proposed remediation activities include installation of an in situ thermal remediation (ISTR) system in AOCs 1 and 3 in OU 1, excavation of COPC-impacted soils within AOC 1 in OU 1, excavation or capping of cadmium impacted materials (i.e., soil, historic fill, sediment) within OU 2, including select areas within the floodplain, disposal of impacted material off-Site, backfilling of excavation areas, restoration/replacement of historical outfall drainage ditches, and Site restoration. The ISTR design is provided in Appendix F of the 100% RDR (Arcadis 2025). The relocation and abandonment of subsurface utilities (i.e., ISTR preparation activities) to be performed before ISTR implementation is detailed in the Waste Management Plan for ISTR Preparation Activities (WMP; Appendix G of the 100% RDR). The OU 2 remedial design is detailed in the Design Drawings and Technical Specifications provided in Appendix H of the 100% RDR (Arcadis 2025). OU 1 construction activities are planned for 2026. OU 2 construction activities are anticipated to commence in 2027.

3.1 Phasing and Sequencing Plan

Specific construction activity phasing and sequencing will be determined in coordination with the selected Contractor(s). The Contractor is defined as the company or companies contracted to implement the remedy. The breakdown of the phasing steps is as follows:

Table 1 – Phasing Table

Phase	Approximate Disturbed Area (Acres)
1	2.16
2	1.86
3	2.25
4	1.90
5	2.25
6	1.91
7	2.24
8	1.83
9	2.31
10	2.87
11	5.28
12	3.65

A phasing table indicating the areas to be disturbed during each phase is included on Figure 1. The sequence of activities related to installation, maintenance and removal of erosion and sediment controls will generally include

the following items described below. Appendices F, G, and H, which are referenced below in Tables 2 through 6, are provided in the 100% RDR (Arcadis, 2025).

3.1.1 Phases 1 and 2 – AOC 3 Utilities Relocation and Abandonment

The approximate durations of Phases 1 and 2 are 3 to 4 weeks and 1 week, respectively.

Table 2 – AOC 3 Utilities Relocation and Abandonment Activities

Construction Activities	Corresponding Figure or Drawing
Mobilize crew, facilities, equipment, and materials required to complete the work.	NA
Install erosion and sediment controls (e.g., silt fence, straw bales) at the Phase 1 area(s) of disturbance (Areas 2A and 2B).	SWPPP Figure 1
Before initial earth disturbance activities, conduct an assessment of the Site to ensure the erosion and sediment controls have been installed correctly and are functional.	NA
Install contractor support area CSA-1 (including temporary containment pad and decontamination pad).	SWPPP Figure 1
Perform utilities relocation and abandonment work and associated backfill and restoration in Phase 1 area(s) (Areas 2A and 2B).	SWPPP Figure 1 and WMP Figures 5, 7, and 9
Install erosion and sediment controls (e.g., silt fence, straw bales) at Phase 2 area(s) (Area 2C). Install and maintain traffic controls for Site perimeter road.	SWPPP Figure 1
Perform utilities relocation and abandonment work and associated backfill and restoration in the Phase 2 area(s) (Area 2C).	SWPPP Figure 1 and WMP Figure 7

3.1.2 Phases 3, 4, and 5 – AOC 1 Utilities Relocation and Abandonment and AOC 1 Thermal Installation

The approximate durations of Phases 2A, 2B, 2C, 2D are 1-2 weeks, 1-2 weeks, 3-4 weeks, and 3-4 weeks, respectively.

Table 3 – AOC 1 Utilities Relocation and Abandonment and AOC 1 Thermal Installation Activities

Construction Activities	Corresponding Figure or Drawing
Mobilize crew, facilities, equipment, and materials required to complete the work.	NA
Install erosion and sediment controls (e.g., silt fence, straw bales) at the Phase 3 area(s) of disturbance (Area 1A).	SWPPP Figure 1
Before initial earth disturbance activities, conduct an assessment of the Site to ensure the erosion and sediment controls have been installed correctly and are functional.	NA
Perform utilities relocation and abandonment work and associated backfill and restoration in Phase 3 area(s) (Area 1A).	SWPPP Figure 1 and WMP Figures 4, 6, and 8

Construction Activities	Corresponding Figure or Drawing
Install erosion and sediment controls (e.g., silt fence, straw bales) at the locations identified for Area 1B.	SWPPP Figure 1
Perform utilities relocation and abandonment work and thermal installation work, and associated backfill and restoration, in Area 1B. Install and maintain traffic controls for Johnston Street.	SWPPP Figure 1 and WMP Figures 6 and 8
Perform thermal installation work and associated backfill and restoration in Area 1A.	SWPPP Figure 1 and Appendix F Drawing WFL-2

3.1.3 Phases 6 and 7 – Utility Corridor Installation, Electrical Installation, and AOC 3 Thermal Installation

The approximate durations for Phases 6 and 7 are 1 to 2 weeks and 4 to 6 weeks, respectively.

Table 4 – Utility Corridor Installation, Electrical Installation, and AOC 3 Thermal Installation Activities

Construction Activity	Corresponding Figure or Drawing
Mobilize crew, facilities, equipment, and materials required to complete the work.	NA
Install erosion and sediment controls (e.g., silt fence, straw bales) at the locations identified for Area 3A.	SWPPP Figure 1
Before initial earth disturbance, conduct an assessment of the Site to ensure the erosion and sediment controls have been installed correctly and are functional	NA
Perform utility corridor installation work and associated backfill and restoration in Area 3A.	SWPPP Figure 1 and Appendix F Drawing TD-01
Install erosion and sediment controls (e.g., silt fence, straw bales) at the locations identified for Area 3B.	SWPPP Figure 1
Perform utility corridor installation, pole installation, and associated backfill and restoration in Area 3B.	SWPPP Figure 1 and Appendix F Drawing TD-01
Install erosion and sediment controls (e.g., silt fence, straw bales) at the locations identified for Area 2A.	SWPPP Figure 1
Perform thermal installation work and associated backfill and restoration in Area 2A.	SWPPP Figure 1 and Appendix F Drawing WFL-03
Install erosion and sediment controls (e.g., silt fence, straw bales) at the locations identified for Areas 4A, 4B, and 4C.	SWPPP Figure 1
Perform electrical installation work and associated backfill and restoration in Areas 4A, 4B, and 4C.	SWPPP Figure 1

3.1.4 Phase 8 – No Activity

No construction activities are anticipated during Phase 8. The approximate duration for Phase 8 is 3 months.

3.1.5 Phase 9 – Tree Removal

The approximate duration for Phase 9 is 1 to 2 weeks.

Table 5 – Tree Removal Activities

Construction Activity	Corresponding Figure or Drawing
Mobilize crew, facilities, equipment, and materials required to complete the work.	NA
Install erosion and sediment controls (e.g., silt fence, straw bales) at tree removal locations identified for Areas HO-2, HO-3, HO-4, HO-5, and HO-45.	SWPPP Figure 1
Before initial earth disturbance, conduct an assessment of the Site to ensure the erosion and sediment controls have been installed correctly and are functional	NA
Perform tree removal in Areas HO-2, HO-3, HO-4, HO-5, and HO-45.	SWPPP Figure 1

3.1.6 Phases 10, 11, and 12 – Historical Outfall Ditch Excavations

The anticipated durations for Phases 10, 11, and 12 are 3 to 4 weeks, 6 to 8 weeks, and 3 to 4 weeks, respectively.

Table 6 – Historical Outfall Ditch Excavations Activities

Construction Activity	Corresponding Figure or Drawing
Mobilize crew, facilities, equipment, and materials required to complete the work.	NA
Install contractor support area CSA-2.	SWPPP Figure 1
Install erosion and sediment controls (e.g., silt fence, straw bales) downslope of the removal areas along the lake's edge and along access routes for Area HO-2.	Appendix H, Drawing 4
Install temporary stormwater bypass to convey Area HO-2 stormwater flow from upgradient areas adjacent to excavation areas to downgradient areas.	NA
Conduct excavation, backfilling, and restoration in Area HO-2.	Appendix H, Drawings 4 and 7
Upgrade access road (identified as contractor support area CSA-3).	Appendix H, Drawing 3
Install erosion and sediment controls (e.g., silt fence, straw bales) downslope of the removal areas along the canal and along access routes for Areas HO-3, HO-4, HO-5, and HO-45.	Appendix H, Drawings 5 and 8
Install temporary stormwater bypass to convey Area HO-3 stormwater flow from upgradient areas adjacent to excavation areas to downgradient areas.	NA
Install fabric-form concrete cap for Area HO-3.	Appendix H, Drawing 8

Construction Activity	Corresponding Figure or Drawing
Install temporary stormwater bypass to convey Area HO-4, HO-5, and HO-45 stormwater flow from upgradient areas adjacent to excavation areas to downgradient areas.	NA
Conduct excavation, backfilling, and restoration in Areas HO-4, HO-5, and HO-45.	Appendix H, Drawings 5 and 9
Install erosion and sediment controls (e.g., silt fence, straw bales) for Areas HO-67A and HO-67B.	Appendix H, Drawing 6
Install temporary stormwater bypass to convey Area HO-67A and HO-67B stormwater flow from upgradient areas adjacent to excavation areas to downgradient areas.	NA
Conduct excavation, backfilling, and restoration in Areas HO-67A and HO-67B.	Appendix H, Drawings 6 and 10

3.1.7 General Site Restoration

Table 7 – General Site Restoration Activities

Construction Activity
Remove temporary erosion and sediment control measures once the Site has been stabilized by a uniform, perennial vegetative cover with a minimum density of 80 percent
Immediately stabilize areas disturbed during the removal of the temporary erosion and sediment control measures (if any)
Perform a final Site inspection upon completion of all construction activities, including final stabilization activities (as defined in Appendix A of the General Permit) of all areas of disturbance, and the removal of all temporary erosion and sediment control measures
Demobilize crew, facilities, equipment, and materials from the Site

3.2 Non-Stormwater Discharges

Stormwater permits for construction activities typically include a prohibition against non-stormwater discharges. However, permits may list some non-stormwater discharges that, when combined with stormwater discharges, may be authorized by the permit provided that the non-stormwater discharges are identified in the SWPPP for the Site. The following non-stormwater discharges, which are typically permitted and that are applicable to this project, are as follows:

- Waters to which cleansers or other components have not been added that are used to control dust in accordance with Section 5.3;
- Uncontaminated groundwater or spring water; and
- Uncontaminated discharges from construction Site dewatering operations.

Construction-related water generated during the dewatering of excavations and excavated sediment that has potential to include Site contaminants will be collected and managed in accordance with Section 5.1.2.

4 Erosion and Sediment Controls

This section presents the means and methods for erosion and sediment control to be utilized as part of construction activities.

4.1 Design Components

Erosion and sediment controls will be installed, inspected, and maintained by the Contractor in accordance with the ESC Standards and the relevant Design Drawings and Technical Specifications of the 100% Remedial Design Report.

As Site conditions allow, temporary erosion and sediment controls will be installed before initiating any ground-disturbing activities, and additional erosion and sediment controls will be installed during construction (as needed) to achieve the stormwater management objectives of this SWPPP (Section 1.1) and in general accordance with the requirements of the General Permit.

4.2 Temporary Structural Measures

This section presents the temporary structural measures to be utilized for erosion and sediment control as part of construction activities.

4.2.1 Silt Fencing and Straw Bale Dikes

Silt fencing will be used to reduce or otherwise control the potential off-Site migration of suspended sediments in stormwater runoff and will be installed before any existing soils or vegetation are disturbed at the Site. Silt fencing (where used) will be installed and maintained by the Contractor in accordance with Section 5 of the ESC Standards, the Design Drawings, and the Technical Specifications.

4.2.2 Temporary Construction Entrance

Temporary construction entrances will be installed where construction vehicles regularly enter the work area from or exit the work area onto public rights-of-way or streets to reduce or eliminate the tracking of soil. Temporary construction entrances will be installed and maintained by the Contractor in accordance with Section 2 of the ESC Standards, the Design Drawings, and the Technical Specifications.

4.2.3 Stormwater Diversions

Swales will be installed (if necessary) to divert flows from entering disturbed areas by intercepting and diverting the runoff to a stabilized outlet. Swales will be installed and maintained by the Contractor in accordance with Section 3 of the ESC Standards.

4.2.4 Check Dams

Check dams will be installed (if necessary) to reduce erosion in swales (if present), ditches with surface water (if present), and the unnamed tributary shown on Figure 1 by restricting the velocity of flow in the channel. Check

dams will be installed and maintained by the Contractor in accordance with Section 3 of the ESC Standards within swales, historical outfall ditches HO 6 and HO 7, and the unnamed tributary, if necessary, based on flow conditions at the time of construction.

4.2.5 Temporary Seeding

Temporary seeding will be applied to provide a temporary protective cover on disturbed areas when construction activities have temporarily ceased, such as when preparing for winter shutdown, or to provide cover when permanent seed growth is delayed due to mid-summer heat or drought. In areas where soil disturbance activity has temporarily ceased, temporary seeding must be initiated by the end of the next business day and be completed within 14 days from the date the current soil disturbance activity ceased. Runoff control measures (e.g., silt fence) will be installed, as needed, before seeding to reduce the potential for erosion of the newly seeded area. Temporary seeding will be installed and maintained by the Contractor in accordance with Section 4 of the ESC Standards, the Design Drawings, and the Technical Specifications.

4.2.6 Permanent Seeding

Permanent seeding will be applied to provide a protective cover following achievement of final grades or during a long-term dormancy period (e.g., longer than 1 year). In areas where soil disturbance activity has permanently ceased, permanent seeding must be initiated by the end of the next business day and be completed within 14 days from the date the current soil disturbance activity ceased. Runoff control measures will be installed, as needed, before seeding to reduce the potential for erosion of the newly seeded area. Permanent seeding will be installed and maintained by the Contractor in accordance with Section 4 of the ESC Standards, the Design Drawings, and the Technical Specifications. Mulch, erosion control fabric, or turf reinforcement mats will be installed as part of the seeding efforts in accordance with Section 4 of the ESC Standard and the Design Drawings to help stabilize the restored area until vegetative cover is established.

4.3 Inspections

Erosion and sediment controls will be inspected as described below and in accordance with General Permit (GP-0-25-001) Part 4 and maintained by the Contractor for the duration of the construction activities, and until such time as all disturbed or open-soil areas at the Site have achieved “final stabilization”, which is defined in Appendix A of the General Permit as follows: “when all activities that create soil disturbances have been completed, and that a uniform perennial vegetative cover has been established with a density of 80% for all pervious, unpaved areas, or all exposed soil is covered with a permanent erosion control practice.”

4.3.1 Daily Maintenance Inspections

Erosion and sediment control measures being implemented within the active work area will be inspected by the Contractor daily and after stormwater events that generate runoff to ensure that they are being maintained in effective operating conditions at all times. If deficiencies are identified, the Contractor will implement the necessary corrective actions as soon as practicable. For temporary work stoppages greater than two weeks in duration (e.g., winter shutdowns, etc.), the daily inspections may be ceased if temporary stabilization measures have been applied to all disturbed surfaces, and if approved by GTEOSI, the Engineer/Construction Manager,

and NYSDEC. Contractor personnel responsible for daily inspections will meet the requirements of a “trained contractor,” as defined in Appendix A of the General Permit.

4.3.2 Periodic Site Inspections

Erosion and sediment controls will also be inspected by the Contractor’s “qualified inspector” (as defined in Appendix A of the General Permit) before the start of ground disturbance activities and once every seven calendar days (at a minimum) during construction to verify and document the continued effectiveness and integrity of the controls. For temporary work stoppages greater than two weeks in duration (e.g., winter shutdowns, etc.), the inspection frequency may be reduced to once every 30 calendar days if temporary stabilization measures have been applied to all disturbed surfaces, and if approved by GTEOSI, the Engineer/Construction Manager, and NYSDEC. The results of each periodic inspection, including any corrective actions to be taken, will be documented using the Stormwater Inspection Report form included in Technical Specification Section 01 41 26 – Stormwater Pollution Prevention Plan and Permit included in Appendix H of the 100% Remedial Design Report.

Any deficiencies identified during a periodic inspection, and any maintenance activities or corrective actions required to address those deficiencies, will be communicated immediately upon discovery. Maintenance and corrective actions will be initiated by the Contractor within one business day and will be completed before the next scheduled periodic inspection. If Site conditions prevent the maintenance activities or corrective actions from being completed before the next scheduled inspection, such conditions will be documented in the Stormwater Inspection Report, and the maintenance activities/corrective actions will be completed as soon as Site conditions permit.

4.4 Site Restoration

Excavation areas will be backfilled and restored to final grades and conditions specified in the ISTR design (Appendix F of the 100% RDR), WMP (Appendix G of the 100% RDR), and OU 2 design (Appendix H of the 100% RDR). Restored surfaces will typically consist of either vegetation/grass or asphalt pavement, except at historical outfall HO-3, which will be completed with a concrete surface. A final inspection will be performed to verify that all restored areas achieve final stabilization. Final stabilization means that all soil disturbance activities have ceased and a uniform, perennial vegetative cover with a density of eighty (80) percent over the entire pervious surface has been established; or other equivalent stabilization measures, such as permanent landscape mulches, rock rip-rap or washed/crushed stone have been applied on all disturbed areas that are not covered by permanent structures, concrete or pavement. If the restored areas are not sufficiently stabilized, corrective actions will be taken by the Contractor and a second final Site inspection will be performed. Upon acceptance of the final Site stabilization, the Contractor will remove any temporary erosion and sediment controls (e.g., silt fencing, construction entrance, etc.) that are no longer needed.

4.5 Post-Construction Stormwater Management Controls

Due to the nature of the work being performed (i.e., removal of impacted material under an Agency approved 100% Remedial Design Report and restoration to similar pre-construction conditions), it is anticipated that the quality of surface water from the Site will remain the same or improve following the completion of construction activities. Additionally, this project will not change the quantity or rate of stormwater runoff from the Site. Therefore, plans for post-remediation water quality and quantity controls are not provided.

5 Pollution Prevention Practices

This section summarizes the prevention practices that will be implemented by the Contractor to control impacted materials, spills, and construction debris from becoming a source of pollutants in Site-related stormwater runoff.

5.1 Impacted Material Handling, Transport, and Disposal

This section presents the handling, transportation, and disposal methods to be implemented for impacted material as part of construction activities.

5.1.1 Soil

Soils will be excavated to the horizontal and vertical limits depicted in Appendices F, G, and H of the 100% RDR. Excavated soil will be direct-loaded (when possible or temporarily staged on-Site) into properly-licensed and permitted vehicles (pursuant to Title 6, Part 364 of the New York Codes, Rules, and Regulations [6 NYCRR Part 364]) and will be transported off-Site in accordance with applicable laws and regulations. Transport vehicles will be water-tight and/or fully-lined with polyethylene liners (or equivalent) and will be equipped with functioning tailgate locks and non-mesh (solid), waterproof tarpaulins.

Excavated soils will be dewatered/solidified by the Contractor as necessary to (at a minimum) pass Paint Filter testing procedures (USEPA SW-846 Method 9095) and be deemed satisfactory by the Engineer/Construction Manager before leaving the Site. The Contractor's means and methods of dewatering/solidification will conform to the requirements of Specification Section 02 60 05 – Contaminated Material Management and Disposal.

In certain instances, excavated soils may be stockpiled on a temporary basis within the limits of the excavation areas or at a dedicated material staging area. Temporary stockpiles will be covered at all times (during both working and non-working hours) with minimum 10-mil polyethylene liners (or other approved means) when not in use. Liners will be properly anchored to prevent uplift due to wind conditions and will be installed to minimize the ponding of precipitation.

Before leaving the work area, transport vehicles will be staged and inspected and will be cleaned of any visible soil/sediment, if necessary, within a temporary decontamination area (constructed as shown on the Design Drawings). Upon leaving the work area, transport vehicles will follow approved haul routes.

5.1.2 Construction-Related Water

Construction-related water generated during the construction activities may include water removed from excavation areas and decontamination water. Construction-related water generated during the dewatering of excavation areas will be collected and conveyed to holding (frac-type) tanks for temporary storage. Holding tanks will be staged on-Site within a prefabricated containment area to capture any wastewater that may leak or spill from the tanks. Water is anticipated to be either transported for off-Site disposal or pre-treated on-Site via a temporary water treatment system and permitted for discharge to the New York State Barge Canal via the interceptor trench outfall.

If off-Site disposal is required, water will be transported from the Site to an appropriate off-Site disposal facility in properly licensed and permitted tanker trucks (pursuant to 6 NYCRR Part 364). Before leaving the Site, transport vehicles will be staged and inspected and will be cleaned of any visible soil/sediment, if necessary, within a

temporary decontamination area (constructed as shown on the Design Drawings). Upon leaving the Site, transport vehicles will follow approved haul routes.

Unimpacted storm water, (i.e., on-Site runoff that is temporarily diverted from excavation areas) will not require containerization, treatment, or off-Site disposal.

5.2 Spill Prevention, Control, and Response

As required by Specification Section 01 35 29 – Contractor's Health and Safety Plan, the Contractor will prepare a Site-specific Health and Safety Plan (HASP) that addresses spill prevention and control, and response to spills and other Site emergencies during the construction activities. The HASP will also include evacuation procedures for Site personnel, directions and a figure showing the route to the local hospital, and a contact list with telephone numbers for local and state emergency responders (e.g., police, ambulance, fire, poison control, etc.).

5.2.1 Spill Prevention

The Contractor's spill prevention practices will include, at a minimum, the following:

- Performing regular inspections of construction vehicles, equipment, and portable fuel tanks to check for leaks.
- Performing routine maintenance on construction vehicles and equipment in accordance with the manufacturer's specifications.
- Promptly repairing or replacing damaged or defective construction vehicles and equipment.
- Storing on-Site fuel tanks within a secondary containment area or providing alternate secondary containment (e.g., double-walled fuel tanks, containment dikes, etc.).
- Re-fueling vehicles on level ground within a designated area away from steep slopes and stormwater runoff conveyance features (e.g., ditches/diversions, storm drains, etc.).
- Attending to construction vehicles and equipment while re-fueling.
- Turning off internal combustion engines before re-fueling with a flammable liquid.
- Replacing the cap on vehicle fuel tanks before starting the engine.
- Securing/locking fuel pump dispensers when not in use to avoid accidental fuel release.
- Storing construction vehicles and equipment away from Site hazards and sensitive resources to the extent practicable.

5.2.2 Spill Control and Response

The Contractor will maintain on-Site sufficient fire extinguishers, spill kits, and oil-absorbent pads, rolls, and booms as required to contain spills (should they occur) and prevent the potential migration of pollutants beyond the work area. In the event of a spill, the Contractor will immediately notify GTEOSI and the Engineer/Construction Manager and will implement the following response measures:

1. Stop/Isolate Source: As conditions allow, the Contractor will attempt to stop or isolate the source of the spill by closing valves and/or shutting down affected vehicles or equipment.
2. Containment: If the spilled material is floating on a water surface, spill-absorbent pads/booms will be placed across the path of the floating spill. If the spilled material sinks below the water surface, a dam, weir, or other

containment method will be used to stop the flow of the spilled material. If the spill occurs on land, a containment unit will be constructed to stop the flow of the spilled material and sorbents will be applied as necessary.

3. Clean-Up: Spills in water will be recovered using pumps and sorbents as necessary until the spilled material is recovered and no sheen or other evidence of the spill is observed on the water surface. Spills on land will be recovered using pumps, sorbents, and heavy equipment, as necessary until the spilled material is recovered. Construction vehicles and equipment used in the clean-up or otherwise affected by the spill will also cleaned/decontaminated.
4. Collection, Storage, and Disposal: Impacted materials, sorbents, and other wastes will be collected and stored in New York State Department of Transportation (NYSDOT) -approved containers. The containers will be labelled with the waste type and date of accumulation and will be transported off-Site for disposal at a permitted facility in accordance with all applicable laws and regulations.
5. Post-Spill Maintenance: Following the clean-up of the spill, the Contractor will verify that all impacted materials, vehicles, and equipment have either been disposed of at a facility permitted to accept the waste, or decontaminated, as appropriate. The vehicle or piece of equipment that may have caused the spill will also be repaired. If the vehicle or piece of equipment cannot be repaired, it will be removed from the Site and replaced.

Spill notifications and reporting to the necessary agencies will be coordinated by GTEOSI and/or the Engineer/Construction Manager. The appropriate emergency response group(s) shall be notified immediately, if the spill or material release has impacted soil, groundwater, or surface water, or is beyond the capabilities of on-Site personnel to control using the methods described above. Depending on the severity and type of the spill, appropriate agencies may include the local fire department, USEPA, NYSDEC, and/or National Response Center.

5.3 Dust Controls

Dust controls will be used to prevent surface and air movement of dust from disturbed or open-soil areas that may cause off-Site damage, health hazards, and traffic safety problems. Dust controls will be proactively employed by the Contractor in accordance with Specification Section 01 57 05 – Temporary Controls, and may include one or more of the following practices:

- Excavating, loading, handling, and backfill materials in a manner that minimizes the generation of dust;
- Removing soil and debris from temporary access roads and active haul routes;
- Wetting down temporary access roads and active haul routes;
- Hauling excavated materials and clean backfill materials in properly tarped/covered transport vehicles;
- Restricting vehicle speeds on temporary access roads and active haul routes; and
- Covering excavations and temporary stockpiles with 10-mil polyethylene liners (anchored appropriately to resist wind forces) before extended work breaks and at the end of each workday.

5.4 Good Housekeeping Practices

Good housekeeping practices will be used to reduce the potential for construction materials entering Site-related stormwater runoff. The Contractor will maintain the Site in a neat and orderly condition throughout the

construction activities in accordance with Specification Section 01 74 05 – Cleaning. This will include the following:

- Routine collection and disposal of trash, rubbish, and sanitary wastes;
- Proper storage of construction materials and equipment at the Site; and
- Routine cleaning of public rights-of-way, streets, and sidewalks.

6 References

Arcadis. 2013. *Corrective Measures Study Report*. Former Philips Display Components Facility, Seneca Falls, New York. June 2013.

Arcadis. 2020. *Corrective Action Work Plan*. Former Philips Display Components Facility, Seneca Falls, New York, USEPA ID No. NYD002246015, NYSDEC Site No. 850003. May 2020.

Arcadis. 2024. *100% Remedial Design Report*. Former Philips Display Components Facility, Seneca Falls, New York. April 2024.

NYSDEC. 2006. *Title 6 of the New York Codes, Rules, and Regulations (6NYCRR), Part 375 Environmental Remediation Programs*. NYSDEC, Division of Environmental Remediation. December 14, 2006.

NYSDEC. 2010. DER-10. *Technical Guidance for Site Investigation and Remediation*. May 2010.

NYSDEC. 2016. *New York State Standards and Specifications for Erosions and Sediment Control,* November 2016.

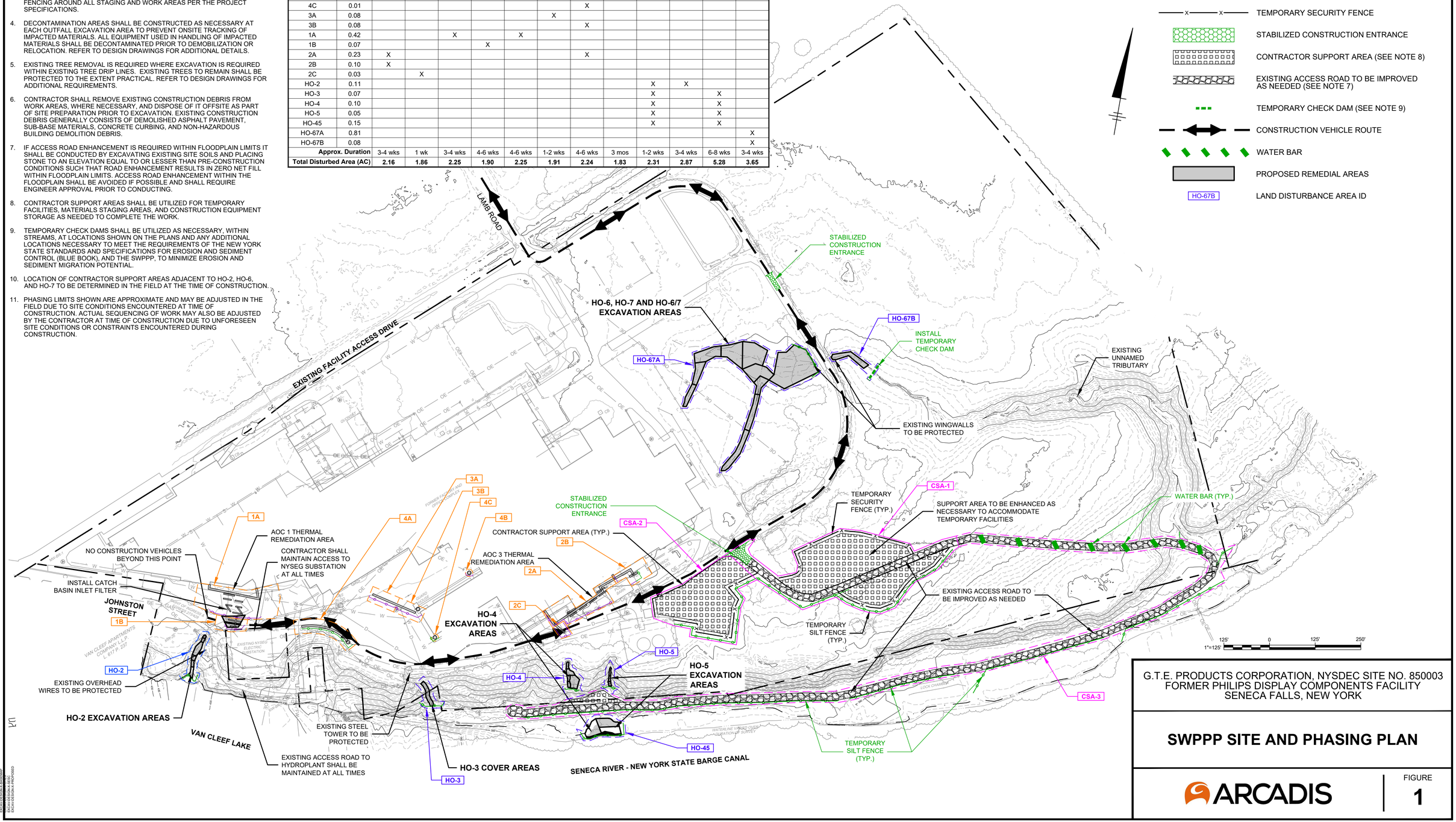
NYSDEC. 2025. GP-0-25-001. *SPDES General Permit for Stormwater Discharges From Construction Activities*. January 29, 2025.

Figures

NOTES:

1. BASE MAP PREPARED FROM TOPOGRAPHIC SURVEY FOR OUTFALL AREAS AND REMEDIATION AREAS BASED ON SEPTEMBER 8, 2020 FIELD SURVEY BY ADVANCED INFORMATION SYSTEMS, JOHN DAMIANO, LLS AND NEW YORK STATE GIS PROGRAM OFFICE (NYSGPO). ALL OTHER AREAS BASED ON USGS LIDAR DATA FOR THE "CENTRAL NY FINGERLAKES" DATED 2020. LIDAR ACCURACY IS 1 METER.
2. PROPOSED TRAFFIC ROUTE BASED ON MINIMIZING IMPACT TO EXISTING SITE OPERATIONS AND RESIDENTIAL AREAS. CONTRACTOR MAY PROPOSE ALTERNATE ROUTE, PROVIDED THAT EXISTING TRAFFIC ROUTES ARE MAINTAINED.
3. CONTRACTOR SHALL PROVIDE TEMPORARY CONSTRUCTION SECURITY FENCING AROUND ALL STAGING AND WORK AREAS PER THE PROJECT SPECIFICATIONS.
4. DECONTAMINATION AREAS SHALL BE CONSTRUCTED AS NECESSARY AT EACH OUTFALL EXCAVATION AREA TO PREVENT ONSITE TRACKING OF IMPACTED MATERIALS. ALL EQUIPMENT USED IN HANDLING OF IMPACTED MATERIALS SHALL BE DECONTAMINATED PRIOR TO DEMOBILIZATION OR RELOCATION. REFER TO DESIGN DRAWINGS FOR ADDITIONAL DETAILS.
5. EXISTING TREE REMOVAL IS REQUIRED WHERE EXCAVATION IS REQUIRED WITHIN EXISTING TREE DRIP LINES. EXISTING TREES TO REMAIN SHALL BE PROTECTED TO THE EXTENT PRACTICAL. REFER TO DESIGN DRAWINGS FOR ADDITIONAL REQUIREMENTS.
6. CONTRACTOR SHALL REMOVE EXISTING CONSTRUCTION DEBRIS FROM WORK AREAS, WHERE NECESSARY, AND DISPOSE OF IT OFFSITE AS PART OF SITE PREPARATION PRIOR TO EXCAVATION. EXISTING CONSTRUCTION DEBRIS GENERALLY CONSISTS OF DEMOLISHED ASPHALT PAVEMENT, SUB-BASE MATERIALS, CONCRETE CURBING, AND NON-HAZARDOUS BUILDING DEMOLITION DEBRIS.
7. IF ACCESS ROAD ENHANCEMENT IS REQUIRED WITHIN FLOODPLAIN LIMITS IT SHALL BE CONDUCTED BY EXCAVATING EXISTING SITE SOILS AND PLACING STONE TO AN ELEVATION EQUAL TO OR LESSER THAN PRE-CONSTRUCTION CONDITIONS SUCH THAT ROAD ENHANCEMENT RESULTS IN ZERO NET FILL WITHIN FLOODPLAIN LIMITS. ACCESS ROAD ENHANCEMENT WITHIN THE FLOODPLAIN SHALL BE AVOIDED IF POSSIBLE AND SHALL REQUIRE ENGINEER APPROVAL PRIOR TO CONDUCTING.
8. CONTRACTOR SUPPORT AREAS SHALL BE UTILIZED FOR TEMPORARY FACILITIES, MATERIALS STAGING AREAS, AND CONSTRUCTION EQUIPMENT STORAGE AS NEEDED TO COMPLETE THE WORK.
9. TEMPORARY CHECK DAMS SHALL BE UTILIZED AS NECESSARY, WITHIN STREAMS, AT LOCATIONS SHOWN ON THE PLANS AND ANY ADDITIONAL LOCATIONS NECESSARY TO MEET THE REQUIREMENTS OF THE NEW YORK STATE STANDARDS AND SPECIFICATIONS FOR EROSION AND SEDIMENT CONTROL (BLUE BOOK), AND THE SWPPP, TO MINIMIZE EROSION AND SEDIMENT MIGRATION POTENTIAL.
10. LOCATION OF CONTRACTOR SUPPORT AREAS ADJACENT TO HO-2, HO-6, AND HO-7 TO BE DETERMINED IN THE FIELD AT THE TIME OF CONSTRUCTION.
11. PHASING LIMITS SHOWN ARE APPROXIMATE AND MAY BE ADJUSTED IN THE FIELD DUE TO SITE CONDITIONS ENCOUNTERED AT TIME OF CONSTRUCTION. ACTUAL SEQUENCING OF WORK MAY ALSO BE ADJUSTED BY THE CONTRACTOR AT TIME OF CONSTRUCTION DUE TO UNFORESEEN SITE CONDITIONS OR CONSTRAINTS ENCOUNTERED DURING CONSTRUCTION.

Phase Description		AOC 3 Utilities Relocation and Abandonment		AOC 1 Utilities Relocation and Abandonment, and AOC 1 Thermal Installation			Utility Corridor Installation, Electrical Installation, and AOC 3 Thermal Installation		No Activity	Tree Removal	Historical Outfall Ditch Excavations		
Land Disturbance Area ID	**Approx. Area (AC)**	**Phase 1**	**Phase 2**	**Phase 3**	**Phase 4**	**Phase 5**	**Phase 6**	**Phase 7**	**Phase 8**	**Phase 9**	**Phase 10**	**Phase 11**	**Phase 12**
CSA-1	1.83	X	X	X	X	X	X	X	X	X	X	X	X
CSA-2	0.93										X	X	X
CSA-3	2.15											X	
4A	0.16							X					
4B	0.01							X					
4C	0.01							X					
3A	0.08						X						
3B	0.08							X					
1A	0.42			X		X							
1B	0.07				X								
2A	0.23	X						X					
2B	0.10	X											
2C	0.03		X										
HO-2	0.11									X	X		
HO-3	0.07									X		X	
HO-4	0.10									X		X	
HO-5	0.05									X		X	
HO-45	0.15									X		X	
HO-67A	0.81												X
HO-67B	0.08												X
Approx. Duration		3-4 wks	1 wk	3-4 wks	4-6 wks	4-6 wks	1-2 wks	4-6 wks	3 mos	1-2 wks	3-4 wks	6-8 wks	3-4 wks
Total Disturbed Area (AC)		**2.16**	**1.86**	**2.25**	**1.90**	**2.25**	**1.91**	**2.24**	**1.83**	**2.31**	**2.87**	**5.28**	**3.65**



LEGEND:

- PROPERTY BOUNDARY
- CENTERLINE OF HISTORICAL OUTFALL (HO) DITCH
- TEMPORARY SILT FENCE
- TEMPORARY COMPOST FILTER SOCK OR HAY BALES
- TEMPORARY SECURITY FENCE
- STABILIZED CONSTRUCTION ENTRANCE
- CONTRACTOR SUPPORT AREA (SEE NOTE 8)
- EXISTING ACCESS ROAD TO BE IMPROVED AS NEEDED (SEE NOTE 7)
- TEMPORARY CHECK DAM (SEE NOTE 9)
- CONSTRUCTION VEHICLE ROUTE
- WATER BAR
- PROPOSED REMEDIAL AREAS
- HO-67B — LAND DISTURBANCE AREA ID

G.T.E. PRODUCTS CORPORATION, NYSDEC SITE NO. 850003
FORMER PHILIPS DISPLAY COMPONENTS FACILITY
SENECA FALLS, NEW YORK

SWPPP SITE AND PHASING PLAN

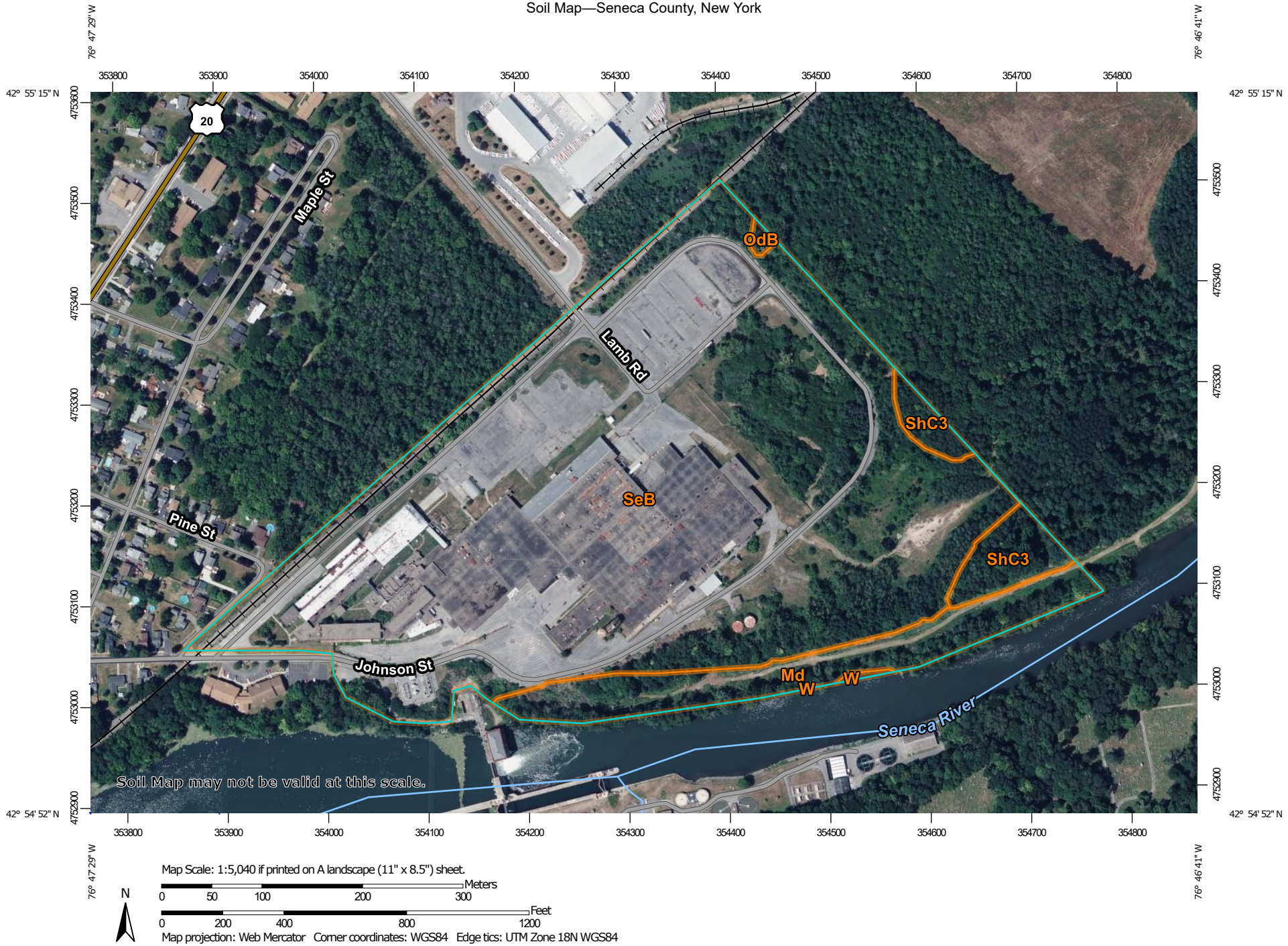
ARCADIS

FIGURE 1

C:\Users\BSchaad\OCAD\Documents\ACC Ltd\GLB\Projects\GTE\GTE_FMR PHILIPS SITE_SENECA FALLS_NY\Project Files\To_WP\ST_ARC_ENV\2020\07-DWG\SEN-FIG1-PHASINGSITE PLAN.dwg LAYOUT: 1 SAVED: 8/25/2020 2:29 PM ACADVER: 24.2S (LMS TECH) PAGESETUP: —
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ATTACH TITLE
EXCAVSEGMENT-CONTOURS
EXCAVSEGMENT-LINES
EXCAVSEGMENT-AREAS
EXCAVSEGMENT-PROPOSED

Attachment A

NRCS Soil Maps



Map Scale: 1:5,040 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 50 100 200 300

Feet
0 200 400 800 1200

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Seneca County, New York
Survey Area Data: Version 20, Sep 10, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 1, 2020—Oct 1, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Md	Made land, tillable	5.5	8.8%
OdB	Odessa silt loam, 3 to 8 percent slopes	0.1	0.2%
SeB	Schoharie silt loam, 2 to 6 percent slopes	54.5	87.2%
ShC3	Schoharie silty clay loam, 6 to 12 percent slopes	2.3	3.7%
W	Water	0.1	0.1%
Totals for Area of Interest		**62.5**	**100.0%**

Appendix C

Air Emissions Evaluation Memorandum

Memo

SUBJECT
Air Emissions Evaluation

TO
FILE

DATE
September 30, 2025

PROJECT NAME
Former Philips Display Components Facility, Seneca Falls, New York

DEPARTMENT
Environment

PROJECT NUMBER
30176334

On behalf of GTE Operations Support Incorporated (GTEOSI), Arcadis of New York, Inc. (Arcadis) has conducted an evaluation of air emissions for NYSDEC Site No. 850003 – G.T.E. Products Corporation (Former Philips Display Components Facility) at 50 Johnston Street, Seneca Falls, New York (the "Site"). This memorandum has been prepared to summarize the air emissions evaluation and conclusions.

Site Air Emissions Sources Subject to Evaluation

The evaluation considers both existing air emissions and anticipated future air emissions resulting from GTEOSI's implementation of the remedial program at the Site, including:

- ***Vapor Intrusion Mitigation Systems (existing)*** – The systems listed below are designed to operate continuously as part of the vapor intrusion pathway component of the remedy for the Site. Emission controls are not used on any of these systems. Locations are shown on Figure 1.
  - **Building 1 SSD Systems** – Four sub-slab depressurization (SSD) extraction points, each with a dedicated inline fan system.
  - **Building 1A SSD System** – Three extraction points (one SSD extraction point, one sump extraction point, and one drainage trench extraction point) connected to a dedicated inline fan system.
  - **Building 2 Ventilation System** – One basement ventilation point with a dedicated inline fan system.
  - **Building 7 SSD System** – Ten SSD extraction points connected to a centralized extraction system.
  - **Building 8 SSD System** – Two SSD extraction points connected to a shared inline fan system.
  - **Building 9 SMD System** – Two crawlspace sub-membrane depressurization (SMD) extraction points connected to a shared inline fan system.
  - **Buildings 9/10/11 SSD System** – Thirty-two SSD extraction points connected to a centralized extraction system.
- ***In Situ Thermal Remediation System (future)*** – Twenty-three multiphase extraction wells, fifteen horizontal soil vapor extraction (SVE) wells, and seven shallow vapor extraction wells connected to a centralized extraction system with vapor-phase treatment. The extraction system is designed to operate continuously during the implementation of in situ thermal remediation (ISTR), which is anticipated to last for around 3 to 5 months. The extraction system will be located southeast of Building 12. The location of Building 12 is depicted on Figure 1.
- ***ISTR Vapor Intrusion Mitigation Systems (future)*** – Two SMD extraction points, each with a dedicated inline fan system with no emission controls. These systems are designed to operate during implementation of ISTR as well as an additional 1 to 3 months after ISTR activities are completed. These two systems will be

located near Area of Concern (AOC) 1 (eastern end of Building 2) and AOC 3 (south side of Building 11), respectively. The locations of Buildings 2 and 11 are depicted on Figure 1.

Each use of the word “system” above corresponds to a single air discharge point, except for the Buildings 9/10/11 SSD System, which includes two separate discharge stacks (one for the Building 9 and 10 SSD extraction points and one for the Building 11 SSD extraction points).

Part 201 Applicability

A review of the applicable New York State regulations indicates that emissions subject to this evaluation fall under the category of trivial activities. New York State code 6 NYCRR §201-3.3 (Trivial Activities) states the following regarding trivial activities.

> *(a) The owner or operator of an emission source or activity that is listed as being trivial in this section may be required to certify that it operated within the specific criteria described in this Subpart. The owner or operator of any such emission source or activity must maintain all required records on-site for a period of five years and make them available to representatives of the department upon request.*
>
> *(b) The owner or operator of any emission source or activity that is listed as being trivial in this section shall operate and maintain the emission source and any associated emissions controls in a manner consistent with manufacturer’s specifications and good engineering practices. Failure to do so constitutes a violation of this Part.*
>
> *(c) The category headings used in the following listing of trivial activities are strictly for organizational purposes and are not intended to be definitive. The following activities are trivial and are exempt from permitting requirements and do not need to be listed in the title V facility permit application:*
>
> (28) Sub-slab depressurization systems that are not installed or operated as a remedial system for soil or groundwater contamination.
>
> (29) Remedial systems used to remediate soil and groundwater contamination that are required under the provisions of an order on consent or stipulation agreement, operated under the supervision of the department, and are properly controlled as required by the department.

The emissions sources subject to this evaluation (both existing and future) will be operated in agreement with and under the supervision of the department and are considered trivial activities. Pursuant to 6 NYCRR §201-3.1 (Applicability), the owner or operator of an emission source listed as a trivial activity is exempt from the registration and permitting provisions of the regulations. Therefore, the emissions sources subject to this evaluation are exempt from the requirement of an air permit for the construction and operation of the source.

Part 212 Applicability

As per 6 NYCRR §212-1.1, Part 212 is not applicable if no facility registration is required. Since all emissions subject to this evaluation are trivial activities as per 6 NYCRR §201-3.3, no facility registration is required; thus, Part 212 is not applicable. Although an air permit is not required (the emissions subject to this evaluation are trivial activities and exempt from permitting and Part 212 requirements per 6 NYCRR Part 201-3.3 and 6 NYCRR Part 212-1.4(a)), an emission control system will be in place, operated properly, maintained, and monitored. Air monitoring will be completed in accordance with Section 4.1.9 of the 100% Remedial Design Report.

Title V Evaluation

In accordance with 6 NYCRR §201-3.1 (Applicability), emissions from exempt activities must be included in potential to emit calculations when determining whether a facility or emission source is subject to Title V facility permitting pursuant to 6 NYCRR §t 201-6. Even though the emissions subject to this evaluation meet the definition of trivial activities (not exempt activities) as per 6 NYCRR §201-3.3, the emissions were still compared to the Major Source Hazardous Air Pollutant (HAP) threshold as defined in 6 NYCRR §201-2.

The existing vapor intrusion mitigation systems at the Site were evaluated separately from the future ISTR system (and associated vapor intrusion mitigation systems). Mass emissions estimates for the existing vapor intrusion mitigation systems are shown in Table 2 and include the following calculation inputs and/or assumptions:

- System effluent vapor sample results from 2017 or 2018 were assigned as representative effluent concentrations for these systems. Even though SSD systems have expanded since 2017/2018, it is reasonable to assume that using the 2017/2018 sample results is conservative since SSD influent concentrations typically decrease over time.
- For the existing Building 9 SMD System, no system effluent vapor sample has been collected for TO-15 analysis. Based on a comparison of portable gas chromatograph concentrations of trichloroethene (TCE) from a Building 9 SMD System influent/effluent sample collected in May 2024 (45.3 micrograms per cubic meter [µg/m^3]) and a TO-15 analysis concentration of 38 µg/m^3 from September 2017, assigning the former Building 9 Crawlspace Ventilation System effluent concentrations measured in 2017 is appropriate.
- Estimated annual mass emissions are calculated as follows:

  lb/year = [µg/m^3] x [ft^3/min] x [m^3/35.3 ft^3] x [kg/10^9µg] x [2.205 lb/kg] x [1440 min/day] x [365 day/year]
- Continuous operation for 365 days per year.

Mass emissions estimates for the future ISTR system, and associated vapor intrusion mitigation systems, are shown in Table 3 and include the following calculation inputs and/or assumptions:

- An estimate of in-place mass was developed by assigning the median constituent concentration (based on Pre-Design Investigation soil borings) as representative throughout the target treatment volume. Median concentrations for AOCs 1 and 3 were developed independently.
- An AOC 1 target treatment volume of 3,746 cubic meters (m^3), and an AOC 3 target treatment volume of 2,676 m^3.
- Soil density of 2,000 kilograms per cubic meter.
- 90% of the in-place mass will be removed by the ISTR extraction system. Emissions controls on the ISTR extraction system will result in 95% removal efficiency.
- Conservatively, 5% of the in-place mass will be removed by the vapor intrusion mitigation measures to be implemented during ISTR. These emissions will not undergo treatment.
- Emissions from the ISTR system will occur until all estimated total in-place mass is removed, which is anticipated to take up to 180 days.

A summary of the emission rate calculations for both the existing vapor intrusion mitigation systems and the ISTR systems is provided in Table 1 below. As shown in Table 1, the calculated emission rates for HAPs (0.08 tons per year or less) are below the following Major Source thresholds:

- 10 tons per year for a single HAP; and
- 25 tons per year for any combination of HAPs.

The emissions subject to this evaluation are well below the Major Source HAP thresholds. Therefore, no further evaluation with respect to Title V permitting is required.

Table 1 – Summary of Major Source Threshold Comparison

Major Source Criteria	Major Source Threshold (tons per year)	Estimated Annual Mass Emissions (tons per year)		
		Existing Vapor Intrusion Mitigation Systems	Future In Situ Thermal Remediation System	Maximum Total
Sum of All Constituents (lb/year)	-	0.01	0.08	0.08
Sum of All HAPs (lb/year)	25	0.01	0.07	0.08
Maximum Individual HAP (lb/year)	10	0.00	0.06	0.06

Enclosures:

Table 2 – Emissions Estimate – Existing Vapor Intrusion Mitigation Systems
Table 3 – Emissions Estimate – In Situ Thermal Remediation System
Figure 1 – Soil Vapor Intrusion Mitigation Systems Layout

Table 2
Emissions Estimate - Existing Vapor Intrusion Mitigation Systems
Former Philips Display Components Facility, Seneca Falls, New York

Constituent	CAS Number	Hazardous Air Pollutant (Yes/No)	Building 1 SSD Systems				Building 1A SSD System	Building 2 Ventilation System	Building 7 SSD System	Building 8 SSD System	Building 9 SMD System	Buildings 9/10/11 SSD System	Estimated Annual Mass Emissions (lb/year)[D]
		System ID:	B1-EP-01	B1-EP-02	B1-EP-03	B1-EP-04							
		Source of Effluent Concentrations Used for Calculation:	Sample from 9/28/17[A]	Sample from 9/28/17[A]	Sample from 9/28/17[A]	Sample from 9/28/17[A]	Sample from 9/28/17[A]	Sample from 9/28/17[A]	Sample from 12/14/17[A]	Sample from 9/28/17[A][C]	Sample from 9/28/2017[B]	Sample from 12/6/2018[A]	
		Maximum Flow Rate (cfm):	66	66	155	82	66	166	495	155	166	4400	
			Concentration ($\mu g/m^3$)										
1,1,1-Trichloroethane	71556	Yes	2.1	1.1	0.6	3.0	0.6	0.6	0.6	1.1	0.6	0.6	0.1
1,1,2,2-Tetrachloroethane	79345	Yes	0.7	1.4	0.7	0.7	0.7	0.7	0.7	1.4	0.7	0.7	0.1
1,1,2-Trichloroethane	79005	Yes	0.6	1.1	0.6	0.6	0.6	0.6	0.6	1.1	0.6	0.6	0.1
1,1-Dichloroethane	75343	Yes	2.0	0.8	0.4	0.4	0.4	0.4	0.4	0.8	0.4	0.4	0.1
1,1-Dichloroethene	75354	Yes	3.2	0.8	0.4	1.4	0.4	0.4	0.4	0.8	0.4	0.4	0.1
1,2-Dichloroethane	107062	Yes	0.4	0.8	0.4	0.4	0.4	0.4	0.4	0.8	0.4	0.4	0.1
Benzene	71432	Yes	0.3	0.7	0.8	0.3	0.3	0.3	1.0	0.7	0.3	4.0	0.6
cis-1,2-Dichloroethene	156592	No	7.6	9.4	0.4	11.0	4.6	0.4	9.3	12.0	0.4	4.2	0.9
Ethylbenzene	100414	Yes	0.4	0.9	1.6	0.4	0.4	0.4	0.4	0.9	0.4	0.9	0.2
m&p-Xylenes	-	No	1.1	2.2	9.3	1.1	1.1	1.1	1.1	2.2	1.1	3.6	0.6
o-Xylene	95476	Yes	0.4	0.9	0.4	0.4	0.4	0.4	0.4	0.9	0.4	1.1	0.2
Tetrachloroethene	127184	Yes	17.0	3.1	2.4	37.0	0.7	0.7	0.7	28.0	0.7	0.7	0.4
Toluene	108883	Yes	2.4	3.0	1.2	1.1	0.4	1.1	0.4	4.5	0.4	2.7	0.4
trans-1,2-Dichloroethene	156605	No	0.4	0.8	0.4	0.4	0.4	0.4	0.4	0.8	0.4	0.4	0.1
Trichloroethene	79016	Yes	210.0	210.0	0.6	210.0	21.0	4.9	52.0	380.0	38.0	24.0	8.0
Vinyl chloride	75014	Yes	0.3	0.5	0.3	0.3	0.3	0.3	0.3	0.5	0.3	0.3	0.1
												Sum of All Constituents (lb/year)	12.09
												Sum of All HAPs (lb/year)	10.49
												Maximum Individual HAP (lb/year)	8.00

Notes:

- Non-detects are shown as one half of the reporting limit.

A) These calculations assume that 2017/2018 sample results are still appropriate and/or conservative, due to the tendency for SSD influent concentrations to decrease over time. Similarly, these calculations assume that additions to the SSD extraction point networks for the Building 7 SSD System and Buildings 9/10/11 SSD System have not resulted in appreciable increases in influent concentrations.

B) Effluent concentrations from the former Building 9 crawlspace ventilation system have been applied. Based on portable gas chromatograph sampling of the Building 9 SMD System in May 2024, the effluent concentrations from the Building 9 SMD System appear comparable to those for the former Building 9 crawlspace ventilation system.

C) Concentrations shown are the greater of the B8-EP-01 and B8-EP-02 system effluent sample concentrations. These systems are now combined into a single discharge.

D) Estimated annual mass emissions calculated as follows: lb/year = [$\mu g/m^3$] x [ft^3/min] x [m^3/35.3 ft^3] x [kg/10^9µg] x [2.205 lb/kg] x [1440 min/day] x [365 day/year].

Abbreviations:

µg = micrograms
ft^3 = cubic feet
lb/kg = pounds per kilogram
lb/year = pounds per year
m^3 = cubic meters
min/day = minutes per day
SMD = sub-membrane depressurization
SSD = sub-slab depressurization

Table 3
Emissions Estimate - In Situ Thermal Remediation System
Former Philips Display Components Facility, Seneca Falls, New York

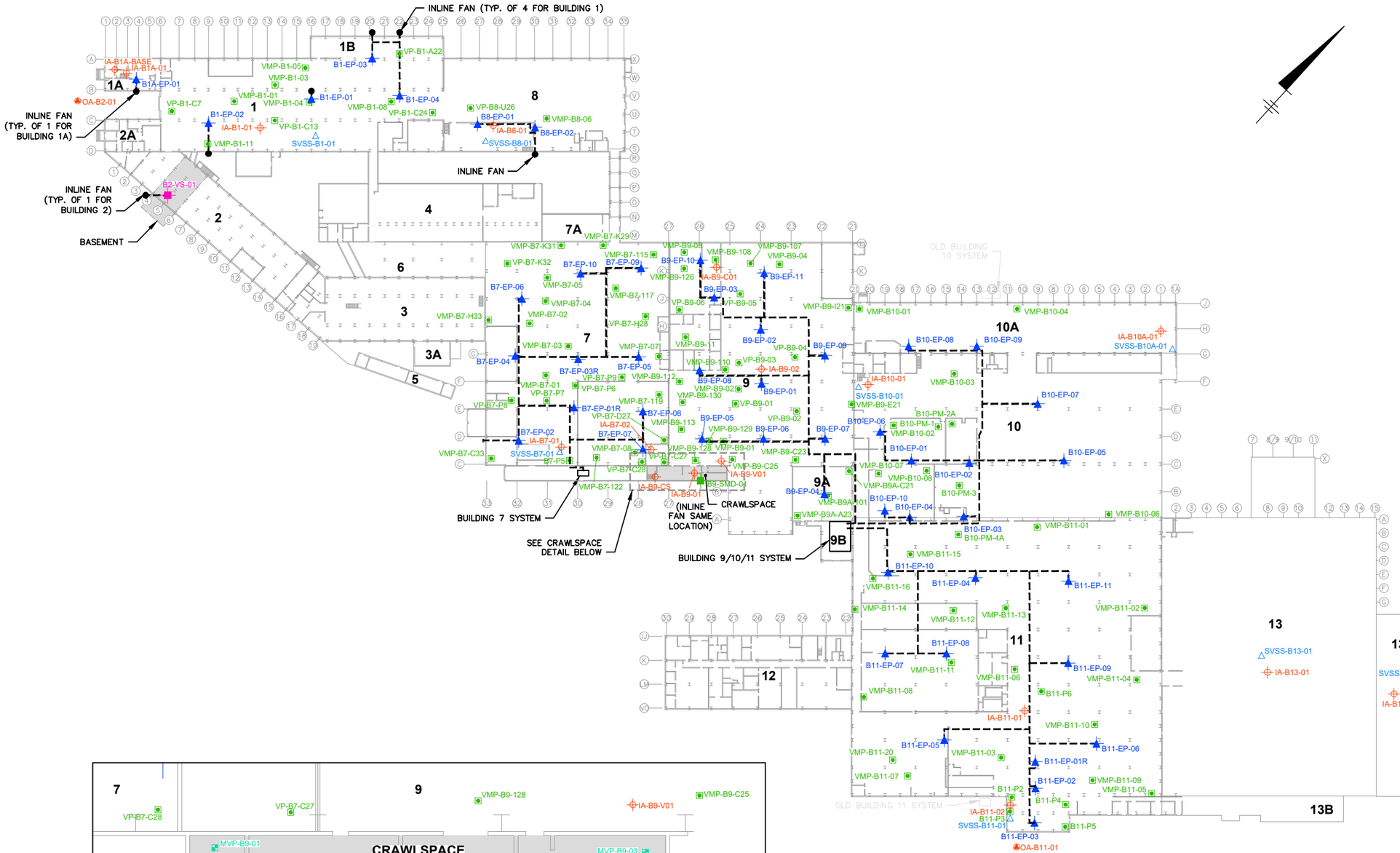
ARCADIS

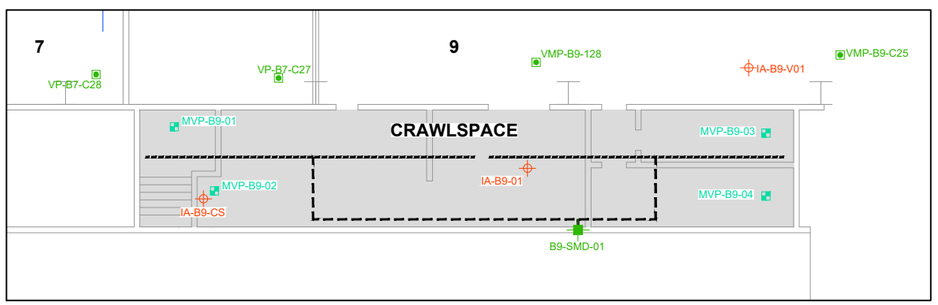
Constituent	CAS	Hazardous Air Pollutant (Yes/No)	TTZ Median Concentration (mg/kg)[A]		Estimated Mass In Place (lbs)[B]			Estimated Pre-Treatment Vapor Phase Mass to be Removed by the ISTR Extraction System (lb)[C]	Estimated Post-Treatment Vapor Phase Mass to be Emitted by the ISTR Extraction System (lb)[D]	Estimated Vapor Phase Mass to be Emitted by ISTR Vapor Intrusion Mitigation Systems (lb)[D]	Total Estimated Mass Emitted (lb)
			AOC 1	AOC 3	AOC 1	AOC 3	Total				
1,1,2-trichloro-1,2,2-trifluoroethane	76131	No	1.1	0.3	18.2	3.0	21.2	19.1	1.0	0.2	1.2
1,1-Dichloroethane	75343	Yes	1.1	0.2	18.2	2.8	21.0	18.9	0.9	0.2	1.2
1,1-Dichloroethene	75354	Yes	1.1	0.2	18.2	2.8	21.0	18.9	0.9	0.2	1.2
1,2-Dichloroethane	107062	Yes	1.1	0.2	18.2	2.8	21.0	18.9	0.9	0.2	1.2
1,2-Dichloropropane	78875	Yes	1.1	0.2	18.2	2.8	21.0	18.9	0.9	0.2	1.2
2-Butanone (MEK)	78933	Yes	5.5	1.2	90.9	14.2	105.0	94.5	4.7	1.1	5.8
4-Methyl-2-Pentanone	108101	Yes	5.5	1.2	90.9	14.2	105.0	94.5	4.7	1.1	5.8
Acetone	67641	No	5.5	1.2	90.9	14.2	105.0	94.5	4.7	1.1	5.8
Benzene	71432	Yes	1.1	0.2	18.2	2.8	21.0	18.9	0.9	0.2	1.2
Carbon Disulfide	75150	Yes	1.1	0.2	18.2	2.8	21.0	18.9	0.9	0.2	1.2
CFC-12	75718	No	1.1	0.2	18.2	2.8	21.0	18.9	0.9	0.2	1.2
cis-1,2-Dichloroethene	156592	No	1.2	0.3	19.8	3.1	22.9	20.7	1.0	0.2	1.3
Cyclohexane	110827	No	1.1	0.2	18.2	2.8	21.0	18.9	0.9	0.2	1.2
Dichloromethane	75092	Yes	1.1	0.2	18.2	2.8	21.0	18.9	0.9	0.2	1.2
Ethylbenzene	100414	Yes	1.1	0.2	18.2	2.8	21.0	18.9	0.9	0.2	1.2
Methylcyclohexane	108872	No	1.2	0.2	19.0	2.8	21.8	19.6	1.0	0.2	1.2
Tetrachloroethene	127184	Yes	1.1	0.2	18.2	2.8	21.0	18.9	0.9	0.2	1.2
Toluene	108883	Yes	1.2	0.4	19.0	4.3	23.3	20.9	1.0	0.2	1.3
Total Xylenes	1330207	Yes	2.2	0.5	36.3	5.7	42.0	37.8	1.9	0.4	2.3
trans-1,2-Dichloroethene	156605	No	1.2	0.2	19.0	2.8	21.8	19.6	1.0	0.2	1.2
Trichloroethene	79016	Yes	87.5	59.0	1,445.4	696.1	2,141.5	1,927.3	96.4	21.4	117.8
Vinyl chloride	75014	Yes	1.1	0.2	18.6	2.8	21.4	19.3	1.0	0.2	1.2
										Sum of All Constituents (lb/year)[E]	157.41
										Sum of All HAPs (lb/year)[E]	144.50
										Maximum Individual HAP (lb/year)[E]	117.78

Notes:
- Data based on D-series borings collected during Pre-Design Investigation (PDI) of Arcadis (2020).
- Only constituents that were detected in at least one sample are considered.
- Assumed volumes over which median concentrations are attributed are 3,746 m^3 for AOC 1 and 2,676 m^3 for AOC 3.
- Soil density of 2,000 kg/m^3 assumed for mass-in-place calculation.
- These calculations assume that the sum of the mass removed by the ISTR extraction system and vapor intrusion mitigation measures implemented in AOCs 1 and 3 will equal the estimated mass in-place.

A) Calculated median concentrations consider concentrations at half of reporting limits for non-detect samples.
B) Estimated mass in-place calculated as follows: lb = [mg/kg] x soil volume [m^3] x soil density [kg/m^3] x [$kg/10^6 mg$] x [2.205 lb/kg].
C) Pre-treatment vapor phase mass to be removed assumes 90% of estimated in-place mass will be removed in the vapor phase.
D) Post-treatment vapor phase mass to be emitted assumes that the vapor intrusion mitigation measures implemented during ISTR will remove 5% of the total in-place mass (not subject to emission controls). The ISTR extraction system (which will remove 90% of the total in-place mass) will include a 95% removal efficiency via emissions controls.
E) Annual emission rate (lb/year) assumes emissions will occur until all estimated total in-place mass is removed.

Abbreviations:
AOC = Area of Concern
HAP = Hazardous Air Pollutant
ISTR = in situ thermal remediation
m3 = cubic meters
mg/kg = milligram per kilogram
lbs = pounds
lb/kg = pounds per kilogram
lb/year = pounds per year
m^3 = cubic meters
TTZ = Target Treatment Zone for In Situ Thermal Remediation





CRAWLSPACE DETAIL

0 10' 20'
GRAPHIC SCALE

LEGEND:

- SSD EXTRACTION POINT
- VENTILATION SYSTEM
- SMD SYSTEM
- CONVEYANCE PIPING
- SMD EXTRACTION PIPING
- INLINE FAN
- 1A BUILDING ID
- SSD VACUUM MONITORING POINT
- SMD VACUUM MONITORING POINT
- SUB–SLAB SOIL GAS SAMPLING LOCATION
- OUTDOOR AIR SAMPLING LOCATION
- INDOOR AIR SAMPLING LOCATION

NOTES:

1. ALL LOCATIONS ARE APPROXIMATE.
2. SVI MITIGATION SYSTEM EXPANSION (IMPLEMENTED 2015–2022) INCLUDED THE FOLLOWING:
   - BUILDING 1: THREE NEW SSD EXTRACTION POINTS (B1–EP–02, B1–EP–03 AND B1–EP–04)
   - BUILDING 2: ONE NEW BASEMENT VENTILATION SYSTEM (B2–VS–01)
   - BUILDING 7: SEVEN NEW SSD EXTRACTION POINTS (B7–EP–04 THROUGH B7–EP–10) AND REPLACEMENT OF TWO PRE–EXISTING SSD EXTRACTION POINTS (B7–EP–01R AND B7–EP–03R)
   - BUILDING 8: TWO NEW SSD EXTRACTION POINTS (B8–EP–01 AND B8–EP–02)
   - BUILDING 9: ONE NEW CRAWLSPACE SMD SYSTEM (B9–SMD–01) AND ELEVEN NEW SSD EXTRACTION POINTS (B9–EP–01 THROUGH B9–EP–11)
   - BUILDING 10: SEVEN NEW SSD EXTRACTION POINTS (B10–EP–04 THROUGH B10–EP–10)
   - BUILDING 11: SEVEN NEW SSD EXTRACTION POINTS (B11–EP–05 THROUGH B11–EP–11) AND REPLACEMENT OF ONE PRE–EXISTING SSD EXTRACTION POINT (B11–EP–01R)

ABBREVIATIONS:
SMD = SUB–MEMBRANE DEPRESSURIZATION
SSD = SUB–SLAB DEPRESSURIZATION

0 60' 120'
GRAPHIC SCALE

FORMER PHILIPS DISPLAY COMPONENTS FACILITY
SENECA FALLS, NEW YORK

SOIL VAPOR INTRUSION MITIGATION SYSTEMS LAYOUT

ARCADIS

FIGURE 1

C:\Users\GSTEINBERGER\DCACCDocs\Arcadis ACC US\AUS-99999999-GTEOSI_FMR PHILIPS SITE_SENECA FALLS_NY\Project Files\10_WIP\10T_ARC_ENV2024\01-DWG\CCR-FIG02-SVI Mitigation Syst Layout.dwg SAVED: 4/16/2024 9:52 AM BY: STEINBERGER, GEORGE

XREFS: IMAGES:
X01-BASE Arcadis Logo.PNG
CCR-X-Border

Appendix D

Site-Specific Health and Safety Plan

Site Specific Health and Safety Plan

Template Revision: 22 c

Project Name:	GTEOSI Seneca Falls
Project Number:	30245593
Client Name:	GTE OSI
Date:	9/11/2025
HASP Expires	9/11/2026
Revision:	

Approvals:

HASP Developer: Adam Svensson

Project Manager: Mark Flusche

HASP Reviewer: Chris Kassel

HASP Reviewer Name Typed



HASP Reviewer Signature (handwritten or digital signature)

Emergency Information

Site Address: 50 Johnston Street
Seneca Falls, NY 13148

Emergency Phone Numbers:

Emergency (fire, police, ambulance)		911
Emergency (facility specific, if applicable):		
Seneca Falls Police Department		315-568-4850
Emergency Other (specify):		
Primary Client Contact:	Matt Walsh	O: 908-559-3691
WorkCare (non-life-threatening injury/illness):		1-888-449-7787
Project Site Safety Officer:	Kaitlyn Fleming	619-727-1921
Task Manager:	Ryan Clare	585-880-7747
Project Manager:	Mark Flusche	518-859-3579
H&S Specialist:	Alec MacAdam	720-454-0948
Area H&S Director:	Aaron Svitana	925-360-2313

Hospital Name and Address: Geneva General Hospital
196 North St.
Geneva, NY 14456

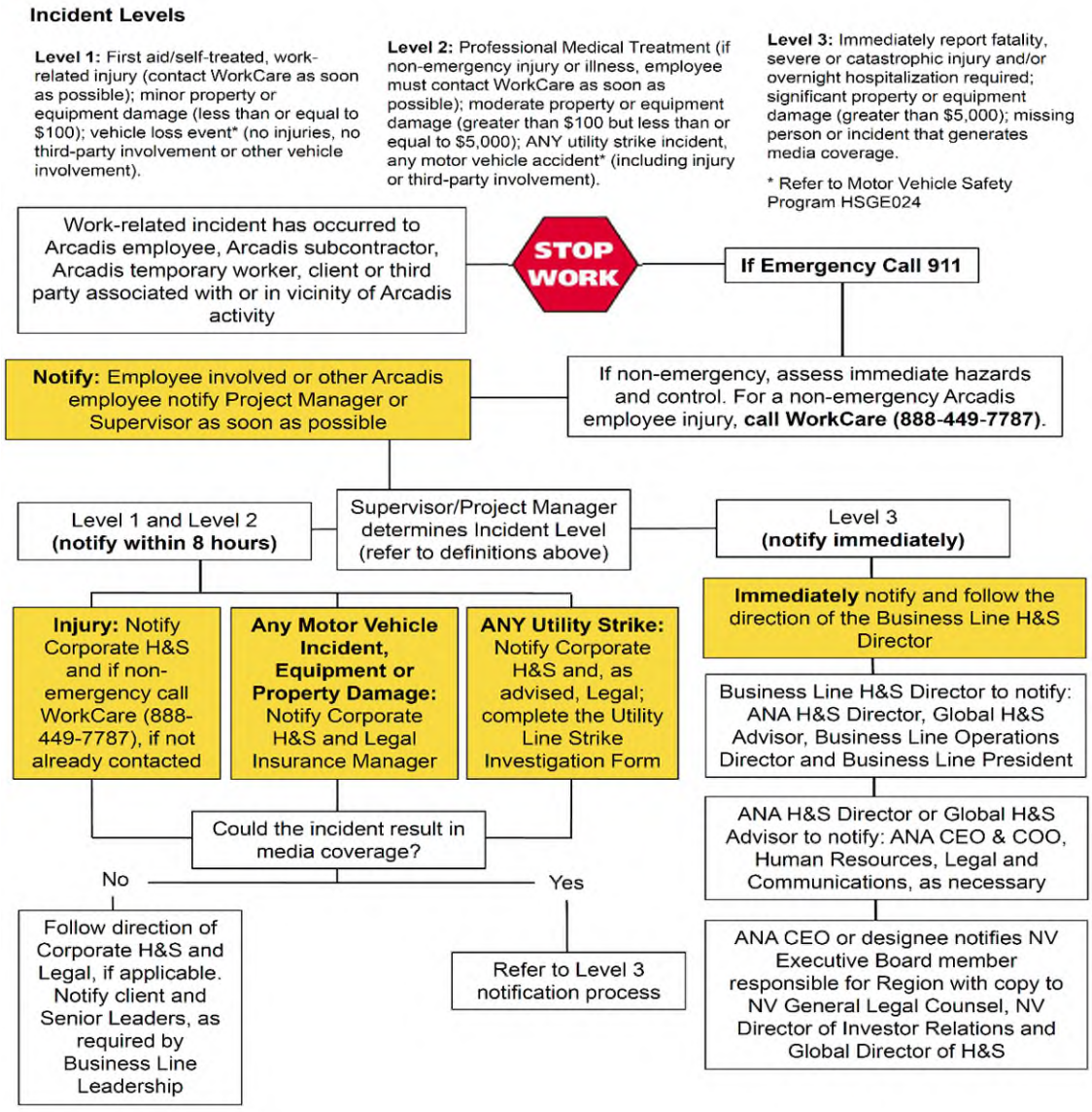
Hospital Phone Number: 315-787-4000

Supplemental Client Contact Information:

Other Important Phone Numbers:

Poison Control Center	1-800-222-1222
Nat. Response Ctr. (spills in reportable quantities)	1-800-424-8802
U.S. Coast Guard (spills to water)	1-800-424-8802

Incident Reporting Protocol Within Arcadis



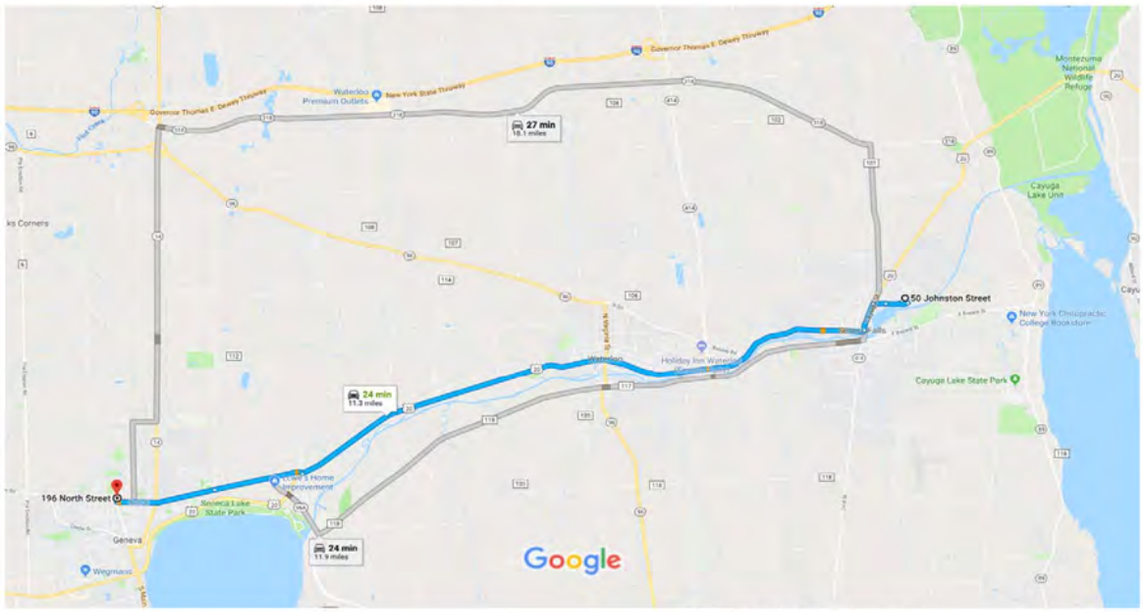
Client Incident Reporting Protocol

Arcadis (Supplier) shall promptly notify Verizon using Verizon's web-based contractor incident reporting protal or other reasonable method specified by Verizon if Supplier or a subcontractor: (a) is subject to a regulatory investigation or receives a notice of violation of any applicable environmental, health and safety requirement resulting from its performance of the Services; (b) experiences an employee fatality, injury, illness, or nearmiss while working on a Verizon project or property; or (c) causes or is involved in property damage, the release of a hazardous substance, or a vehicle accident on a Verizon project or property.

For serious injuries or incidents, including those that result in a fatality, amputation, hospitlization or property damage, Supplier shall immediately call the Verizon Environment, Heath and Safety 24-hour Hotline at 1-800-386-9639 and, if needed, 911, before entering information into the web-based portal.

Route to the Hospital

Google Maps 50 Johnston St, Seneca Falls, NY 13148 to 196 North Street, Geneva, NY Drive 11.3 miles, 24 min



Map data ©2018 Google 1 mi

50 Johnston St
Seneca Falls, NY 13148

1. Head southwest on Johnson St — 0.3 mi
2. Continue onto Johnston St — 0.2 mi
3. Turn left onto Cayuga St — 0.4 mi
4. Turn right onto US-20 W/Fall St — 8.0 mi
   Continue to follow US-20 W
5. Turn right onto Border City Rd — 1.2 mi
6. Continue onto E North St — 1.3 mi
   Destination will be on the right

Site Map Showing Assembly Areas



Guard Shack assembly area (above)

Route 5&20 assembly area (below)



Site Type

The project site is an active facility with the following attributes:

Parking Lot/Private Drive (NON ROW)	
Buildings	
Commercial	
Other: Wooded	

Work in parking lots will require preparation of a Non-ROW Traffic Safety Plan.

Surrounding Land Use and Topography

The facility is located adjacent to, and north of, the Seneca and Cayuga Canal and Van Cleef lake and situated at the top of a wooded steep bedrock escarpment at an elevation approximately 30 to 80 feet higher than the lake and canal, respectively. There are residential properties to the north adjacent to the railroad tracks and to the west. To the east, there is forested land and former parking lots. The site includes these adjacent areas, other than the residential and railroad properties.

Simultaneous Operations (SimOps)

SimOps is expected or will be conducted in proximity to Arcadis work activities on the project site. SimOps creates unique hazards that could affect Arcadis employees and subcontractors and SimOps hazards identified on site will be addressed in the JSA or similar governing document (i.e. permit) for affected Arcadis work tasks. If the SimOps work activities create a high hazard to Arcadis staff or subcontractors, Arcadis will utilize stop work until the SimOps activity is complete or will coordinate work activities with SimOps workers and/or client to ensure SimOps work hazards are mitigated.

Site Background

The Site is located along the northern side of Van Cleef Lake and the Cayuga and Seneca Canal in the Village of Seneca Falls, New York. Residential and undeveloped properties surround the Site to the west, north and east. The buildings on the Site cover approximately 13 acres. The Site was last operated as a manufacturing facility in 1986 closing out a four-decade period when television picture tubes and component parts were manufactured first by Sylvania Electric Products Corporation and then by North American Philips Corporation ("Phillips"). The revitalization of the Site began in 1989 when the property was purchased by the Seneca County Industrial Development Agency. Seneca Falls Specialties & Logistics now occupies a majority of the building complex for warehousing and leases portions of the building space to several professional and commercial tenants. Consituents of concern in groundwater are primarily trichloroethene and its breakdown products. Constituents of concern in soil are primarily trichloroethene and cadmium.

Project Tasks
The following tasks are identified for this project:

1	Driving - Motor vehicles
2	Sampling - Well sampling using diffusive samplers
3	Sampling - Non-pressurized or passive air sampling using summa canisters, sample canisters, tedlar bags, or passive collection device
4	Inspections and audits - Buildings
5	Construction - Construction contractor oversight
6	Drilling - Contractor oversight
7	Operation and maintenance - Small to large systems
8	Operation and maintenance - Contractor oversight
9	Sampling - Soil sampling using manual methods
10	Decontamination - Small or hand-held objects using manual methods
11	Sampling - Soil sampling using direct push technology
12	Survey - Geophysical
13	Confined Space
14	Excavation - Contractor oversight
15	Utilities - Clearance
16	Electrical - Contractor Oversight
17	Select
18	Select
19	Select
20	Select

The following documents/plans/support associated with the above task(s) are attached or to be provided:
- The Arcadis Utilities and Structures Checklist must be used for utility clearance activities.
- Site access agreements for off-site non-client owned private property access.
- Silica Exposure Control Plan
- Arcadis Work Authorization Form Letter

[X] Required Checklists/Work Forms

Tailgate Safety Briefing Form
Vehicle Inspection Checklist
Confined Space Evaluation Form
Lockout/Tagout Exchange of Information Form
Lockout/Tagout Periodic Inspection
LOTO Specific Equipment Procedure Template
Utility and Structures Checklist

[X] Required Permits

Lockout Tagout Permit to Work

[X] Required H&S Standards

Motor Vehicle Safety Program_ARC HSGE024
Control of Hazardous Energy (Lockout/Tagout)_ARC HSFS004
Hearing Conservation_ARC HSIH008

Short Service Employees (SSEs), Part Time As Needed Employees (PTANs) and Temporary Agency Employees
SSEs (employees who are employed with Arcadis for less than 1 year or are Inexperienced Workers) have the potential to work on this project. If SSEs are utilized, the project team working in conjunction with the SSE's administrative supervisor will ensure requirements of ARC HSGE019 "Short Service Employees" are completed. SSE's will be identified on the project Tailgate Safety Meeting Form.

Roles and Responsibilities

	Name	Role	Short Service Employee
1	Mark Flusche	Project Manager (PM)	No
2	Chris Kassel	Associate Project Manager (APM)	No
3	Chris Davern/Ryan Clare	Task Manager	No
4	Quinn Carnahan/Ryan Clare	Field Technical Lead	No
5	Kaitlyn Fleming	Site Safety Officer (SSO) (HAZWOPER)	No
6	Jason Gutowski	Field Staff	No
7	Kaitlyn Fleming	Field Staff	No
8	Bailey Kudla-Williams	Field Staff	No
9	Robbie Sullivan	Field Staff	Yes
10	Beech Wayland	Field Staff	No

☐ The staff listed above are the initial participants on this project phase of work. This phase of work will have rotating staff on a a daily or weekly basis. See Project scheduling tool or equivalent tool for current staff roles and responsiblities.

Training

All Arcadis employees are required to have the following training to be on site:

H&S Program Orientation (non-certificate)
HAZCOM GHS/EAP (non-certificate)
Defensive Driving - Smith On-Line
PPE (non-certificate)
Hazwoper 40-Hour
Hazwoper 8-Hour Annual Refresher
Cadmium - General Awareness
None
None
None
None
None
None
Client specific/Other:

Selected Arcadis employees are required to have the following additional training:

	Names or Numbers from above
Hazwoper 8-Hour Supervisor	4,5,6
DOT HazMat #1	4,6
Lockout/Tagout - Affected	4,5,6,7,8,9,10
Construction Safety - 10 Hour	4,5,6,7
BBP (Bloodborne Pathogens)	4,5,6,7,8,9,10
Fire Extinguisher (non-certificate)	4,5,6,7,8,9,10
First Aid/CPR	4,5,6,7,8,9,10
Lockout/Tagout - Authorized	4,6,7,8,9,10
Confined Space Awareness	3,4,5,6,7,8,9,10
Silica General Awareness	4,5,6,7,8,9,10
None	
None	
None	
None	
None	

(1) The Arcadis Basic H&S Training Suite includes the following non-certificate trainings: H&S Orientation, Hazard Communication (HAZCOM/GHS), Emergency Action Planning (EAP), Personal Protective Equipment, and Hearing Conservation. The Suite also includes the following certificate issued training: Smith System Forward/Backing Training.

Protecting Our People: Our Health, Safety and Wellbeing Principles

As a people first business, our mission is to improve quality of life by promoting that our employees, clients, and wider society are kept both physically and psychologically healthy and safe, through our shared commitment to Health, Safety and Wellbeing, as a core Arcadis value. This reflects our key priority of "Protecting our People" by mitigating risk and preventing harm in everything we do.

Protecting Our People ensures the safeguarding of Arcadians from physical and psychological harm. Through robust health, safety, security, and wellbeing approaches, we identify, control, and manage risks, prevent harm, and create a secure environment where Arcadians can thrive. Protecting Our People ensures the health, safety, security, wellbeing, and happiness of Arcadians whilst delivering sustainable outcomes for our customers.

To achieve our "Protecting Our People" values, Arcadis relies on our Health, Safety and Wellbeing Principles:



TRACK is a basic risk analysis and assessment tool which helps us to: 1) Identify, assess, and control hazards; and 2) maintain safe work behaviors and practices.

Apply TRACK every day when planning tasks and before starting any task and use TRACK again when conditions change



Every employee at Arcadis is empowered and expected to stop what they are doing if they feel that something could happen or if they simply are not sure if it is safe to move forward.

It is your responsibility to stop your own work, the work of other Arcadis staff, or work under Arcadis control, if you believe it to be unsafe.



Be accountable for keeping yourself and others around you safe by acting immediately to prevent harm. If you see something unsafe (or not right), say something!



Undertake Health and Safety Planning.

Prepare and maintain a Health and Safety Plan for all work activities outside of an office environment.



Report all incidents, significant near misses, and unsafe acts and conditions immediately so that they can be investigated, corrected to prevent recurrence, and the lessons learned shared.



Wellbeing is a fundamental element of our health, safety and wellbeing priority, to protect our People by eliminating risk and preventing harm in everything we do.



Harnessing the potential of Arcadians through comprehensive training,, empowering them with invaluable knowledge and transforming experiences, ensuring a workforce ready to champion protection, minimize risk, and safeguard all from harm.



This is the "face" of Health, Safety and Wellbeing and we are all stewards, from the Chief Executive Officer to the newest employee, We must purposely think about how our actions or inaction regarding health and safety impact on others.

General Task Hazard Assessment and Risk Control (HARC)

General:	Site-Wide

The 12 hazard category HARC ratings are not available in this General THA. The mitigated and unmitigated ratings for the hazards presented are based on the Risk Assessment Matrix below. Modify hazards and ratings as necessary to meet project needs.

Risk Assessment Matrix		Likelihood Ratings			
Consequences Ratings		A	B	C	D
People	Property	0 Almost Impossible	1 Possible but Unlikely	2 Likely to Happen	3 Almost Certain to Happen
1-Slight or No Health Effect	Slight or No Damage	0-Low	1-Low	2-Low	3-Low
2-Minor Health Effect	Minor Damage	0-Low	2-Low	4-Medium	6-Medium
3-Major Health Effect	Local Damage	0-Low	3-Low	6-Medium	9-High
4-Fatalities	Major Damage	0-Low	4-Medium	8-High	12-High

Hazard

Driving - On road - Injury or vehicle damage from motor vehicle accident or incident

Suggested FHSHB Ref:	3.4	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	HIGH	Smith System (on line)
Mitigated Risk:	MEDIUM	JSAs
Comments:	Use Smith System "5-Keys" when driving. See Driving JSA for details.	

Hazard

Driving - Driver - Injury, death or property damage due to driver distraction, fatigue, etc.

Suggested FHSHB Ref:	3.4, 3.21	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	HIGH	Smith System (on line)
Mitigated Risk:	LOW	Driver awareness/use of stop work authority
Comments:	Use route planning. Keep eyes moving while driving. See Driving JSA.	

Hazard

Biological - skin/eye irritation or damage from poisonous plants

Suggested FHSHB Ref:	3.17.12	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	See HASP "Tick/Poisonous Plant Hazards" Section
Mitigated Risk:	LOW	Job Briefing/Site Awareness
Comments:	Use skin pre-treatment lotions when available.	

Hazard

Biological - bites or stings from exposure to insects or arachnids

Suggested FHSHB Ref:	3.17: 2,3,5,7,8,9,10,11	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	PPE (see HASP "PPE" section)
Mitigated Risk:	LOW	Job Briefing/Site Awareness
Comments:	Do body check daily. For ticks see also HASP Tick/Poisonous Plant section	

Hazard

Biological - cuts, scrapes, skin/eye puncture from exposure to physically damaging plants

Suggested FHSHB Ref:	3.17.12	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Job Briefing/Site Awareness
Mitigated Risk:	LOW	PPE (see HASP "PPE" section)
Comments:		

General Task HARC (continued)

Hazard		
Environmental - Thermal stress - Injury or illness from heat or cold		
Suggested FHSHB Ref:	3.16	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Field H&S Handbook
Mitigated Risk:	LOW	JSAs
Comments:	Use job rotation or rest breaks. Stay hydrated and eat regularly.	
Hazard		
Environmental - Inclement weather -Injury or equipment damage from inclement weather		
Suggested FHSHB Ref:	3.12	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Weather Monitoring
Mitigated Risk:	LOW	Cont./Emerg. Planning
Comments:	Use 10/30 rule for lightning. See FHSHB section 3.12.2 for details.	
Hazard		
Motion - Musculoskeletal - Injury from lifting, twisting , stooping, or awkward body positions		
Suggested FHSHB Ref:	3.3	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Engineering Controls (specify in comments)
Mitigated Risk:	LOW	Admin. Controls (specify in comments)
Comments:	Use proper lifting techniques. See FHSHB/HASP Stretching Worksheet. Job rotation.	
Hazard		
Motion - Musculoskeletal - Injury from repeated work activity or body motion		
Suggested FHSHB Ref:	3.3	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Field H&S Handbook
Mitigated Risk:	LOW	Admin. Controls (specify in comments)
Comments:	Use job rotation or lifting aids. See FHSHB/HASP Stretching Worksheet.	
Hazard		
Gravity - Falls - Injury due to slips and trips		
Suggested FHSHB Ref:	3.27, 4.12	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Site Awareness
Mitigated Risk:	LOW	Housekeeping
Comments:	Use footwear appropriate for site conditions, plan routes and do not hurry while walking.	

Task Specific HARC

Task 1:	Driving - Motor vehicles								
HARC Unmitigated Hazard Types (H-High, M-Medium, L-Low):							FHSHB Ref:	3.4	
Biological*	-	Chemical	-	Driving*	H	Electrical	-		
Environmental*	-	Gravity*	-	Mechanical	-	Motion*	-		
Personal Safety	L	Pressure	-	Radiation	-	Sound	L		
* *Hazard rating, if present, excludes General THA hazards in this category.*									
Hazard #1									
Mechanical - Pinch point - Injury by pinching of body part in mechanical process									
Suggested FHSHB Ref:	3.28.4			To mitigate this hazard, use TRACK and the following:					
Overall Unmitigated Risk:	MEDIUM			Site Awareness					
Mitigated Risk:	LOW			Field H&S Handbook					
Comments:	Use caution when shutting vehicle doors, tailgates, or hoods.								
Hazard #2									
None									
Suggested FHSHB Ref:	None			To mitigate this hazard, use TRACK and the following:					
Overall Unmitigated Risk:	Not Ranked			Select					
Mitigated Risk:	Not Ranked			Select					
Comments:									

Task 2:	Sampling - Well sampling using diffusive samplers

HARC Unmitigated Hazard Types (H-High, M-Medium, L-Low): FHSHB Ref: 3.9, 3.30

Biological*	L	Chemical	L	Driving*	-	Electrical	-
Environmental*	L	Gravity*	L	Mechanical	-	Motion*	L
Personal Safety	L	Pressure	L	Radiation	-	Sound	L

Hazard #1

Chemical - liquids, skin or eye irritation/damage/allergy

Suggested FHSHB Ref:	3.9, 3.22,3.31	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	PPE (see HASP "PPE" section)
Mitigated Risk:	LOW	HASP
Comments:	Job briefing/site awareness, JSA's, PPE. Don the required PPE to protect from groundwater or sample bottle preservatives.	

Hazard #2

Motion - Cuts and scrapes - Injury from moving object impacting skin or eye

Suggested FHSHB Ref:	2.5, 3.22	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Engineering Controls (specify in comments)
Mitigated Risk:	LOW	Job Briefing/Site Awareness
Comments:	Use caution while using scissors to cut PDBs and zip ties. Inspect sample bottles prior to use and avoid overtightening lids.	

Hazard #3

Motion - Struck by - Bodily injury from impact with moving object

Suggested FHSHB Ref:	2.5, 3.22	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	JSAs
Mitigated Risk:	LOW	Job Briefing/Site Awareness
Comments:	Wear Hi-viz gear; use vehicle as blockade and set up cones around work area in roads and parking lots.	

Hazard #4

None

Suggested FHSHB Ref:	None	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	Not Ranked	Select
Mitigated Risk:	Not Ranked	Select
Comments:		

Task 3:	Sampling - Non-pressurized or passive air sampling using summa canisters, sample canisters, tedlar bags, or passive collection device

HARC Unmitigated Hazard Types (H-High, M-Medium, L-Low): FHSHB Ref: 3.9, 3.30

Biological*	L	Chemical	L	Driving*	-	Electrical	-
Environmental*	-	Gravity*	L	Mechanical	-	Motion*	L
Personal Safety	-	Pressure	-	Radiation	-	Sound	L

Hazard #1

Motion - Struck by - Bodily injury from impact with moving object

Suggested FHSHB Ref:	2.5, 3.22	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Site Awareness
Mitigated Risk:	LOW	Engineering Controls (specify in comments)
Comments:	Be aware of moving fork truck traffic around the site. Use the curved mirrors, and listen for movement before stepping around blind corners.	

Hazard #2

Mechanical - Pinch point - Injury by pinching of body part in mechanical process

Suggested FHSHB Ref:	3.28.4	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Operator Competency per Standard
Mitigated Risk:	LOW	Work Plan
Comments:	Use caution when assembling sample trains.	

Hazard #3

None

Suggested FHSHB Ref:	None	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	Not Ranked	Select
Mitigated Risk:	Not Ranked	Select
Comments:		

Task 4:	Inspections and audits - Buildings

HARC Unmitigated Hazard Types (H-High, M-Medium, L-Low): FHSHB Ref: 3.9

Biological*	L	Chemical	L	Driving*	L	Electrical	L
Environmental*	L	Gravity*	L	Mechanical	M	Motion*	L
Personal Safety	L	Pressure	L	Radiation	L	Sound	L

Hazard #1

Motion - Struck by - Bodily injury from impact with moving object

Suggested FHSHB Ref:	2.5, 3.22	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Site Awareness
Mitigated Risk:	LOW	Engineering Controls (specify in comments)
Comments:	Be aware of moving fork truck traffic around the site. Use the curved mirrors, and listen for movement before stepping around blind corners.	

Hazard #2

Gravity - Struck by - Injury from falling object

Suggested FHSHB Ref:	3.26.2	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	PPE (see HASP "PPE" section)
Mitigated Risk:	LOW	Job Briefing/Site Awareness
Comments:	Be aware of non-competent buildings; look up for potential falling debris (i.e., windows, insulation, pipes)	

Hazard #3

None

Suggested FHSHB Ref:	None	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	Not Ranked	Select
Mitigated Risk:	Not Ranked	Select
Comments:		

Task 5:	Construction - Construction contractor oversight

HARC Unmitigated Hazard Types (H-High, M-Medium, L-Low): FHSHB Ref: 4

Biological*	L	Chemical	L	Driving*	-	Electrical	M
Environmental*	L	Gravity*	M	Mechanical	M	Motion*	M
Personal Safety	-	Pressure	L	Radiation	-	Sound	M

Hazard #1

Electrical - Process failure - Injury or death from improper lockout/tagout

Suggested FHSHB Ref:	3.24	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	HIGH	HASP
Mitigated Risk:	MEDIUM	Lockout/Tagout
Comments:	Communicate with contractors regarding any planned electrical work and turning on/off equipment. Thermal Remediation tasks (contractor should be the only one entering fenced in areas).	

Hazard #2

Gravity - Struck by - Injury from falling object

Suggested FHSHB Ref:	3.26.2	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	H&S Standards
Mitigated Risk:	LOW	PPE (see HASP "PPE" section)
Comments:	Use job briefing to discuss daily tasks and hazards with the contractor. Ensure everyone has/uses job-specific PPE.	

Hazard #3

Motion - Cuts and scrapes - Injury from moving object impacting skin or eye

Suggested FHSHB Ref:	2.5, 3.22	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Engineering Controls (specify in comments)
Mitigated Risk:	LOW	JSAs
Comments:	PPE is necessary to protect workers from job hazards. Use appropriate cutting tools that have auto-retracing blades or blade guards.	

Hazard #4

Motion - Struck by - Bodily injury from impact with moving object

Suggested FHSHB Ref:	2.5, 3.22	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Site Awareness
Mitigated Risk:	LOW	Engineering Controls (specify in comments)
Comments:	Be aware of fork lift and truck traffic around the site. Use the curved mirrors, and listen for movement before stepping around blind corners.	

Hazard #5

None

Suggested FHSHB Ref:	None	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	Not Ranked	Select
Mitigated Risk:	Not Ranked	Select
Comments:		

Task 6:	Drilling - Contractor oversight

HARC Unmitigated Hazard Types (H-High, M-Medium, L-Low): FHSHB Ref: 4.5

Biological*	L	Chemical	L	Driving*	-	Electrical	L
Environmental*	L	Gravity*	M	Mechanical	M	Motion*	M
Personal Safety	-	Pressure	L	Radiation	-	Sound	H

Hazard #1

Motion - Struck by - Bodily injury from impact with moving object

Suggested FHSHB Ref:	2.5, 3.22	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	JSAs
Mitigated Risk:	LOW	Engineering Controls (specify in comments)
Comments:	TRACK. Eye contact/good communication with drillers. Delineate a work zone. Wear appropriate PPE. Set up work area and stand away from heavy equipment.	

Hazard #2

Environmental - Utilities - Injury or property damage from utility strike/damage

Suggested FHSHB Ref:	3.37	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	HIGH	PPE (see HASP "PPE" section)
Mitigated Risk:	MEDIUM	Inspections
Comments:	TRACK. Eye contact/good communication with drillers. Delineate a work zone. Wear appropriate PPE. Utility clearance form.	

Hazard #3

Mechanical - Pinch point - Injury by pinching of body part in mechanical process

Suggested FHSHB Ref:	3.28.4	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	PPE (see HASP "PPE" section)
Mitigated Risk:	LOW	Site Awareness
Comments:	TRACK, PPE, Site awareness, Job briefing. Use the job briefing to make sure all workers are aware of site activities and the use of mechanical equipment. Do not wear loose clothing, jewelry, or hair that can become entangled in equipment.	

Hazard #4

None

Suggested FHSHB Ref:	None	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	Not Ranked	Select
Mitigated Risk:	Not Ranked	Select
Comments:		

Task 7:	Operation and maintenance - Small to large systems

HARC Unmitigated Hazard Types (H-High, M-Medium, L-Low): FHSHB Ref: NA

Biological*	L	Chemical	M	Driving*	-	Electrical	M
Environmental*	L	Gravity*	M	Mechanical	H	Motion*	H
Personal Safety	L	Pressure	M	Radiation	L	Sound	H

Hazard #1

Chemical - solids/particulates, skin or eye irritation/damage/allergy

Suggested FHSHB Ref:	3.9, 3.22,3.31	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	PPE (see HASP "PPE" section)
Mitigated Risk:	LOW	Job Briefing/Site Awareness
Comments:	TRACK, PPE, Job Briefing, site/equipment awareness; Use PPE and TRACK when conducting SSD system OMM.	

Hazard #2

Electrical - Process failure - Injury or death from improper lockout/tagout

Suggested FHSHB Ref:	3.24	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	HIGH	Lockout/Tagout
Mitigated Risk:	MEDIUM	HASP
Comments:	TRACK, PPE, LOTO Training, LOTO permits, site awareness, job briefing. Use the LOTO procedure before conducting SSD system OMM.	

Hazard #3

Gravity - Struck by - Injury from falling object

Suggested FHSHB Ref:	3.26.2	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	H&S Standards
Mitigated Risk:	LOW	Fall Protection Awareness Training
Comments:	TRACK, PPE, Job Briefing, site awareness. Use caution when working on overhead equipment; wear a hard hat if practicable when working on overhead components.	

Hazard #4

Mechanical - Process failure - Injury from lockout/tagout noncompliance

Suggested FHSHB Ref:	3.24	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	HIGH	Lockout/Tagout
Mitigated Risk:	LOW	HASP
Comments:	TRACK, LOTO permits/procedures, PPE, job briefing, site awareness, Use LOTO and discharge all forms of energy before working on the process pipe network.	

Hazard #5

None

Suggested FHSHB Ref:	None	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	Not Ranked	Select
Mitigated Risk:	Not Ranked	Select
Comments:		

Task 8:	Operation and maintenance - Contractor oversight

HARC Unmitigated Hazard Types (H-High, M-Medium, L-Low): FHSHB Ref: 3.9

Biological*	L	Chemical	M	Driving*	-	Electrical	L
Environmental*	L	Gravity*	M	Mechanical	L	Motion*	M
Personal Safety	L	Pressure	M	Radiation	L	Sound	M

Hazard #1

Chemical - solids/particulates, skin or eye irritation/damage/allergy

Suggested FHSHB Ref:	3.9, 3.22,3.31	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	HASP
Mitigated Risk:	LOW	JSAs
Comments:	TRACK, PPE, Job briefing, site/equipment awareness, Use PPE and TRACK when conducting O&M on SSD systems.	

Hazard #2

Electrical - Process failure - Injury or death from improper lockout/tagout

Suggested FHSHB Ref:	3.24	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	HIGH	Lockout/Tagout
Mitigated Risk:	MEDIUM	PPE (see HASP "PPE" section)
Comments:	TRACK, PPE, LOTO permits, site awareness, job briefing, Use the LOTO procedure before conducting any O&M work on the systems.	

Hazard #3

Mechanical - Pinch point - Injury by pinching of body part in mechanical process

Suggested FHSHB Ref:	3.28.4	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Machine Guarding
Mitigated Risk:	LOW	Site Awareness
Comments:	TRACK, PPE, Site awareness, Job briefing. Use the job briefing to make sure all workers are aware of site activities and the use of mechanical equipment. Do not wear loose clothing, jewelry, or hair that can become entangled in equipment.	

Hazard #4

Pressure - Process failure - Injury, death or equipment damage due to improper lockout/tagout

Suggested FHSHB Ref:	3.24	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Lockout/Tagout
Mitigated Risk:	LOW	Engineering Controls (specify in comments)
Comments:	TRACK, LOTO permits/procedures, PPE, job briefing, site awareness, Use LOTO and discharge all forms of energy before working on the process pipe network.	

Hazard #5

None

Suggested FHSHB Ref:	None	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	Not Ranked	Select
Mitigated Risk:	Not Ranked	Select
Comments:		

Task 9:	Sampling - Soil sampling using manual methods

HARC Unmitigated Hazard Types (H-High, M-Medium, L-Low): FHSHB Ref: 3.9, 3.30

Biological*	L	Chemical	L	Driving*	-	Electrical	-
Environmental*	M	Gravity*	M	Mechanical	-	Motion*	M
Personal Safety	L	Pressure	L	Radiation	-	Sound	L

Hazard #1

Chemical - solids/particulates, injury or illness from inhalation

Suggested FHSHB Ref:	3.9, 3.22,3.31	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	PPE (see HASP "PPE" section)
Mitigated Risk:	LOW	Job Briefing/Site Awareness
Comments:	Use PID to monitor breathing zone; cadmium awareness training; STOP work if dust is generated in breathing zone.	

Hazard #2

None

Suggested FHSHB Ref:	None	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	Not Ranked	Select
Mitigated Risk:	Not Ranked	Select
Comments:		

Task 10:	Decontamination - Small or hand-held objects using manual methods

HARC Unmitigated Hazard Types (H-High, M-Medium, L-Low): FHSHB Ref: 3.10.4

Biological*	L	Chemical	M	Driving*	-	Electrical	-
Environmental*	L	Gravity*	L	Mechanical	-	Motion*	L
Personal Safety	L	Pressure	L	Radiation	-	Sound	L

Hazard #1

Chemical - liquids - injury or illness from vapor inhalation

Suggested FHSHB Ref:	3.9, 3.22,3.31	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	JSAs
Mitigated Risk:	LOW	PPE (see HASP "PPE" section)
Comments:	TRACK, Wear appropriate PPE (nitrile gloves, safety glasses); use special spray nozzle to prevent "misting" or nitric acid solution. Work upwind of decontamination area.	

Hazard #2

Chemical- liquids - injury or illness from skin absorption

Suggested FHSHB Ref:	3.9, 3.22,3.31	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	JSAs
Mitigated Risk:	LOW	PPE (see HASP "PPE" section)
Comments:	TRACK. Wear nitrile gloves and long sleeve clothing. Check nitric acid solution spray bottle for leaks and competency.	

Hazard #3

None

Suggested FHSHB Ref:	None	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	Not Ranked	Select
Mitigated Risk:	Not Ranked	Select
Comments:		

Task 11:	Sampling - Soil sampling using direct push technology

HARC Unmitigated Hazard Types (H-High, M-Medium, L-Low): FHSHB Ref: 3.9, 3.30

Biological*	L	Chemical	L	Driving*	-	Electrical	M
Environmental*	L	Gravity*	M	Mechanical	M	Motion*	M
Personal Safety	L	Pressure	L	Radiation	-	Sound	H

Hazard #1

Environmental - Utilities - Injury or property damage from utility strike/damage

Suggested FHSHB Ref:	3.37	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	HIGH	H&S Standards
Mitigated Risk:	MEDIUM	Specialized Equipment (specify in comments)
Comments:	Perform utility checklist, one call, and geophysical investigation.	

Hazard #2

Mechanical - Pinch point - Injury by pinching of body part in mechanical process

Suggested FHSHB Ref:	3.28.4	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Machine Guarding
Mitigated Risk:	LOW	Site Awareness
Comments:	TRACK. Proper training; use proper PPE (gloves); test E-stop switches on rig; do not touch rotating parts. Do not wear loose clothing, jewelry, or hair that can become entangled in equipment.	

Hazard #3

Pressure - Hydraulic - Injury from hydraulic process or device failure

Suggested FHSHB Ref:	2.5, 4.5, 4.6	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	H&S Standards
Mitigated Risk:	LOW	Engineering Controls (specify in comments)
Comments:	TRACK. Perform equipment checks; wear appropriate PPE. Have a spill kit available.	

Hazard #4

Chemical- liquids - injury or illness from skin absorption

Suggested FHSHB Ref:	3.9, 3.22,3.31	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	HASP
Mitigated Risk:	LOW	PPE (see HASP "PPE" section)
Comments:	TRACK; Training; wear nitrile gloves and safety glasses; practice good house keeping in sample processing area. Keep process areas covered in plastic sheeting.	

Hazard #5

Radiation - Non-ionizing - Injury or illness due to exposure to non-ionizing radiation including sun exposure

Suggested FHSHB Ref:	2.5, 3.22	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	As Low As Reasonably Achievable (ALARA)
Mitigated Risk:	LOW	See HASP "Monitoring" section
Comments:	TRACK; wear eye protection and use appropriate equipment guards when performing UV and LIF tests on soil samples.	

Hazard #6

None

Suggested FHSHB Ref:	None	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	Not Ranked	Select
Mitigated Risk:	Not Ranked	Select
Comments:		

Task 12:	Survey - Geophysical

HARC Unmitigated Hazard Types (H-High, M-Medium, L-Low): FHSHB Ref: 3.9, 3.30

Biological*	M	Chemical	-	Driving*	-	Electrical	L
Environmental*	M	Gravity*	L	Mechanical	-	Motion*	M
Personal Safety	L	Pressure	-	Radiation	-	Sound	L

Hazard #1

Gravity - Struck by - Injury from falling object

Suggested FHSHB Ref:	3.26.2	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Job Briefing/Site Awareness
Mitigated Risk:	LOW	PPE (see HASP "PPE" section)
Comments:	TRACK. Proper training; use proper PPE (gloves) when unloading and loading equipment.	

Hazard #2

None

Suggested FHSHB Ref:	None	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	Not Ranked	Select
Mitigated Risk:	Not Ranked	Select
Comments:		

Task 13:	Confined Space

HARC Unmitigated Hazard Types (H-High, M-Medium, L-Low): FHSHB Ref: NA

Biological*	-	Chemical	M	Driving*	-	Electrical	-
Environmental*	-	Gravity*	-	Mechanical	-	Motion*	-
Personal Safety	-	Pressure	-	Radiation	-	Sound	M

Hazard #1

Chemical - gasses - injury due to inhalation, asphyxiation, skin/eye contact

Suggested FHSHB Ref:	3.9, 3.22, 3.31, 3.33	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	See HASP "Monitoring" section
Mitigated Risk:	LOW	Respiratory Protection Training
Comments:	Monitor breathing zone in confined space with 5-gas meter. Use attendee/attedent for entry.	

Hazard #2

Gravity - Falls - Injury due to falls from height

Suggested FHSHB Ref:	3.26, 3.35	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	HIGH	Fall Protection Awareness Training
Mitigated Risk:	LOW	Job Briefing/Site Awareness
Comments:	Establish access/egress procedures. Utilize fall protection as needed.	

Hazard #3

None

Suggested FHSHB Ref:	None	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	Not Ranked	HASP
Mitigated Risk:	Not Ranked	JSAs
Comments:		

Task 14:	Excavation - Contractor oversight

HARC Unmitigated Hazard Types (H-High, M-Medium, L-Low): FHSHB Ref: 4.4

Biological*	L	Chemical	L	Driving*	-	Electrical	M
Environmental*	L	Gravity*	L	Mechanical	M	Motion*	M
Personal Safety	-	Pressure	L	Radiation	-	Sound	M

Hazard #1

Mechanical - Crushing - Injury by crushing body part in mechanical process

Suggested FHSHB Ref:	3.28.4	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Site Awareness
Mitigated Risk:	LOW	Field H&S Handbook
Comments:	Make eye contact with operator, establish hand signals, keep distance from active operations.	

Hazard #2

Sound - Noise - Injury or illness due to noise exposure

Suggested FHSHB Ref:	3.15	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	PPE (see HASP "PPE" section)
Mitigated Risk:	LOW	H&S Standards
Comments:	Wear ear plugs when near active machinery.	

Hazard #3

Gravity - Falls - Injury due to falls from height

Suggested FHSHB Ref:	3.26, 3.35	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	HIGH	H&S Standards
Mitigated Risk:	LOW	Job Briefing/Site Awareness
Comments:	Keep away from excavation edges.	

Hazard #4

Motion - Struck by - Bodily injury from impact with moving object

Suggested FHSHB Ref:	2.5, 3.22	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Site Awareness
Mitigated Risk:	LOW	JSAs
Comments:	Be aware of the swing radius of the excavator and keep outside swing radius while in operation.	

Hazard #5

None

Suggested FHSHB Ref:	None	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	Not Ranked	Select
Mitigated Risk:	Not Ranked	Select
Comments:		

Task 15:	Utilities - Clearance

HARC Unmitigated Hazard Types (H-High, M-Medium, L-Low): FHSHB Ref: 3.37

Biological*	L	Chemical	L	Driving*	-	Electrical	M
Environmental*	L	Gravity*	L	Mechanical	M	Motion*	M
Personal Safety	L	Pressure	L	Radiation	-	Sound	L

Hazard #1

Motion - Cuts and scrapes - Injury from moving object impacting skin or eye

Suggested FHSHB Ref:	2.5, 3.22	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	Medium	PPE (see HASP "PPE" section)
Mitigated Risk:	Low	Job Briefing/Site Awareness
Comments:	Wear gloves and eye protection when removing monhole covers. Use proper tools.	

Hazard #2

Electrical - Process failure - Injury or death from improper lockout/tagout

Suggested FHSHB Ref:	3.24	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	HIGH	Lockout/Tagout
Mitigated Risk:	MEDIUM	PPE (see HASP "PPE" section)
Comments:	When working near active utilities, use TRACK and make sure contractor uses the proper Lockout/Tagout procedures.	

Hazard #3

None

Suggested FHSHB Ref:	None	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	Not Ranked	Select
Mitigated Risk:	Not Ranked	Select
Comments:		

Task 16:	Electrical - Contractor Oversight

HARC Unmitigated Hazard Types (H-High, M-Medium, L-Low): FHSHB Ref: NA

Biological*	L	Chemical	L	Driving*	L	Electrical	H
Environmental*	L	Gravity*	L	Mechanical	M	Motion*	L
Personal Safety	L	Pressure	L	Radiation	L	Sound	L

Hazard #1

Electrical - Electrocution or arc flash - Injury or death from electrocution or arc flash from electrical

Suggested FHSHB Ref:	3.25	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	High	Lockout/Tagout
Mitigated Risk:	Medium	PPE (see HASP "PPE" section)
Comments:	Contractor to ensure all electrical components are deenergized and locked out before work begins.	

Hazard #2

Electrical - Process failure - Injury or death from improper lockout/tagout

Suggested FHSHB Ref:	3.24	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	HIGH	Lockout/Tagout
Mitigated Risk:	MEDIUM	Cont./Emerg. Planning
Comments:	Conctractor to follow their LO/TO plan supplemented by Arcadis LO/TO plan.	

Hazard #3

Electrical - Housekeeping - Injury or property damage due to frayed wiring, improperly mounted wiring, missing

Suggested FHSHB Ref:	3.25	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Housekeeping
Mitigated Risk:	LOW	Electrical (NFPA 70E) Training
Comments:	Be aware of lockout/tagout procedures and ensure implementation before starting work.	

Hazard Communication (HAZCOM)/Global Harmonization System (GHS)

[ ] HAZCOM/GHS for this project is managed by the client or contractor
[ ] Project will utilize <=3 Chemical(s)/Product(s) subject to HAZCOM/GHS

List the chemicals anticipated to be used by Arcadis on this project per HAZCOM/GHS requirements.
(Modify quantities as needed)

	Preservatives	Qty
[ ]	Not applicable	
[X]	Hydrochloric acid	<500 ml
[ ]	Nitric acid	<500 ml
[ ]	Sulfuric acid	<500 ml
[ ]	Sodium hydroxide	<500 ml
[ ]	Zinc acetate	<500 ml
[ ]	Ascorbic acid	<500 ml
[ ]	Acetic acid	<500 ml
[ ]	Isopropyl alcohol	< 4 gal.
[ ]	Formalin (<10%)	< 4 gal.
[ ]	Methanol	<500 ml
[ ]	Sodium bisulfate	<500 ml

	Decontamination	Qty
[ ]	Not applicable	
[X]	Alconox	≤ 5 lbs
[X]	Liquinox	≤ 1 gal
[ ]	Acetone	≤ 1 gal
[ ]	Methanol	≤ 1 gal
[ ]	Hexane	≤ 1 gal
[ ]	Isopropyl alcohol	≤ 4 gal
[X]	Nitric acid	≤ 1 L
[ ]	Other:	

	Calibration	Qty.
[ ]	Not applicable	
[X]	Isobutylene/air	1 cyl
[ ]	Methane/air	1 cyl
[ ]	Pentane/air	1 cyl
[ ]	Hydrogen/air	1 cyl
[ ]	Propane/air	1 cyl
[X]	Hydrogen sulfide/air	1 cyl
[X]	Carbon monoxide/air	1 cyl
[X]	pH standards (4,7,10)	≤ 1 gal
[X]	Conductivity standards	≤ 1 gal
[X]	Other:	
	ORP	

	Fuels	Qty.
[ ]	Not applicable	
[X]	Gasoline	≤ 5 gal
[X]	Diesel	≤ 5 gal
[ ]	Kerosene	≤ 5 gal
[ ]	Propane	1 cyl
[ ]	Other:	

	Kits	Qty.
[X]	Not applicable	
[ ]	Hach (specify):	1 kit
[ ]	DTECH (specify):	1 kit
[ ]	Other:	1 kit

	Remediation	Qty.
[X]	Not applicable	
[ ]		
[ ]		
[ ]		
[ ]		
[ ]		

	Other:	Qty.
[ ]	Not applicable	
[X]	Spray paint	≤ 6 cans
[X]	WD-40	≤ 1 can
[X]	Pipe cement	≤ 1 can
[X]	Pipe primer	≤ 1 can
[X]	Mineral spirits	≤ 1 gal
	Sikaflex concrete sealant	

	DOT(1):	Qty.
[ ]	MOT eligible soils	
[ ]	MOT eligible water	
[ ]	MOT eligible solids	
[ ]	MOT eligible liquids	
[ ]		
[ ]		
[ ]		

(1) Attach applicable Materials of Trade (MOT) Quick Form to shipping determination or this HASP. SDS not generally applicable to this category.

SDSs for this project will be available in printed form in the company vehicle. All project workers will be notified of the SDS location in their initial safety briefing.

Air Monitoring

	There are no atmospheric chemical, radiological, or particulate hazards on this project requiring air monitoring.
	Air monitoring is the responsibility of the client or subcontractor.
X	Air monitoring is required for the following tasks:

- Drilling - Contractor oversight
- Excavation - Contractor oversight
- Confined Space
- Operation and maintenance - Small to large systems

Constituents of Interest:

Time Weighted Averages (TWAs) are ACGIH 8 Hr Threshold Limit Values (TLVs) unless noted.

TCE			
TWA	10 ppm	LEL/UEL (%):	8/10.5
STEL	25 ppm	RGD (Air = 1):	NA
IDLH	1000 ppm, NIOSH	VP (mmHg):	58
Tetrachloroethylene			
TWA	25 ppm	LEL/UEL (%):	NA/NA
STEL	100 ppm	RGD (Air = 1):	NA
IDLH	150 ppm, NIOSH	VP (mmHg):	14
Xylenes			
TWA	20 ppm	LEL/UEL (%):	1.1/7.0
STEL	150 ppm, NIOSH	RGD (Air = 1):	NA
IDLH	900 ppm, NIOSH	VP (mmHg):	9
Toluene			
TWA	20 ppm	LEL/UEL (%):	1.1/7.1
STEL	150 ppm, NIOSH	RGD (Air = 1):	NA
IDLH	500 ppm, NIOSH	VP (mmHg):	21
None			
TWA	NA	LEL/UEL (%):	NA
STEL	NA	RGD (Air = 1):	NA
IDLH	NA	VP (mmHg):	NA

TWA - Time Weighted Average (ACGIH TLV unless noted)
STEL - Short Term Exposure Limit
IDLH - Immediately Dangerous to Life and Health

LEL/UEL - Lower/Upper Explosive Limit
RGD - Relative Gas Density
VP (mmHg) - Vapor Pressure (millimeters mercury)

Notes:
Atmospheric (5-gas meter or similar) monitoring required during confined space work or assessing potential vapor intrusion.

Required Monitoring Instruments, Action Levels and Monitoring Frequency

Photoionization Detector — Select Lamp: 10.6 eV

Action levels are in PID units (1):			Computed action levels have been manually adjusted.
<	16.2		Continue working
	16.2 - 32.4		Levels sustained > 5 minutes, monitor continuously and review engineering controls and PPE. Proceed with caution.
>	32.4		Stop work and contact SSO

(1) Computed action levels are for PIDs which have not been programmed to correct TLVs for specific constituents or mixtures.

Particulate/aerosol monitoring is not required. Re-evaluate if visible dusts or aerosols cannot be controlled.

Standard 4 Gas Monitoring (LEL,O2,H2S,CO) with a multigas meter is required

LEL/O2 Meter Monitoring Required	0-5% LEL	Continue work
	>5-10% LEL	Continually monitor, review engineering controls, proceed with caution
	>10% LEL	Stop work, evacuate, contact SSO
	19.5%-23.5% O2	Normal, continue work
	<19.5% O2	O2 deficient, stop work, evacuate, contact SSO
	>23.5% O2	O2 enriched, stop work, evacuate, contact SSO

Checked gases require monitoring:

		1/2 TLV	Stop Work Action Level
	Ammonia	12.5 ppm	25 ppm
	Carbon dioxide	2500 ppm	5000 ppm
X	Carbon monoxide	12.5 ppm	25 ppm
	Chlorine	0.05 ppm	0.1 ppm
	Hydrogen cyanide	2.35 ppm (skin)	4.7 ppm* (skin)
X	Hydrogen sulfide	0.5 ppm	1 ppm
	Methane	Simple Asphyxiant	
	Nitrogen dioxide	0.1 ppm	0.2 ppm
	Phosphine	0.025 ppm	0.05 ppm
	Sulfur dioxide	0.125 ppm	0.25* ppm
	Mercury vapor	0.0125 mg/m3	0.025 mg/m3

Comments

Use a multigas meter equipped with a sensor(s) capable of detecting checked gases identified to the right. Review engineering controls and perform continuous monitoring with data logging at concentrations >1/2 TLV. Stop work action levels are based on Level D protection.

* Ceiling or STEL value

All air-monitoring instruments must be calibration checked daily, if used, per manufacturer's instructions. Calibration checks, including calibration gases used, must be documented.

Compound specific monitoring using indicator tubes, chips, or electrochemical sensors is not required.

Air Monitoring Acronyms and Definitions

Arcadis Acronym	*Meaning*	*Definition*
	Action Levels	
A	Arcadis Specific TWA	An Arcadis administrative TWA.
c	Ceiling (TLV-C)	The concentration that shall not be exceeded during any part of the working exposure.
i	Inhalable	Particles that enter the respiratory system via the nose or mouth.
IDLH	Immediately Dangerous to Life and Health	The exposure concentration which is likely to cause significant injury/illness or death.
PEL	Permissible Exposure Limit (OSHA)	OSHA exposure limit and is legally enforceable in the United States.
r	Respirable	The portion of inhalable particles that enter the deepest part of the lung, the nonciliated alveoli.
REL	Recommended Exposure Limit (NIOSH)	The NIOSH TWA for an exposure up to a 10-hour workday during a 40-hour work week.
s	Skin	Potential for dermal absorption
se	Sensitizer	Potential for dermal or respirable sensitization resulting from the interaction of an absorbed agent.
STEL	Short Term Exposure Limit (TLV-STEL)	Usually a 15-minute TWA exposure that should not be exceeded at any time during the workday, even if the 8-hour TWA is within the TLV,PEL, or REL TWAs.
TLV	Threshold Limit Value (ACGIH)	The ACGIH TWA for an exposure up to a 8-hour workday during a 40-hour work week.
TWA	Time Weighted Average (TLV-TWA)	Time-weighted average exposure concentration for a conventional 8-hour (TLV,PEL) or up to 10-hour (REL) workday and a 40-hour week.
	Chemical and Physical Properties	
IP	Ionization Potential	Ionization potential, eV (electron volts) [Ionization potentials are given as a guideline for the selection of photoionization detector lamps used in some direct-reading instruments.]
LEL	Lower Explosive Limit	The minimum concentration of a vapor in air below which propagation of a flame will not occur in the presence of an ignition source.
UEL	Upper Explosive Limit	The maximum concentration of a vapor in air below which propagation of a flame will not occur in the presence of an ignition source.
RGD	Relative Gas Density	Weight of a vapor or gas compared to an equal volume of air (air = 1). If greater than 1.0, the vapor or gas is heavier than air and will concentrate in the low places. If less than 1.0, the vapor or gas will rise.

Units		
eV	Electron volt	A unit of energy equal to the energy acquired by an electron falling through a potential difference of one volt.
m	mg/m3	Milligrams per cubic meter
p	ppm	Parts per million
Organizations/Agencies		
ACGIH	American Conference of Governmental Industrial Hygienists	
NIOSH	National Institute for Occupational Safety and Health	
OSHA	Occupational Safety and Health Administration	

Tick and Poisonous Plant Hazards

For all projects with outdoor work, biological hazards must be addressed in the tailgate safety meeting each day. The following controls must be used to mitigate biological hazards while working and must also be discussed in the tailgate safety meeting.

Controlling Tick Hazards

Risk Guide for Ticks:

Low	Paved areas; parking lots; well manicured lawns and fields; no work taking place within 15 feet of vegetated areas; work in REGIONS with no tick populations; sub-freezing temperatures, snow or ice cover on ground.*
Medium	Brush hogged fields, wetlands, and grasslands; forested areas with little undergrowth; weeds less than knee height; moderately dense foliage; sporadic or moderately vegetated shaded areas; average leaf accumulation and decaying material on the ground; work taking place in fields after application of insecticide; work in REGIONS with a recognized moderate tick populations; outdoor work during spring, summer and fall months.*
High	Uncut fields, wetlands, forested areas, and grasslands; weeds taller than knee height; heavy dense foliage; heavily vegetated shaded areas; excessive accumulations of leaves and decaying material on the ground; work in REGIONS with recognized heavy tick populations; areas with posted tick hazard warnings; outdoor work during spring, summer and fall months.*

*Cold weather does not eliminate risk of exposure to deer ticks as they may be active all year in areas that experience subfreezing temperatures.

Ticks are ranked as a **Medium** risk for this project

Care should be taken to avoid walking through or working in tall grasses, overgrown or bushy vegetation to the extent reasonable and practical. No single control is effective against ticks.

Select required controls below:

Engineering Controls

- [ ] Mowing of work area
- [ ] Clearing overgrown vegetation
- [ ] Pesticide application
- [ ] Other: _____

Administrative Controls

- [X] Complete tick check morning/evening
- [ ] Scheduled tick check: _____
- [X] Inspect backpacks, equipment cases, etc. daily
- [X] Vehicle cab - maintain good housekeeping
- [ ] Other: _____

Personal Protective Equipment

- [ ] Light colored clothing
- [ ] Light colored hat/hardhat
- [X] Pants tucked in boots
- [ ] Shirt tucked into pants
- [ ] Long sleeved shirt and long pants
- [ ] White Tyvek pants
- [ ] White coveralls/Tyvek
- [ ] White Tyvek Pants
- [ ] Taped cuffs/pant legs
- [ ] Tick gators
- [ ] Double sided tape/duct tape sticky side out
- [ ] Insect mesh/netting for face/head or whole body suit
- [ ] Other: _____

Repellents

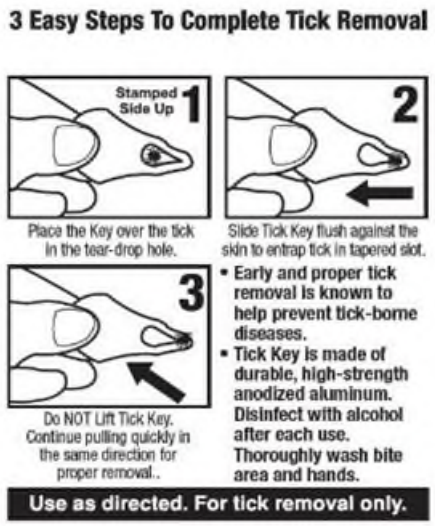
- [ ] Repellents will not be used
- [ ] Permethrin impregnated clothing (purchased)
- [X] Permethrin (0.5% self applied/treated to clothing)
- [ ] Deet 20-40% applied to skin
- [ ] Other: _____

Permethrin must be applied to clothing within the past 6 weeks or within 6 garment washings. Do not apply permethrin directly to skin. Follow manufacturer's application instructions.

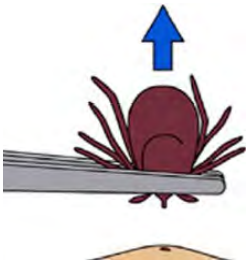
Tick Removal and First Aid

Ticks removed within 24 hours of embedment represent a very low risk for adverse outcomes. Perform tick checks as directed above. To properly remove a tick:

Using a Tick Removal Tool



Using Tweezers



1) Use point tip tweezers, if available, to reduce potential of crushing the ticks body
2) Grasp the tick as close to skin as possible
3) Pull upward with even pressure.

Do not crush tick with fingers

After removal, wash affected area with alcohol or iodine. Wash hands thoroughly after removal.
Document date/time of the removal in field notes, field form or H&S app.
If rash or fever develops, call WorkCare

Poisonous Plants (Poison Ivy, Poison Oak, Poison Sumac)

All work outdoors, regardless of time of year, must address poisonous plant hazards and controls in the tailgate safety meeting.

Controlling Exposure to Poisonous Plants

Poisonous Plants are ranked as a **Medium** risk on this project

Select required controls below:

Engineering Controls

- [X] Not applicable
- [ ] Mowing of work area
- [ ] Clearing overgrown vegetation
- [ ] Herbicide application
- [ ] Other: _____

Administrative Controls

- [X] Identify and avoid (see ID Quick Guide below)
- [X] Watch for signs or symptoms of exposure
- [X] Vehicle cab - maintain good housekeeping
- [ ] Other: _____

Personal Protective Equipment

- [X] Gloves
- [ ] Hat/hardhat/head covering
- [X] Pants tucked in boots
- [ ] Shirt tucked into pants
- [ ] Long sleeved shirt and long pants
- [ ] White coveralls/Tyvek
- [ ] White Tyvek Pants
- [ ] Taped cuffs/pant legs
- [ ] Dust mask (during burning activities, etc.)
- [ ] Other: _____

Repellents

- [ ] Repellents will not be used
- [ ] Barrier creams
- [ ] Other: _____

Skin Decontamination

- [ ] Wash with post-exposure soap and water
- [X] Wash with soap and water (use hot water if available)
- [ ] Hot shower at end of day
- [ ] Other: _____

Equipment Decontamination

Due to the medium risk associated with poisonous plants on this project, portable equipment and tools have a potential to be contaminated with urushiol (the oil that causes allergic reactions and dermatitis in poisonous plants covered by this plan). Decontaminate by using post-exposure soap and water or alcohol spray if safe to do so for the equipment/tool being cleaned. Larger equipment should be decontaminated prior to performing maintenance by pressure washing or spraying with alcohol spray in area of maintenance (i.e. tires, etc.).

Clothing Decontamination

Wash work clothing in hot water separate from other clothing. Since the project has a medium risk for poisonous plants, work boots should be considered contaminated with urushiol. Decontaminate with post-exposure soap and water or hot soap and water. If safe for the boot, consider spraying with alcohol spray if post-exposure soap is not available. Place disposable outer clothing (coveralls, Tyvek, etc.) and disposable gloves in plastic bag for disposal. Wear gloves while removing disposable outer clothing.

First Aid

If skin irritation or other signs of allergic reaction develops contact WorkCare for assistance. Document date and time of exposure, if known, in field notes, field form or H&S app.

Identification Quick Guide

Ticks:

American Dog Tick 

Blacklegged (Deer) Tick 

Brown Dog Tick 

Groundhog Tick 

Gulf Coast Tick 

Lone Star Tick 

Rocky Mountain Wood Tick 

Soft Tick 

Poison Ivy:





Poison Oak:





Poison Sumac:



For other biological hazards, address the hazards and controls in the JSA for the work task.

Personal Protective Equipment (PPE)

See JSA or Permit for the task being performed for required PPE. If work is not conducted under a JSA or Permit, refer to the governing document for PPE requirements. At a minimum, the following checked PPE is required for all tasks during field work (outside of field office trailers and vehicles) not covered by a JSA or Permit on this project:

Minimum PPE required to be worn by all staff on project:

						Specify Type:
X	Hard hat		Snake chaps/guards		Coveralls:	
X	Safety glasses		Briar chaps		Apron:	
	Safety goggles		Chainsaw chaps	X	Chem. resistant gloves:	Nitrile Gloves
	Face shield		Sturdy boot		Gloves other:	
	Hearing protection	X	Steel or comp. toe boot		Chemical boot:	
	Rain suit		Metatarsal boot		Boot other:	
	Other:			X	Traffic vest, shirt or coat:	Class II
					Life vest:	

Task specific PPE: Electrical/Arc flash PPE selected based on Electrical Standard during electrical work. Hearing protection is required when working in or around the SSD Systems.

Comments:

See Tick and Poisonous Plant Hazards section for addtional PPE information.

Hard hat only required during conctrator oversight or when entering potentially delapitated structures.

Medical Surveillance

All Arcadis employees performing field work will be required to be current in HAZWOPER medical surveillance.

Client and DOT drug and/or alcohol testing will be required for all project workers for client mandated testing and selected project workers for DOT testing. The project manager, or their designate, will coordinate drug and alcohol testing activities with Arcadis HR to ensure testing performed is consistent with regulatory expectations.

Hazardous Materials Shipping and Transportation

A shipping determination package has been prepared, reviewed and provided to Arcadis field staff for this project.

Traffic Safety and Traffic Safety Plans (TSPs)

All or portions of the project work will be conducted in a parking lot and/or private roadway. A Non-ROW TSP addressing this work is attached to this HASP.

Arcadis Commercial Motor Vehicles (CMVs)

CMVs operated by Arcadis employees on public roadways will not be utilized on this project. Arcadis defines a CMV as any single vehicle with a gross vehicle weight rating (GVWR) ≥10,001 pounds or a truck and trailer combination with a combined GVWR ≥10,001 pounds (GVWR of truck + GVWR of trailer = ≥10,001 pounds).

Site Control

Site control requirements are addressed in the applicable task JSA for this project. JSAs requiring site control are attached to this HASP.

Decontamination

Decontamination protocols are addressed in the applicable task JSA(s) for this project. The applicable JSAs are attached to this HASP.

Sanitation

Restroom facilities on site provided by client or other contractor.

Safety Briefings

Enter desired text in this field.

Employee Health and Safety Engagement

The CPM or APM is responsible for reviewing and establishing H&S engagement goals for the project. These goals are summarized below.

Hazard Observations (via H&S App or TIP) required at the following frequency on this project:

Tip is required once a week

Close Call reporting (via H&S app) goals for this project:

H&S Field Assessment required once a month

Other (specify):

Safety Equipment and Supplies

Safety equipment/supply requirements are addressed in the JSA or Permit for the task being performed. If work is not performed under a JSA or Permit, the following safety equipment is required to be present on site in good condition unless otherwise noted (Check all that apply):

X	First aid kit	X	Insect repellent: Per biological controls
	Bloodborne pathogens kit	X	Sunscreen
X	Fire extinguisher		Air horn
	Eyewash (ANSI compliant)	X	Traffic cones
X	Eyewash (bottle)		2-way radios
X	Drinking water		Heat stress monitor
X	Other: mobile phone	X	See Tick and Poisonous Plant Hazards section for addtional equipment/supply information.

International Travel

International travel is not required for this project.

Spill Control and Containment

Spill Control and containment protocol requirements for O&M are the responsbility of Arcadis. The rest of the spill control and containment protocols and requirements fall s under the responsibility of the Contractor.

Use of Electronic Devices in Areas of Increased Safety Risk

Use of electronic devices (tablets, laptops, and/or cell phones) to collect data or document work is not anticipated on this project. If electronic devices are used, distraction hazards and use must be addressed and documented in the job briefing/safety briefing.

Signatures

I have read, understand and agree to abide by the requirements presented in this health and safety plan. I understand that I have the absolute right to stop work if I recognize an unsafe condition affecting my work until corrected.

Printed Name	Signature	Date

Add additional sheets if necessary

You have an absolute right to STOP WORK if unsafe conditions exist!

September 5, 2025

To whom it may concern:

Arcadis and its affiliates (“Arcadis”) is a firm with experienced professionals and staff who support projects, activities, infrastructure and businesses essential to maintaining the public's health, safety and welfare.

Arcadis has been authorized by GTE OSI to complete the following activities:

Arcadis personnel will be identifiable by:

- ☐ Branded hard hat and/or safety vest
- ☐ Branded vehicle
- ☐ Business card or ID badge
- ☐ Other: _____

If you have any questions related to the work being completed or Arcadis’ presence at this location, please contact the following:

Mark Flusche	Arcadis Project Manager	at	518-859-3579
Matt Walsh	GTE OSI	at	O: 908-559-3691

Attachment A
Forms

Air Monitoring Documentation Form

PID Model: _____ Monitor Frequency: _____

LEL/O_2 Model: _____

CIT Model: _____

Dust Mon. Model: _____

Air Monitoring Results

Date	Time	PID (units)	O_2 (%)	LEL (% LEL)	CIT (ppm)	Dusts (mg/m^3)	Location

CIT = Colorimetric Indicator Tube
LEL = Lower Explosive Limit
mg/m3 = Milligram per cubic meter
O2 = Oxygen
ppm = Part per million
% = Percent
PID = Photoionization Detector

Control Number: TSM- 30245593

TSM + project number plus date as follows: xxxxxxxx.xxxx.xxxxx - dd/mm/year

ARCADIS

TAILGATE HEALTH & SAFETY MEETING FORM

Project Name:			**Project Location:**
Date:	**Time:**	**Conducted by:**	**Signature/Title:**

Issues or concerns from previous day's activities:

Task anticipated to be performed today:

☐ Additional permits/checklists attached

USE TRACK! Evaluate the hazards (h) for the tasks being performed today and rank as Low (L), Medium (M) or High (H). Use relevant JSAs, FHSHB, permit or other work standard to communicate controls (c) to be used to eliminate or mitigate identified hazards.

☐ Gravity (i.e., ladder, trips) (L M H) h: c:	☐ Motion (i.e., traffic, machinery) (L M H) h: c:	☐ Mechanical (i.e., augers, motors) (L M H) h: c:
☐ Electrical (i.e., utilities) (L M H) h: c:	☐ Pressure (i.e., gas cyl., wells) (L M H) h: c:	☐ Environment (i.e., heat, cold) (L M H) h: c:
☐ Chemical (i.e., fuel, acid, paint) (L M H) h: c:	☐ Biological (i.e., ticks, poison ivy) (L M H) h: c:	☐ Radiation (i.e., alpha, sun, laser) (L M H) h: c:
☐ Sound (i.e., machinery) (L M H) h: c:	☐ Personal (i.e. alone, night) (L M H) h: c:	☐ Driving (i.e. car, ATV, boat) (L M H) h: c:

☐ Refer to the attached Hazard Analysis Sheet(s) or JSA

Comments:

Signature and Certification: I have read and understand the project specific HASP for this project.

SSE Employee*

Non-Life Threatening Injury or Illness
Call WorkCare 1-888-449-7787

Printed Name/Signature/Company	Sign In Time	Sign Out Time

***Short Service Employee (SSE) working for Arcadis <1 year.**

I will STOP the job any time anyone is concerned or uncertain about health & safety or if anyone identifies a hazard or additional mitigation not recorded in the site, project, job or task hazard assessment.

I will be alert to any changes in personnel, conditions at the work site or hazards not covered by the original hazard assessments.

If it is necessary to **STOP THE JOB,** I will perform **TRACK**; and then amend the hazard assessments or the HASP as needed.

I will not assist a subcontractor or other party with their work unless it is absolutely necessary and then only after I have done TRACK and I have thoroughly controlled the hazard.

All site staff should arrive fit for work. If not, they should report to the supervisor any restrictions or concerns.

In the event of an injury, employees will call **WorkCare at 1.888.449-7787** and then notify the field supervisor.

Utility strike, motor vehicle accident or 3rd party property damage - field supervisor will immediately notify the Project or Task Manager

Arcadis Weekly Vehicle Inspection Form (Revised 9/28/2022)

Vehicle # / License Plate # | **Lease Plan # / Last 6 of Vin #**

Inspection Date												
Odometer reading												
Driver / Inspector Name												
Check the appropriate box and enter repair date for identified repairs:	OK	Needs Repair	Repair Date	OK	Needs Repair	Repair Date	OK	Needs Repair	Repair Date	OK	Needs Repair	Repair Date
Interior												
Horn operational												
Door Locks operational												
Seat Belts in good repair												
Seats and Seating Controls												
Steering Wheel - No Excessive Play												
Interior Lights and Light Controls												
Instrument Panel/Gauges												
Wiper Controls operational												
Heat/Defrost/Air Conditioning working												
Rear View Mirror present												
Backup Camera/Sensors working												
Jack and Lug Wrench present												
Exterior[1]												
Lights and Signals operational												
ires properly inflated/good tread depth												
Spare Tire properly inflated												
Doors operational												
Windows Not Cracked/Damaged												
Side View Mirrors												
Body Panels and Bumpers												
Engine & Brakes												
Engine Start & Running Smoothly												
Fluid Levels, No Noticeable Leaks												
Belts tight, no cracks												
Brakes operational, no squeaking												
Emergency Equipment[2]												
First Aid Kit, inspected weekly												
Fire Extinguisher properly secured												
Fire Extinguisher inspected weekly												
range/Yellow emergency warning light												
Roadside Assistance Information												
Recommend spotter cones available												
Cargo												
Cargo Secure and Properly Distributed												
Securing Devices in Good Condition												
Registration												
License Plate /Tags												
Registration and Insurance												
City/State Inspection Decal												
Lease Plan information/Fuel Card												

[1] **Note all damages to the vehicle on the back of this page**

[2] **Emergency Equipment required per Motor Vehicle Standard ARC HSGE024**

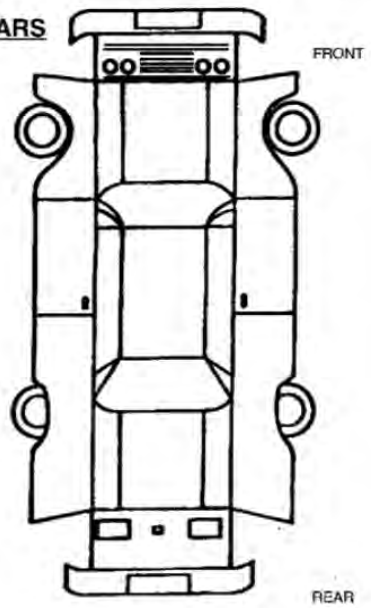
Note All Vehicle Damage Below

All Vehicle Damage must be reported to ANA_insuranceinquiries@arcadis.com, Zach Mongan (EF H&S), and Susan Atwood (EF Fleet Manger)

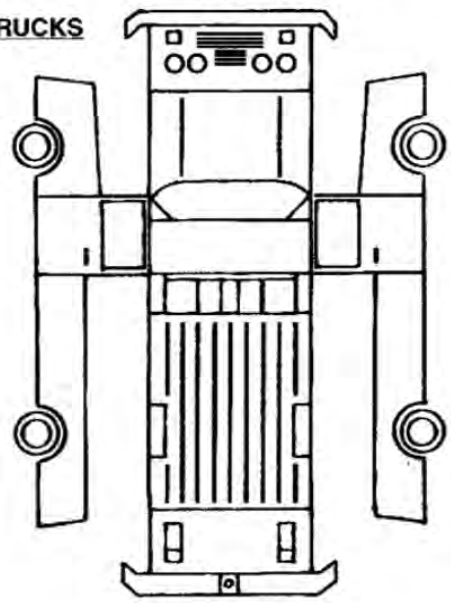
CODES:

B-BENT
BR-BROKEN
BU-BULGE
C-CHAFED
CH-CHIPPED
CPM-COVERED WITH PROTECTIVE MATERIAL-UNABLE TO DETERMINE DEFECTS IF ANY
CSA-CHAFED AND SCRATCHED ALL OVER
CR-CRACKED
D-DENTED
DMC-DUST AND MUD COVERED UNABLE TO DETERMINE OTHER DEFECTS IF ANY
G-GOUGED OR CUT
GC-GLASS CRACKED
HS-HAIRLINE SCRATCH
M-MISSING
P-PUNCTURED
R-RUSTY
S-SCRATCHED
SC-SCRAPED
SM-SMASHED
ST-STAINED AND/OR SOILED
T-TORN

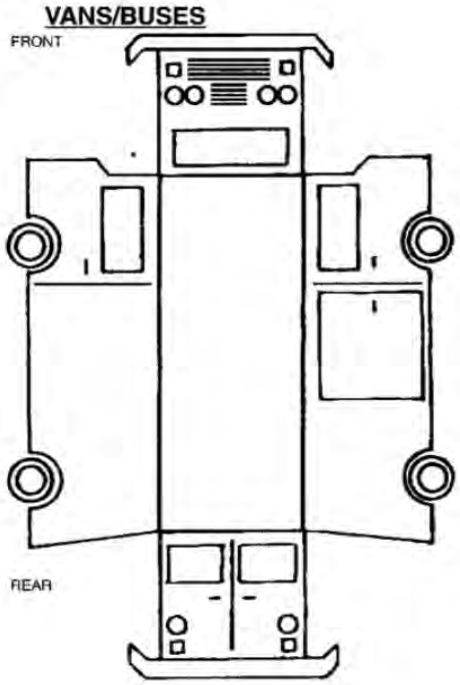
CARS



TRUCKS



VANS/BUSES



-INDICATE ON DIAGRAM-
-GIVE DIMENSIONS-
-CIRCLE WHERE APPLICABLE-

Notes:

Tread guide: If a tread gauge is not available coins may be used to determine remaining tread. 2/32” is the minimum by law in most states (top of Lincoln’s head on penny), 4/32” is minimum recommended for wet surfaces (top of Washington’s head on quarter), 6/32” is minimum recommended for snowy surfaces (top of Lincoln Memorial on penny).Vehicle tires should be replaced if the tread depth is less than 6/32”.



2/32” remaining 4/32” remaining 6/32” remaining

Reference JSA 10907 For Weekly Vehicle Inspection

Task Improvement Process

General

Observed Company:

Observation Type:

TIP Form: H&S Field Multi-Task (General)

Task Observed:

Observee Name:

Observer Name:

Observation Date:

Project Number: 30245593

Project Name: GTEOSI Seneca Falls

Supervisor:

Equipment On Site:

Pertinent Information:

Observation

Task	Correct	Questionable	Comments
General			
PPE worn according to HASP/JLA specifications and inspected before use?			
STOP work authority used where appropriate?			
Body Use/Positioning			
Proper lifting/pushing/pulling techniques used (no awkward positions/posture; no twisting or excessive reaching; no straining; no excessive weight; load under control/stable; etc.)?			
Body parts away from pinch points (clear or protected from being caught between objects/equipment or from contacting sharp objects/edges, etc.)?			
Body parts not in the Line of Fire (protected from being struck by traffic, equipment, falling/flying objects, etc.)?			
Work Procedures/Environment			
Correct type and number of barricades/warning devices/cones?			

Communication with others when necessary (hand signals, flags, etc.)?			
Right tools and equipment selected for the job and inspected before use?			
Tools and equipment used properly?			
Housekeeping performed (work areas and pathways clear of hazards, uneven surfaces addressed, etc.)?			
Slip/trip/fall hazards addressed (path selected and cleared, eyes on path, speed footing, etc.)?			
Proper energy control (electrical systems grounded, lock out/tag out performed, isolated, cords/fixtures in good condition, GFCI inspected and utilized when appropriate and used properly, etc.)?			
Protected from overhead/underground utilities (proper clearance, properly marked, spotters as necessary, etc.)?			
Safe work on/near water (appropriate flotation device, appropriate boat for body of water and operation of boat, etc.)?			
Chemical/Radiation protection (decontamination zones set up properly, air monitoring, completed, and logged, etc.)?			
Fall from elevated height prevention (maintains 3-points of contact, appropriate ladder, mounting/dismounting vehicle/equipment, fall arrest system, etc.)?			
Any additional safety issues identified:			

Tip Summary **Enter details of the TIP and follow up discussion provide details on how any questionable items were resolved.**

Discussion following the TIP led by: _____

Date of follow-up discussion: _____

Positive Comments:

Discussion Summary Completed:

- ☐ Supervisor Led
- ☐ Peer to Peer
- ☐ Arcadis Employee to Subcontractor

Summary of Questionable Items

Action Items (Optional) Assign appropriate action items based on the observations made. You can add more than one action item if needed.

Item #	Action Item	Responsible Person	Due Date	Comp. Date
1				
2				
3				

Standard Review

Reviews to be performed after entry of this TIP into 4-Sight.

Quality Review

Quality Reviews to be performed after entry of this TIP into 4-Sight.

Field Validation and Verification

Use the 4-Sight generated copy of this TIP to perform field V&V activities.

Silica Exposure Control Plan

Project Name: GTEOSI Seneca Falls
Project Number: 30245593
Date:

Task Description:

1) *Arcadis Silica Competent Person:* *Phone:*
The above individual will ensure requirements stipulated in this plan are implemented and has the authority to take corrective measures and/or revise this plan to ensure employee, contractor and/or public exposure to silica dust remains below the respirable inhalation time weighted average action level of 25 µg/m3 over an 8-hour period.

2) *What material will the team be working with on this project?*
Select

3) *The following work activity will be performed on this project which have a potential for silica dust exposure:*

Select

The following controls will be utilized to mitigate exposure to silica dust hazards:
Based on the activity entered above, the following OSHA/Arcadis activity category is:
0

4) *The controls to be utilized include:*
#N/A

4a) *Respiratory Protection:*

	≤4 HRS	>4HRS		≤4 HRS	>4HRS
Indoors or Enclosed Area:	#N/A	#N/A	Outdoors:	#N/A	#N/A

Preparation of the Level C Supplement is required if location/duration has assigned APF.
#N/A

Additional Housekeeping Requirements:
Arcadis prohibits dry sweeping or dry brushing where such activity could contribute to employee exposure to respirable crystalline silica unless wet sweeping, HEPA-filtered vacuuming or other methods that minimize the likelihood of exposure are not feasible.

Arcadis prohibits use of compressed air to clean clothing or surfaces where such activity could contribute to employee exposure to respirable crystalline silica unless:
The compressed air is used in conjunction with a ventilation system that effectively captures the dust cloud created by the compressed air; or
No alternative method is feasible (requires concurrence with a CIH).

5) Air Monitoring Requirements for Activities with an Assigned Respirator APF Listed in Section 4a.

☐ Real-time air monitoring for silica is not required for this project.
☐ Real-time air monitoring will be conducted during work activities where employees or contractors are exposed to or have the reasonable probability to be exposed to silica dust hazards. Silica air monitoring will include use of an aerosol monitor equipped with a Dorr-Oliver cyclone kit for respirable dust evaluation. Although not permitted to be the sole method of determining employee exposure, real-time air monitoring for silica will be performed in the employee breathing zone (personal air monitoring) and also performed at the perimeter of the work area (exclusion zone boundary). The results will be documented and submitted to Corporate H&S upon completion of the project. Air samples for laboratory analysis will also be required unless excepted from collection by a CIH.

Aerosol monitor selected for use on this project: _____
Frequency of air sample collection for laboratory analysis: _____
Air samples will be submitted to the following laboratory: _____

6) Medical Surveillance

Employees performing work activities where exposure to silica dust is known to be or has a reasonable probability to be above the OSHA 8-Hr TWA action level of 25 µg/m3 will participate in silica medical surveillance in conjunction with their annual HAZWOPER physical. New entrants into the silica medical surveillance program at times when the HAZWOPER physical is not due will coordinate the required surveillance with WorkCare and then maintain the surveillance with their HAZWOPER physical going forward.

7) Additional Instructions

Signatures:

_____ _____
Preparer Name Printed Date

_____
Preparer Signature

AUS Personal Protective Equipment List by Business Area

This matrix outlines **basic** PPE requirements for each Business Area. **Specific client, task, or regulatory requirements may dictate the type of PPE beyond what is listed in this matrix.** Additionally, task specific PPE requirements may also be included in the HASP or JSA. Hazard/task specific PPE or emergency supply recommendations are outlined by hazard/task in the Field H&S Handbook. PPE and equipment should be charged to the project. For any supplies that the PM determines cannot be billed, the equipment should be charged to the employee's overhead charge number. PPE associated with specialized training such as NFPA 70E Arc Flash is not included in this matrix. Refer to the specific training program for a description of the necessary PPE for tasks involving such requirements.

Listed "General PPE" is required for field staff, the last column specifies PPE for Arcadis staff visiting project sites. Revised 7/9/2021	**Environment/ Resilience [1]**	**Infrastructure/ Mobility [1]**	**Water/ Places [1]**	**Staff Visiting Project Sites**
Minimum PPE Required to Be Worn				
Hard Hat	R	R	R	R
Reflective Traffic Vest (Minimum Class 2)	R	R	R	R
Safety Glasses - Clear and Tinted	R	R	R	R
ANSI Compliant Safety - Toe Boots	R	R	R	R
Minimum PPE Required to Have On Hand				
Hearing Protection - Ear plugs (Need for ear muffs TBD)	R	R	R	R
Leather gloves and glove clip	R	R	R	R
First Aid Supplies [2]				
Small first aid kit	R	R	R	O
16 oz. bottle of Eye Wash	R	R	R	O
Tick Remover (fine tip tweezers) (See HASP Tick/Poisonous Plant Section)	O	O	O	O
PPE Supplies Required As Appropriate				
PPE duffel bag with logo, or equivalent	O	O	O	O
Half Face or Full-Face Respirator [3] (See THA)	O [3]	O [3]	O [3]	O [3]
Insect Repellent (See THA.) (Recommended 20-30% DEET)	O	O	O	O
Sunscreen	O	O	O	O
Hand sanitizer	O	O	O	O
Cut Resistant or Chemical Resistant Gloves [4]	O	O	O	O
Poison Ivy pre-exposure wipes or post exposure cleanser (i.e., Tecnu or Zanfel) (see THA for high risk locations)	O	O	O	O
Other specialized protective equipment (See THA for Work Tasks)	O	O	O	O
Outdoor wilderness survival kit [5]	O	O	O	O

Notes:

R - Required

O - Optional. Based on HASP Task Hazard Analysis (THA) or geographic location of work.

THA - Task Hazard Analysis.
Review the HASP Task Hazard Analysis (THA) in making this determination. Certain specific factors can influence the determination for requiring this PPE for the site or task. For example, certain geographic regions may have a higher incidence of the hazard or associated risk, the proximity of the site relative to emergency services may require such, previous observations of the hazard at the site, or where unknown hazard conditions apply. Modifications to the minimum required PPE are required to be communicated via the HASP and/or JSA.

1. The Business Area Director, Operations Manager, Project Manager, or Employee Supervisor is responsible for making the decision to provide Arcadis branded shirts to employees. Billing of such shirts is related to the authority level of the decision maker.

2. For project sites with an office/trailer, first aid/emergency response supplies can be kept in a central location, and may not be required to be carried by each Arcadis employee.

3. Staff must comply with the Arcadis Respiratory Protection H&S Standard before a respirator can be worn. The H&S Standard is available on the H&S Team webpage via the H&S Standards Library link.

Arcadis Standards

4. Determination for use of cut resistant, chemical resistant gloves or other specialized hand protection are to be based on THA in the project HASP.

5. Outdoor survival kits are generally required when working in remote wilderness locations. See the HASP THA and the Field H&S Handbook for requirements and supply list.

PID Calibration Log

Zero Gas Source: _____ Instrument Type: _____ PAGE ____ of ____

Lot Number/Expiration Date: _____ Serial Number: _____

Calibration Gas Source: _____ Instrument Type: _____

Lot Number/Expiration Date: _____ Serial Number: _____

Concentration: _____ _____

Instrument Number	Date	Time	Zero Cal. OK (Y/N)	Calibration Gas Reading	Comments	Calibration w/in 2% (Y/N)?	Alarms Set (Yes/No)?	User Initials

THIS FORM MUST BE ENTIRELY COMPLETED PRIOR TO BEGINNING ANY INTRUSIVE WORK

Project Name: GTEOSI Seneca Falls Start Date:

Project #: 30245593 End Date:

Utility markings valid for 15 days. Initiate clearance renewal 5 days prior to expiration for ongoing work

PRE-FIELD WORK REQUIREMENTS

DigSafe 811 notified 48-72 hrs. in advance of work? ☐ DigSafe Ticket #:

Ticket Expiration Date: State Utility Laws: www.commongroundalliance.com/map

Ticket(s) Attached(Y/N)? ☐ List utility owners notified via DigSafe 811 & response status:

List addt'l. utilities requiring notification not included in DigSafe811 Notice:

Review task details w/ private utility location subcontractor. ID work areas, clearance equipment needed, depth of clearance needed, types of features, utilities, anticipated/known/unknown. Verify DigSafe 811 markings to confirm public utility clearance.

Private Utility Locator Name, if used: AUS onsite meeting (Y/N)? ☐

FIELD WORK REQUIREMENTS

This portion of the checklist must be completed on site. AUS staff must have a minimum of one year of field experience in identifying utilities to complete the checklist. Field staff will review the completed checklist with PM or designee prior to beginning intrusive work.

Heavy equipment/mechanized intrusive work w/in the Arcadis Tolerance Zone (utility or structure present within 30-in. of point of work) REQUIRES pre-approval by Corporate H&S prior to working at all such locations. STOP WORK if the Arcadis Tolerance Zone work has not been approved.

List work type & locations for utility location and clearance as applicable to this checklist:

3 Reliable Lines of Evidence are REQUIRED for EACH INTRUSIVE LOCATION prior to starting any subsurface intrusive work. Check corresponding boxes below to document utility clearance efforts.

☐ OneCall/DigSafe 811 Public Utility Locate (required by State law for subsurface work)

811 is only reliable as a Line of Evidence when working in/adjacent to a public ROW or easement.

Marking type: ☐ Paint ☐ Pin Flags/Stakes ☐ Other: ☐ None

☐ Client provided maps/drawings (Y/N)? ☐ Maps/drawings not provided (Y/N)?

☐ Client Clearance (Y/N)? Name(s)/Affiliation(s):

☐ Interviews (Y/N)? Name(s)/Affiliation(s):

☐ Specific subsurface feature types and depths provided by person interviewed (Y/N)?

Details provided:

☐ Site Inspected (Y/N)? (document on Pg. 2.) Photo Document Marked Utilities & Structures

☐ Public records/Client Dwgs/As-Builts (Y/N)? Type:

List private locator tools used: ☐ Radio Freq. Detection ☐ Electromagnetic ☐ GPR

☐ Metal Detector ☐ Acoustic Pipe Locator ☐ Downhole sonde Other:

☐ Soft Dig Methods used (Y/N)? ☐ Hand auger ☐ Probing ☐ Hand tools (shovel/rake)

☐ Air knife ☐ Hydro Knife ☐ Potholing/Vacuum extraction

☐ Other soft dig tools used (Y/N)? If Yes, list here:

ALL BOXES BELOW MUST BE COMPLETED BEFORE PROCEEDING

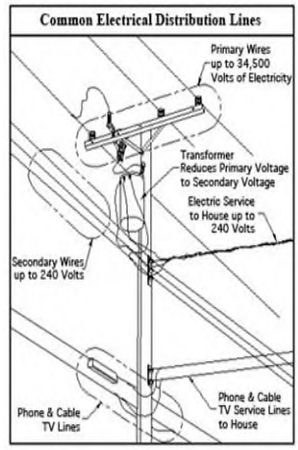
Site inspection also requires investigating vicinity outside of the work area for structures and utilities. Noting "YES" requires addt'l. investigation. Utilities must be field marked prior to intrusive work.

Is the utility present (Y/N)?		Utility Color Code
	Utilities entering/exiting structures?	No Color
	Intrusive work area marked out?	White
	Structural features above or below?	White
	Public natural gas line or meter?	Yellow
	Private natural gas laterals/feeders?	Yellow
	Public electrical service?	Red
	Conduit from meter or on wall?	Red
	Conduit from poles into ground?	Red
	Poles/devices w/ no visible lines?	Red
	Overhead electrical lines?	Red
	Solar arrays or wind turbines?	Red
	Public water line(s)?	Blue
	Private water line(s) or lateral(s)?	Blue
	Water meter onsite?	Blue
	Fire hydrants/post indicator valves?	Blue
	Irrigation system control box/valve?	Blue
	Sprinkler heads, drip lines, vaults?	Blue
	Water dispensers, fill stations?	Blue
	Telecomm. overhead or buried?	Orange
	Telecomm. ground box or relays?	Orange
	Telecomm./security CCTV devices?	Orange
	Public sanitary sewer pipes?	Green
	Combined sanitary/storm pipes?	Green
	Private sanitary laterals/clean outs?	Green
	Restrooms, kitchens, wash bays?	Green

Is the utility present (Y/N)?		Utility Color Code
	Evidence of stormwater network?	Green
	Curb drains/catch basins/manholes?	Green
	Stormwater culverts, outfalls?	Green
ABOVEGROUND Features Present?		
	Transportation tunnels/structures/markers present?	
	Overhead electrical lines?	Red
	< 50 kV w/in 10 ft of work area?	Red
	>50-200 kV w/in 15 ft of work area?	Red
	>200-350 kV w/in 20 ft of work area?	Red
	>350-500 kV w/in 25 ft of work area?	Red
	>500-750 kV w/in 35 ft of work area?	Red
	>750-1000 kV w/in 45 ft of work area?	Red
	Aboveground fire suppression?	Blue
	Aboveground communications?	Orange
	Aboveground chases/racks/trays?	Orange
	Private/Remediation system lines?	Various
	Unclassed utilities/anomalies?	Pink
	Warning signs/stakes/markers present?	
	Heavy Equipment: Mark travel route for overhead, next to route, and/or under route (e.g. crush risk) utilities.	
Signs of other utilities/ground disturbance		
	Signs of asphalt or concrete disturbance/repair?	
	Any ground subsidence or change in vegetation?	
	Unknown manholes or valve covers in work area?	

Tips for Thorough Utility Location (HSS Section 5.6):

1. Don't forget to look up for utilities
2. Be on-site with Private Utility Locators.
3. Ask Private Locators to "confirm" other's markings.
4. Also clear alternate/backup locations
5. Mark all known utilities.
6. No hammering, no pickaxes, no digging bars, no shortcutting.
7. No excessive turning or downward force of hand tools, especially hand augers.
8. Utilities may run in or directly under asphalt/concrete
9. Heavy equipment may damage shallow utilities. Especially during clearing and grubbing.
10. Use spotter for heavy equipment near aboveground utilities?



☐ Utilities & Structures Checklist reviewed by the PM or Designee (Y/N)? *If no, STOP WORK call PM*

PM or Designee Name: _____

Name and Signature of person completing the checklist: _____

Date of checklist review / update: _____

ALL SUSPECT UTILITY STRIKES REQUIRE CORPORATE H&S NOTIFICATION WITHIN 24 hrs. OF KNOWLEDGE OF STRIKE WITH A CONFIRMED RESPONSE FROM CORPORATE H&S.

Attachment B
JSAs

Job Safety Analysis

General

JSA ID	11430	**Status**	(3) Completed
Job Name	Environment-Groundwater Sampling and free product recovery	**Created Date**	7/31/2014
Task Description	Groundwater Sampling using Passive Diffusion Bags (PDBs)	**Completed Date**	09/03/2014
Template	False	**Auto Closed**	False

Client / Project

Client	GTE Operations Support, Inc.
Project Number	30245593 (updated PN on 7/1/2025)
Project Name	GTEOSI Seneca Falls
PIC	Mall, Richard (updated PIC on 7/1/2025)
Project Manager	Flusche, Mark

User Roles

Role	Employee	Due Date	Completed Date	Supervisor	Active
Developer	Kassel, Chris	8/29/2014	8/8/2014	McCune, Bill	☐
HASP Reviewer	Kassel, Chris	8/22/2014	9/4/2025	McCune, Bill	☑
Quality Reviewer	Murphy, Richard	9/29/2014	9/29/2014	Lenzo, Frank	☑

Job Steps

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
1	Mobilize to pre-determined sampling location, set up work zone and stage sampling equipment	1	Personnel could be hit by vehicular traffic	Set up cones and establish work area. Position vehicle so that field crew is protected from site traffic. Unload as close to work area as safely possible. Wear appropriate PPE (Class II/III high visibility safety vest).	DOT TSP for Private Roadways and Parking Areas
		2	Sampling equipment, tools and monitoring well covers can cause tripping hazard	Keep equipment picked up; stage to one side of well/work area out of pathway between well and vehicle; use TRACK to assess changes.	
2	Access wells on foot in undeveloped, heavily treed/vegetated remote portion of site.	1	Significant distance away from field vehicle (in case of hazardous weather or emergency).	Use buddy system to access remote wells. Assess weather conditions prior to access remote areas and use stop work if there is potential for hazardous weather within time needed to return to field vehicle. Carry mobile phones and small first aid kit; consider notifying facility staff when employees will be working at wells located in remote area.	
		2	Slips, trips or falls from muddy/wet, uneven and heavy ground vegetation.	Survey pathway ahead, use caution and choose least obstructed pathway. Do not carry objects that obscure visibility of ground surface; wear proper footwear with ankle support and good tread.	
		3	Eye/face injury from vegetation/tree branches	Use caution when walking through trees and brush; wear proper eye protection with side shields to avoid eye injury.	
		4	Falling tree branches/ice/snow	Assess pathway ahead for ice/snow or branches from overhead trees/powerlines. Use caution and wear hard hat when walking in areas with potential overhead hazards.	
		5	Biohazards including insects, ticks, spiders, snakes, poisonous and thorny plants.	Use caution, assess pathway ahead and minimize contact with vegetation to extent possible. Wear long sleeve shirt/long pants and gloves when walking through heavy brush. Use insect repellent as needed.	
		6	Hypothermia/frostbite/dehydration/heat stress/sunburn (according to season/conditions).	Assess weather conditionsand wear appropriate clothing. Drink plenty of water throughout day; take rest breaks as needed in warm weather and avoid prolonged periods of direct sun exposure. Wear sunscreen and if possible plan work when wells will be shaded.	

3	Open wells to equilibrate and gauge wells	1	Bees/wasps/spiders/ants nesting in well vaults	Assess well for any signs of nests/activity before opening. Wear appropriate gloves and open well vaults slowly with caution. If bees/wasps are encountered, leave well open and leave the area until they have left the well, or until the nest can be removed safely. If spiders/ants are encountered, wear gloves/use a brush to physically remove the offenders.	HASP Attachment F (DOT TSP)
		2	When squatting, personnel can be difficult to see by vehicular traffic.	Wear class II traffic vest if wells are located proximal to vehicular traffic. Use tall cones and the buddy system if practicable.	
		3	Pinchpoints on well vault can pinch or lacerate fingers	Use correct tools to open well vault/cap. Wear leather gloves when removing well vault lids, and chemical protective gloves while gauging. Wear proper PPE including safety boots, knee pads and safety glasses.	
		4	Carrying field equipment can cause muscle strain	Unload as close to work area as safely possible; use proper lifting, reaching and carrying techniques and body positioning; don't carry more than you can handle (use buddy system and get help moving heavy or awkward objects).	
		5	Pressure can build up inside well causing cap to release under pressure	Keep head away from well cap when removing. If pressure relief valves are on well use prior to opening well	
4	Retrieve/deploy PDB; collect groundwater sample form PDB; equipment/tool decontamination.	1	Working with PDB twine/cable can cause rope burns on hands.	Slowly raise and lower the twine/cable for the PDB. Wear appropriate gloves for the task.	Arcadis TGI for Passive Diffusion Samplers.
		2	Lacerations from cutting tool used on zip ties holding PDBs; from cutting PDB sleeve.	Use two handled snips to cut zip ties; used scissors (which can be docontaminated) to open PDB. Wear appreopriate gloves for task (e.g., cut resistent and nitrile gloves).	
		3	Sample containers could break or leak preservative	Discard any broken sampleware or glass properly. Do not overtighten sample containers. Wear chemical protective gloves.	
		4	Spilled groundawater from PDB could cause muddy or slippery conditions.	When collecting groundwater sample, pour over bucket to collect any spillage.	
		5	Eye hazard from groundwater or decontamination activities.	Wear appropriate safety glasses. when using decontamination spray bottles, spray in a direction downwind and away from self and field buddy.	

PPE **Personal Protective Equipment**

Type	Personal Protective Equipment	Description	Required
Dermal Protection	long sleeve shirt/pants		Recommended
Eye Protection	safety glasses		Required
Foot Protection	steel-toe boots		Required
Hand Protection	chemical resistant gloves (specify type)	Nitrile	Required
	work gloves (specify type)	leather/cut-resistent	Required
Head Protection	hard hat	Required when overhead hazards are present	Required
Miscellaneous PPE	other	Knee pads	Recommended
	traffic vest--Class II or III		Required

Supplies

Type	Supply	Description	Required
Communication Devices	mobile phone		Required
Decontamination	Decon supplies (specify type)	alconox, DI water, spray bottle	Required
Miscellaneous	fire extinguisher		Required
	first aid kit		Required
	flashlight		Required
Personal	eye wash (specify type)	bottle	Required
	insect repellent		Recommended
	sunscreen		Recommended
Traffic Control	barricades		Recommended
	traffic cones		Required

Review Comments

Reviewer		Comments
Employee: **Role** **Review Type** **Completed Date**	Bobar, Aaron HASP Reviewer Approve 9/3/2014	Looks good - for some reason, I can't tell what job step #2 is, but I think it is a 4-sight issue. Also - make sure STAR/TCP is complete and provided to field staff... Thanks.
Employee: **Role** **Review Type** **Completed Date**	Murphy, Richard Quality Reviewer NA 9/29/2014	Good idea to take into account issues related to weather. There can be real risks associated with that. Thanks, Richard

Job Safety Analysis

General

JSA ID	49	**Status**	(3) Completed
Job Name	Environment-Soil sampling/well installation - manual	**Created Date**	2/6/2009
Task Description	Hand augering	**Completed Date**	02/06/2009
Template	True	**Auto Closed**	False

Client / Project

Client	GTE Operations Support, Inc.
Project Number	30245593 (updated PN on 7/1/2025)
Project Name	GTEOSI Seneca Falls
PIC	Mall, Richard (updated PIC on 7/1/2025)
Project Manager	Flusche, Mark

User Roles

Role	Employee	Due Date	Completed Date	Supervisor	Active
Developer	Kassel, Chris	12/19/2011	2/6/2009	McCune, Bill	☐
HASP Reviewer	Kassel, Chris	2/8/2009	9/4/2025	McCune, Bill	☐
Quality Reviewer	Vollertsen, Patricia	3/3/2009	3/3/2009	Vollertsen, Patricia	☐

Job Steps

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
1	Sampling set-up	1	Underground utilities could be encountered during hand augering	Follow the Utility Clearance HS Standard	Utility Clearance HS Standard ARCHSF019
		2	Muscle fatigue can occur from lifting heavy equipment in and out of vehicle	Park as close as possible to the sample locations. Use lifting techniques outlined in the Field H&S Handbook	
		3	Slips/trips/falls could occur from uneven walking and working surfaces	Remove any gravel or debris from sampling location. Gravel will get stuck in auger and continue to fall back down in hole. A five gallon bucket with the bottom cut out will retain gravel from falling back down in the hole.	
2	Sampling set-up	1	Underground utilities could be encountered during hand augering	Follow the Utility Clearance HS Standard.	Utility Clearance HS Standard ARCHSF019
		2	Muscle strains can occur from lifting heavy equipment in and out of vehicle	Park as close as possible to the sampling locations. Use lifting techniques as outlined in the Field H&S Handbook.	
		3	Slips/trips/falls could occur from uneven walking and working surfaces	Remove any gravel or debris from sample location. Gravel will get stuck in auger or will continue to fall back down in hole. A five gallon bucket with the bottom cut out will retain gravel from falling back down in the hole.	
3	Installation of hand auger boring	1	Muscle strains from pulling/pushing could occur when installing the boring, and when removing the auger from the hole	Stretch out arms/back/shoulder muscles prior to beginning. Using firm grip on handle, slowly turn auger and progress downward in 6" increments. Slowly pull auger from hole-use legs to pull auger out of hole. If water is encountered, a suction will be created when trying to remove the auger. Ask for assistance from another worker if you can't remove safely on your own.	
		2	Hand strain and blisters could develop from prolonged hand augering	Select proper gloves for task, usually leather type work gloves or mechanics style gloves. If hot spots develop on hands (Hot Spots are where blisters start to form) readjust gloves or change to better padded glove. If blisters begin to form, stop work so as not to worsen blistering.	
		3	Over-exertion could occur when trying to force an auger forward if there is refusal.	If refusal occurs, Stop Work. Remove auger from hole and check hole with flashlight if possible. DO NOT overexert by using excessive force.	

3	Installation of hand auger boring	4	Fatigue can occur due to strenuous nature of hand augering activities	Take rest breaks as needed or switch out task with another employee.	
4	Collect Sample Soil Sample	1	Staff can come into contact with impacted soils	Wear chemical protective gloves as outlined in the HASP, and wear safety glasses.	
		2	Sharp edges and broken glassware can cause lacerations	Discard any broken sample containers or glass. Do not overtighten sample containers.	
		3	Containerizing and moving soil cuttings can cause muscle strains	Dispose of left over soil cuttings in a drum or bucket and dispose properly. Only fill buckets half full due to weight and strength of bucket. Wear leather work gloves and use good lifting techniques when handling buckets.	
5	Decon Hand Auger	1	Exposure to COCs while deconing equipment.	Wear chemical protective gloves as outlined in the HASP, and wear safety glasses.	
		2	Cleaning solutions can splash while deconing equipment	Use PPE as outlined in the HASP, and try to minimize splashing.	
		3	The end of the hand auger has sharp edges, and lacerations can occur	Use brush to scrub off soils and not hands. Do not reach into the nose (the end with teeth) of the auger with hand.	
6	Fill in Sample Location	1	Open boreholes are a trip hazard	Fill in hole with sand or bentonite. Pack down chips as best as possible. Add a bit of DI Water to make chips swell and fill hole completely.	
		2	Muscle strain can occur from lifting bags of sand and/or bentonite.	Use proper lifting techniques as detailed in the Field H&S handbook	
7	Installation of Temporary Piezometer/Well	1	Excessive noise can occur form driving well casing with hammer or macrocore sampler.	Wear hearing protection.	Arcadis HS Standard for Hearing Conservation (ARC HSIH008)
		2	Body parts or onlookers can be struck when using hand tools	Check swing radius above and around before driving well casing in bore hole. Wear leather gloves and safety glasses.	
		3	Muscle strains can occur when pulling/pushing well materials into place	Stretch out arms/back/shoulder muscles prior to beginning. Take frequent breaks as fatigue sets in and if muscle cramps occur.	
		4	Edges of PVC well casings have sharp edges especially when they have been cut, which can cause lacerations.	File the tops of well casings after they have been cut. Wear leather work gloves.	
		5	Debris in the eyes can occur when working with soil, grout, and bentonite	Use disposable dust mask if excessive dust is created.	

PPE — Personal Protective Equipment

Type	Personal Protective Equipment	Description	Required
Eye Protection	safety glasses		Required
Foot Protection	steel-toe boots		Required
Hand Protection	chemical resistant gloves (specify type)		Required
	work gloves (specify type)		Required
Head Protection	hard hat		Required
Hearing Protection	ear plugs		Required
Miscellaneous PPE	traffic vest--Class II or III		Required
Respiratory Protection	dust mask		Recommended

Supplies

Type	Supply	Description	Required
Decontamination	Decon supplies (specify type)		Required
Miscellaneous	first aid kit		Required
Personal	eye wash (specify type)	bottle	Required
Traffic Control	traffic cones		Required

Review Comments

Reviewer		Comments
Employee: **Role** **Review Type** **Completed Date**	Coppola, Mija HASP Reviewer Approve 2/6/2009	
Employee: **Role** **Review Type** **Completed Date**	Vollertsen, Patricia Quality Reviewer NA 3/3/2009	Looks really good and these are so easy to read. Some comments Step 1, hazard 2: Consider including page number from handbook Step 2, hazard 2: Consider using "hand/muslce fatigue rather than "strain". Step 3, critical action 1: Is Tyvek ever required for really wet soils? Step 3, harard 3 and step 5 hazard 1: Consider muscle "fatigue" rather than strain Step 5, hazard 1: Do you ever have to move to the next spot before filling in hole? If so, may want to add in the CA -if you have to walk away before filling, mark hole to alert others. Step 6 - as this is a JLA for hand augering, would you maybe just reference the "well installation JLA" rather than adding the step here? If that doesn't make sense, need to look at hazard 5 as it notes that debris can get in eyes, but the CA talks about a dust mask - may want to reword that debris in eyes, nose and mouth can occur when working with soil, grout, and bentonite and for CA include reference to eye protection.

Job Safety Analysis

General

JSA ID	11461	**Status**	(3) Completed
Job Name	Environment-Air Monitoring	**Created Date**	8/8/2014
Task Description	Indoor Air Sampling - Industrial Facility	**Completed Date**	09/19/2014
Template	False	**Auto Closed**	True

Client / Project

Client	GTE Operations Support, Inc.
Project Number	30245593 (updated PN on 7/1/2025)
Project Name	GTEOSI Seneca Falls
PIC	Mall, Richard (updated PIC on 7/1/2025)
Project Manager	Flusche, Mark

User Roles

Role	Employee	Due Date	Completed Date	Supervisor	Active
Developer	Kassel, Chris	8/29/2014		McCune, Bill	☐
HASP Reviewer	Kassel, Chris		9/4/2025	McCune, Bill	☑
Quality Reviewer	Wippold, Timothy	10/16/2014	10/16/2014	Wippold, Timothy	☐

Job Steps

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
1	Driving to and from sampling locations.	1	Striking or being struck by another object or vehicle	Follow the 5 Keys of Smith System Driving	US Field H&S Handbook 3.4.2, Motor Vehicle Safety HS Standard ARCHSGE004, Driving JSA #15
2	Working within active warehousing/distribution facility to conduct sampling activities.	1	Facility operations could cause injury by being struck by forktrucks, or by loads being transported by forktrucks. Slips, trips, falls, and limited visibility due to poor lighting.	Coordinate with facility manager and warehouse workers to make them aware of ARCADIS personnel on site. Use caution and be aware of warehouse operations/forktruck traffic; stay in posted pedestrian walkways when possible; use cones or barricades when working in forktruck lanes. Wear Class II/III safety vest. Use caution and scan pathway ahead for obstacles or other slip/trip/fall hazards. Carry flashlight or head lamp for work in areas with poor lighting.	Tailgate Meeting HS Standard, PPE HS Standard, Motor Vehicle Safety HS Standard, US Field H&S Handbook 3.4.2
		2	Health hazards posed by presence of dead birds/animals and/or accumulation of feces.	Avoid disturbance of and any contact with dead birds/animals and feces. Wear appropriate PPE such as nitrile gloves. Use Stop Work Authority if appropriate, contact PM and re-evaluate hazards.	
3	Sample Canister - sampling preparation, collection and shipping	1	Heavy or awkward lifting, bending and carrying.	Use a dolly or cart when necessary to move canisters/boxes to and from staging areas. Practice good lifting and bending techniques and keep your back straight. Avoid twisting or awkward movements/positions. Remove canisters from the box and transport individually. Stack boxes for packing canisters (for shipment) to minimize awkward lifting/bending. If the box or other equipment are too heavy, use buddy system for lifting/staging or loading boxes for shipment.	US Field H&S Handbook 3.3 4.8, Motor Vehicle Safety HS Standard ARCHSGE004, Driving JSA #15
		2	Cuts or lacerations from opening the box of canisters	Use appropriate cutting tools such as safety knives and cut away from your body when opening the box.	
		3	Pinch points	Use proper tools for adjusting canister valves. Wear gloves when necessary.	

4	Sub-Slab soil vapor sampling	1	Slips, trips, falls. Pinch points. Eye injury from debris. Injury from lifting and carrying equipment, prolonged kneeling on hard surfaces.	Wear work gloves when handling equipment/materials. Practice good housekeeping. Unload equipment as close to work area as possible; use cart to transport equipment. Keep equipment and supplies organized. Wear work gloves when handling equipment/materials. Use correct size wrenches when assembling sampling train. Wear safety glasses. Practice good lifting techniques and keep your back straight. Avoid twisting or awkward movements/positions. Use two people to lift items heavier than 50 pounds. Wear kneepads.	US Field H&S Handbook 3.11.2, Electrical Safety HSS, Hearing Conservation HSS.
		2	Electrical shock from the improper use of power tools (electric hammer drill)	Wear appropriate gloves. Do not remove any safety guards from power tools. Inspect power cords for damage/wear. Be aware of potential for hidden electric sources. Make sure your power source is rated appropriately for the equipment being used. Use GCFI with power cords. Always unplug equipment before peforming any repairs.	
		3	Lacerations from cutting of sample tubing.	Use appropriate cutting device (tubing cutter) and wear gloves when handling blades.	
		4	Exposure to constituents in soil vapor	Collect purged soil vapor in a Tedlar bag. Discharge purged soil vapor outside building. Perform air monitoring to monitor exposure.	
		5	Excessive noise generated by hammer drill operation	During drilling operations, hearing protection should be used.	

PPE — Personal Protective Equipment

Type	Personal Protective Equipment	Description	Required
Eye Protection	safety glasses		Required
	safety goggles	When using electric hammer drill	Required
Foot Protection	steel-toe boots		Required
Hand Protection	chemical resistant gloves (specify type)	Nitrile	Required
	work gloves (specify type)	Leather/cut-resistent	Required
Head Protection	hard hat	When overhead hazards are present	Required
Hearing Protection	ear plugs	When using hammer drill	Required
Miscellaneous PPE	other	Knee pads	Recommended
	traffic vest--Class II or III		Required
Respiratory Protection	dust mask	When drilling concrete sub-slab	Recommended

Supplies

Type	Supply	Description	Required
Communication Devices	mobile phone		Required
	walkie talkie		Recommended
Miscellaneous	fire extinguisher		Required
	first aid kit		Required
	flashlight		Recommended
	Other	headlamp	Recommended
Personal	water/fluid replacement	drinking water	Recommended
Traffic Control			

Review Comments

Reviewer		Comments
Employee: **Role** **Review Type** **Completed Date**	Wippold, Timothy Quality Reviewer NA 10/16/2014	Very good TIP. I really thought step #1 was good! We often overlook the most basic--getting to and from the jobsite safely.

Job Safety Analysis

General

JSA ID	14188	**Status**	(3) Completed
Job Name	Environment-Remediation system O&M	**Created Date**	7/7/2016
Task Description	Sub-Slab Depressurization Systems Operations, Maintenance and Monitoring	**Completed Date**	09/07/2016
Template	False	**Auto Closed**	False

Client / Project

Client	GTE Operations Support, Inc.
Project Number	30245593 (updated PN on 7/1/2025)
Project Name	GTEOSI Seneca Falls
PIC	Mall, Richard (updated PIC on 7/1/2025)
Project Manager	Flusche, Mark

User Roles

Role	Employee	Due Date	Completed Date	Supervisor	Active
Developer	Kassel, Chris	9/14/2016	9/1/2016	McCune, Bill	☑
HASP Reviewer	Kassel, Chris	9/15/2016	9/4/2025	McCune, Bill	☑
Quality Reviewer	Yates, Vivian	9/12/2016	9/12/2016	Yates, Vivian	☐

Job Steps

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
1	General Inspection	1	Slips trips and falls on wet surfaces , equipment, piping, or supplies.	Wear footwear with ankle support and good tread and anti-slip sole. Mark all hoses and piping in walkways with high visibility colored materials or paint, use signage if necessary, cover to prevent trip hazards.	Site LOTO plan; ARC HSFS004 (LOTO); ARC HSIH008 (Hearing); ARC HSGE015 (PPE)
		2	Noise from system operation	Wear hearing protection appropriate for noise levels encountered. Increase distance from noise sources when practical.	
		3	Impaired visibility when going into structures on bright days or structures/rooms without illumination	Use auxiliary lighting when inspecting inside structures on bright days or in poorly illuminated rooms.	
		4	Burns to skin form contact with system components.	Wear protective gloves, allow system components to cool down before accessing.	
		5	Contact with vapor from improper system operation.	Review O&M plan prior to inspection to refresh shut down and start up sequence. Follow the LOTO plan where vapor could be released. Bleed off any component under pressure prior to removing.	
		6	Insect hazards (wasps, poisonous spiders, etc.) in system structures	Be vigilant for and remove/avoid. Never reach into poorly lit and damp places on the system, especially systems located in buildings.	
		7	Vehicle traffic	Watch for traffic approaching or leaving loading bays near systems. Do not cross the path of any backing vehicle walking to or from systems. Wear high visibility clothing. Use buddy system. Do not walk in center of warehouse fork truck lanes, never assume the right of way has been yielded to you unless clearly signaled from the stopped fork truck driver. Stop and look around all corners/intersections. Use a flashlight when entering or exiting poorly illuminated areas as well as in them.	

1	General Inspection	8	Asbestos, oil, old machinery, general debris	Do not move any items or debris unless required to do so to access an O&M site. Inspect items first for hazards including nails, sharp edges, potential asbestos containing materials, solvents or other unexpected hazards, including biological. Do not move items that movement might create an additional risk, such as potential asbestos containing materials; call the task manager or project manger to report these items if they interfere with your work. Upgrade PPE when needed, call project management if PPE beyond what is defined in this JSA is required to ensure task is required and is being done safely.	
2	System sample collection	1	Contact with sample preservatives	Wear protective gloves and eye protection, avoid breathing acid vapors by keeping open bottles away from face. Have baking soda or other acid neutralizer if acid gets on skin or clothing. Always assume acid residue is on outside of sample bottles, always wear gloves.	ARC HSGE015 (PPE)
		2	Cuts to hands from compromised sample bottles	Inspect bottles prior to use and do not use if bottle or lid appears compromised. Do not over-tighten lids. Wear cut proof gloves.	
		3	Awkward body positions collecting the sample	Plan sampling activity and take the time to set up properly. Use job rotation if filling large containers from a slow flowing port or valve.	
		4	Exposure to impacted media or free product	Wear gloves appropriate for the chemical hazards, and eye protection. If sample port has potential to be under pressure, bleed pressure off first. Wear face shield and protective suits or aprons if splash hazards from pressure or other cause exists.	
3	Pipe, meter, port, valve, gauge, cleaning or replacement	1	Exposure to hazardous energy.	Review and follow the site LOTO plan. Do not access or alter system components unless required to for the task you are preforming. Ensure you have the correct training and permits completed prior to beginning LOTO work.	Site LOTO plan; ARC HSFS004 (LOTO); ARC HSFS006 (Electrical Safety)
		2	Working at height on tanks or edge of vaults	If over 6 ft high wear personal fall arrest devices approved and overseen by a Competent Person. See Working at Heights JSA template. Competent Person to inspect guard rails, stairs, ladders, if present, to ensure they are maintained in good condition.	
		3	Removal of vessel lids or covers causing overexertion or awkward twisting	Use buddy system to lift lids weighting >51 pounds or that cause awkward bending or twisting to open.	
		4	Exposure to carbon dusts, when dried	Maintain good housekeeping at all times and clean up spilled carbon while still wet. If dust is an issue from large spill, use respiratory protection (HEPA) filter.	
		5	Confined space hazards if tank or vault entry is required.	Follow ARCADIS Confined Space procedures.	
		6	Struck by hazards from hoisting carbon bags or change out equipment	Keep unnecessary workers clear of work area. Use tag lines if lifting over knee height, especially for large bags or objects being hoisted. See Cranes and Rigging JSA, hard hat required.	
		7	Heavy lifting of carbon material bags or placement hoses/piping.	Use buddy system to lift bags weighting >51 pounds or cause awkward bending or twisting to move. Use dollys, carts etc. to facilitate moving of supplies or bags. Use buddy system for bulky, awkward objects like large coiled hoses or long piping links.	
		8	Electrical hazards associated with system entry	Follow ARCADIS electrical procedures. Ensure gloves and footwear worn are electrical safety rated. Do not deviate from any O&M plan procedural requirements.	

3	Pipe, meter, port, valve, gauge, cleaning or replacement	9	Delivery vehicle damage operating in tight area.	Use the ARCADIS spotter program in the defensive driving procedure. Coordinate moves/route with driver prior to operating the vehicle.	
4	Carbon or media change out	1	Cuts, contact stress to hands from hand tools	Wear protective gloves, but ensure glove used maintain ample dexterity to perform task.	Site LOTO plan; ARC HSFS004 (LOTO); ARC HSGE015 (PPE)
		2	Back strain from awkward twisting, opening housing, removing and replacing filters	Plan activity. Use buddy system if covers weigh >51 pounds or cause awkward twisting of body. Do not over-exert while moving, removing, or placing components and don't hurry through activity.	
		3	Hazardous energy.	Review and follow site LOTO plan to remove energy from the carbon vessel prior to removing from the system.	
5	Blower, belt and filter maintenance and servicing	1	Entanglement, pressure or other hazards in components (hazardous energy)	Review and follow Site LOTO Plan to inactivate equipment, do not remove protective guards unless necessary to service blower. Wear tight fitted clothing and ensure shirt tails are tucked in.	Site LOTO Plan; ARC HSGE015 (LOTO); ARCHHSS1004, Handbook section 3.24
		2	Pinch points, scrapes to hands and fingers	Wear protective gloves that maintain dexterity to perform task. Identify pinch hazards and keep hands and fingers away from them.	
		3	Contact stress to knee/legs from kneeling on hard surfaces	Use padding if kneeling/sitting on hard surfaces.	
		4	Lifting hazards from blower components	Use proper lifting techniques and buddy system if components weigh >51 pounds. Use TRACK and plan lifts prior to attempting to move heavy objects.	
		5	Tool slip hazards form grease or oil surfaces	Take the time clean up excessive grease and oily areas on surfaces requiring maintenance or adjustment.	
		6	Push / pull muscle strain from blower housing component removal or replacement	Do not over exert or hurry through the task. Use buddy to help slide or move heavy objects.	
6	Checks of electrical systems	1	Electrocution from contact with energized system components	Follow ARCADIS electrical procedure. Only NFPA 70E trained employees may service electrical components. Do not access electrical components unless trained and required to do so. Wear electrical rated gloves and footwear and make sure to inspect PPE prior to work activity.	ARHSFS006, FHSHB section 3.25
		2	Pinch points, cuts, scrapes to hands from opening electrical panels	Electrical rated gloves worn to offer protection from these hazards	
		3	Injury from arc flash	Same as critical action 1 above	
7	Removal of water from knockout tank / secondary containment	1	Slip and fall hazards on wet or icy surfaces	Wear proper footwear with good tread, anti-slip soles and ankle support. Clean up wet areas where practical and maintain good housekeeping. Use snow/ice removal methods to clear walking paths for activity.	FHSHB Section 3.27
		2	Trip hazards over hoses or piping	Avoid running hoses or piping across aisle ways, secure from movement or cover, watch for and avoid walking over hoses and piping. Mark lines with comes where appropriate.	
		3	Splashing water	Water that originated in the knockout tank should be relatively stripped of VOCs from the vacuum of the blower. Avoid splashing by pouring carefully if pouring is required. Wear eye protection and consider wearing a face shield if water is being poured; use TRACK. See Sample collection section of JSA.	
		4	Falls from vehicle mounted tanks	Do not hurry through task. Use 3 points of contact accessing or egressing from tank on vehicles. USE TRACK to select proper route onto tank. Ensure anti-slip tape, paint or other material is intact and in good condition. If absent, obtain and place on vehicle in access locations.	

8	Drum handling and management	1	Pinch / crush hazards to hands from drum rings and lids	Wear leather gloves with good grip capability. Use drum dollies or automated methods to move full drums. Space drums in staging areas where aisle maintained and sufficient space between drums to permit safe ring removal. Ease drums into position slowly using buddy system to extent practical. Identify ring and lid hazard during removal, placement and keep hands/fingers clear.	Drum Sampling/Handling JSA; FHSHB Section 3.34
		2	Foot crush hazards from drum movement	Steel toe boot with good tread and ankle support required. Watch foot placement during drum lowering/placement activities. Maintain adequate aisle space so worker can move freely when handling drums. Maintain good illumination and visibility of floor surface.	
		3	Injury from empty drum lid removal when drum under pressure from temperature changes - lid may blow off	Empty drums under pressure if subject to wide temperature ranges. Test for and bleed off any pressure by carefully loosening a bung prior to opening	
		4	Muscle strain from moving drums (empty or full)	Keep back straight when shifting full drums into position or rotating. Use buddy system to shift, rotate full drums. If automated methods are available, take the time to use the method instead of a quick manual movement.	

PPE — Personal Protective Equipment

Type	Personal Protective Equipment	Description	Required
Dermal Protection	splash apron		Recommended
Eye Protection	faceshield		Recommended
	safety glasses		Required
Foot Protection	steel-toe boots	Safety toes	Required
Hand Protection	chemical resistant gloves (specify type)	as specified in HASP, nitrile	Required
	work gloves (specify type)	Leather, ANSI level II minimum cut resistant	Required
Head Protection	hard hat	In system enclosures or near overhead hazards	Required
Hearing Protection	ear plugs	In system enclosures while running	Required
Miscellaneous PPE	traffic vest--Class II or III		Required

Supplies

Type	Supply	Description	Required
Communication Devices	mobile phone		Required
Miscellaneous	fire extinguisher		Required
	first aid kit		Required
	flashlight		Required
Personal	eye wash (specify type)	bottle	Required
	insect repellent		Recommended
	sunscreen		Recommended
	water/fluid replacement		Recommended
Traffic Control	traffic cones	If work in parking lots	Required

Review Comments

Reviewer		Comments
Employee: **Role** **Review Type** **Completed Date**	Zuck, Daniel HASP Reviewer Revise 8/31/2016	Revise to include reference to Drum handling JSA and FHSHB Section. Additional comments should be included to identify the steps of the task an the individual Hazard- for instance the secondary containment water: Face shield or splash goggles should be added as a PPE item during transport or poring into drum/drains. Additional notes regarding hoses- if hoses are needed they should be converted by a hose ramp and cones identifying the hazard exists. Revise the glove(or layers or gloves) option to be more in line with the hazard, if there is a risk of cuts add ANSI level 2 as a minim level of protection. I have not reviewed the HASP so I am not sure the HASP identifies the correct chemical glove protection based on the contaminates and the exposure time, but that should also be evaluated.
Employee: **Role** **Review Type** **Completed Date**	Zuck, Daniel HASP Reviewer Approve 9/7/2016	
Employee: **Role** **Review Type** **Completed Date**	Yates, Vivian Quality Reviewer NA 9/12/2016	This JSA calls out special attention to routine tasks that can sometimes become second nature with system O&M. I thought it was great to see detail regarding careful emptying of KO tank water, switching gloves for different tasks and safe handling of drums.

Job Safety Analysis

General

JSA ID	20166	**Status**	(3) Completed
Job Name	Construction-Oversight - excavation and construction	**Created Date**	4/25/2024
Task Description	Oversight of installation of thermal system	**Completed Date**	04/26/2024
Template	False	**Auto Closed**	False

Client / Project

Client	GTE Operations Support, Inc.
Project Number	30245593 (updated PN on 7/1/2025)
Project Name	GTEOSI Seneca Falls
PIC	Mall, Richard (updated PIC on 7/1/2025)
Project Manager	Flusche, Mark

User Roles

Role	Employee	Due Date	Completed Date	Supervisor	Active
Developer	Kassel, Chris	5/10/2024	4/26/2024	McCune, Bill	☑
HASP Reviewer	Kassel, Chris	5/10/2024	9/4/2025	McCune, Bill	☑
Quality Reviewer	Nguyen, Bao Quynh	4/30/2024	4/30/2024	Malek, Hamidreza	☑

Job Steps

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
1	Utility Clearance	1	Contact with utilities can cause injury, property damage, and cause releases of hazardous substances to the environment.	Establish a minimum of three lines of evidence, and obtain additional lines of evidence as needed for site specific conditions. Maintain utility markings, perform detailed site inspections, and keep open and constant communication between operators, onsite staff, and project management. Always Use Stop Work Authority if there is a question or concern about the location of a utility.	ARCHSFS019 - Utility Clearance HS Standard
		2	Slip trip and falls while performing site clearance activities	Focus on task at hand and do not hurry through task. Avoid reading maps/drawings while walking, stop walking when looking up for overhead utilities.	
2	Excavation/Trenching and Backfilling Oversight	1	Struck by equipment during excavation, entrapment, chemical exposure, slips trips and fall hazards	Stand clear of excavation operations (10 feet from equipment, 6 feet from edge of excavation). Keep spoil piles at least 2 feet from excavation edge. Wear appropriate PPE. See Excavation JSA (17809) for full list of potential hazards and critical actions relating to excavation.	Excavation Oversight JSA (17809)
3	Drilling Oversight	1	Struck by equipment and pinch points, chemical exposure, flying debris	Stay at least 5 feet away from the drill rig and moving parts. Wear appropriate PPE. See Drilling JSA (5023) for a full list of potential hazards and critical actions.	Drilling JSA (5023)
4	Above and Below Grade Pipe Run Construction Oversight	1	Slips trips and falls while inspecting and reviewing work by contractor.	Focus on task at hand and do not hurry through task. Avoid looking at documents/drawings while moving in the container. Maintain balance while stepping between and near equipment. Stand still while photodocumenting work completion.	Traffic Safety Plan (TSP)
		2	Struck by - unstable or partially deconstructed piping or supports unexpectedly falling during work.	Provide proper bracing and support for piping or pipe racks during installation.	

4	Above and Below Grade Pipe Run Construction Oversight	3	Struck by - heavy equipment and active truck traffic	Maintain a safe distance from heavy equipment. Review and follow the Traffic Safety Plan (TSP). Be cognizant of PPE-created hazards such as hearing protection. Divert traffic away from work area when possible.	
5	Remediation System Construction	1	Electrocution from contact with energized system components.	Review Lock-Out Tag-Out (LOTO) plan prior to initiating work. Follow Arcadis electrical procedure. Wear electrical rated gloves and footwear and make sure to inspect PPE prior to work activities.	Lock-Out Tag-Out (LOTO) Plan - attached to HASP
		2	Thermal hazard (burns) from contact with piping	Proper PPE should be used if the piping needs to be contacted based on the temperature. Insulate locations where inadvertant contact might occur if possible. Label hot surfaces. Contact with piping should be avoided unless necessary.	
		3	Excessive temperature during system installation and testing.	Take frequent breaks in hot weather outside of the trailer with water to cool core temperature. See Arcadis Heat Illness Prevention Plan	
		4	Struck by - heavy equipment and active truck traffic	See critical actions listed in "Above and Below Grade Pipe Run Construction Oversight" job step.	
6	Hot Media Sampling	1	Thermal hazard (burns) from contact with soil or liquids	Ensure tools and PPE can withstand the heat of the media. For soils, proper tools and PPE should be used to prevent the soil from coming into contact with the body. For liquids, proper PPE should be used to prevent accidental spray and splashes from contacting body. Open valves slowly and stand to the side to direct potential spray away from the body.	

PPE — Personal Protective Equipment

Type	Personal Protective Equipment	Description	Required
Dermal Protection	long sleeve shirt/pants		Required
Eye Protection	safety glasses		Required
Foot Protection	steel-toe boots		Required
Hand Protection	chemical resistant gloves (specify type)	Nitrile	Required
	insulated gloves	Electrical insulated for electrical work	Required
	work gloves (specify type)	Leather, heat resistant	Required
Head Protection	hard hat		Required
Hearing Protection	ear plugs		Required
Miscellaneous PPE	traffic vest--Class II or III		Required

Supplies

Type	Supply	Description	Required
Communication Devices	mobile phone		Required
Miscellaneous	fire extinguisher		Required
	first aid kit		Required
Personal	eye wash (specify type)		Required
	insect repellent		Recommended
	sunscreen		Recommended
	water/fluid replacement		Recommended
Traffic Control	barricades		Recommended

Review Comments

Reviewer		Comments
Employee: **Role** **Review Type** **Completed Date**	Kassel, Chris HASP Reviewer Approve 4/26/2024	Good use of project-specific references.
Employee: **Role** **Review Type** **Completed Date**	Nguyen, Bao Quynh Quality Reviewer NA 4/30/2024	Great information for a safety checklist. Thank you for sharing this helpful tips.

Job Safety Analysis

General

JSA ID	166	**Status**	(3) Completed
Job Name	Environment-Sample cooler handling	**Created Date**	5/1/2009
Task Description	Sample cooler handling	**Completed Date**	05/13/2009
Template	True	**Auto Closed**	False

Client / Project

Client	GTE Operations Support, Inc.
Project Number	30245593 (update PN on 7/1/2025)
Project Name	GTEOSI Seneca Falls
PIC	Mall, Richard (update PIC on 7/1/2025
Project Manager	Flusche, Mark

User Roles

Role	Employee	Due Date	Completed Date	Supervisor	Active
Developer	Kassel, Chris	12/19/2011	5/11/2009	McCune, Bill	☐
HASP Reviewer	Kassel, Chris	5/4/2009	9/4/2025	McCune, Bill	☑

Job Steps

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
1	Transfer field samples to sample packing area	1	Lifting heavy coolers may result in muscle strain especially to lower back.	Use proper lifting techniques and keep back straight. Use buddy system for large coolers, Use mechanical aids like hand trucks if readily available to move coolers. Do not over fill coolers with full sample containers for temporary movement to the sample prep area. Ensure an adequate supply of sample coolers are in field.	
		2	Hazards to hands from broken glass caused by over tightening lids or improper placement in cooler	Inspect all bottles and bottle caps for cracks/leaks before and after filling container. Do not over tighten sample lids. Clean up any broken bottles immediately, avoid contact with sample preservatives. Wear leather gloves when handling broken glass.	
		3	Exposure to chemicals (acid preservatives or site contaminants) on the exterior of sample bottles after filling.	Wear protective gloves for acid preservatives and safety glasses with side shields during all sample container handling activities (before and after filling), Once filled follow project specific HASP PPE requirements for skin and eye protection.	
		4	Samples containing hazardous materials may violate DOT/IATA HazMat shipping regulations	All persons filling a sample bottle or preparing a cooler for shipment must have complete ARCADIS DOT HazMat shipping training. Compare the samples collected to the materials described in the Shipping Determination for the Project and ensure consistent. Re-perform all Shipping determinations if free product is collected and not anticipated during planning.	
2	Sample cooler selection	1	Sample coolers with defective handles, lid hinges, lid hasps cracked or otherwise damaged may result in injury (cuts to hands, crushing of feet if handle breaks etc)	Only use coolers that are new or in like new condition, No rope handled coolers unless part of the manufacturer's handle design.	ARCADIS Shipping Guide US-001
		2	Selection of excessively large coolers introduces lifting hazards once the cooler is filled.	Select coolers and instruct lab to only provide coolers of a size appropriate for the material being shipped. For ordinary sample shipping sample coolers should be 48 quart capacity or smaller to reduce lifting hazards.	
3	Pack Samples	1	Pinch points and abrasions to hands from cooler lid closing unexpectedly	Beware that lid could slam shut; block/brace if needed; be wary of packing in strong winds. New coolers may be more prone to self closing, tilt cooler back slightly to facilitate keeping lid open.	

3	Pack Samples	2	Awkward body positions and contact stress to legs and knees when preparing coolers on irregular or hard ground surfaces.	Plan cooler prep activities. Situate cooler where neutral body positions can be maintained if practical, like truck tailgate. Avoid cooler prep on rough gravel surfaces unless knees and legs protected during kneeling.	
		3	Frostbite or potential for oxygen deficiency when packing with dry ice. Contact cold stress to fingers handling blue ice or wet ice	Dry ice temperature is -109.30F. Wear thermal protective gloves. DO NOT TOUCH with bare skin! Dry ice sublimates at room temp and could create oxygen deficiency in closed environment. Maintain adequate ventilation! Do not keep dry ice in cab of truck. Wear gloves when handling blue ice or gaging wet ice. Dry Ice is DOT regulated for air shipping, follow procedures in Shipping Determination.	
4	Sealing, labeling and Marking Cooler	1	Cuts to hands and forearms from strapping tape placement or removing old tape and labels	Do not use a fixed, open-blade knife to remove old tags/labels, USE SCISSORS or other safety style cutting device. Only use devices designed for cutting. Do not hurry through task.	
		2	Lifting and awkward body position hazards from taping heavy coolers, dropping coolers on feet during taping.	Do not hurry through the taping tasks, ensure samples in cooler are evenly distributed in cooler to reduce potential for overhanging cooler falling off edge of tailgate/table when taping.	
		3	Improper labeling and marking may result in violation of DOT/IATA HazMat shipping regulations delaying shipment or resulting in regulatory penalty	Do not deviate from ARCADIS Shipping Guide or Shipping Determination marking or labeling requirements.	
5	Offering sample cooler to a carrier or lab courier for shipment.	1	Lifting heavy coolers may result in muscle strain especially to lower back.	See lifting hazard controls above.	
		2	Carrier refusal to accept cooler may cause shipping delay and/or result in violation of DOT HazMat shipping regulations.	Promptly report all rejected and refused shipments to the ARCADIS DOT Program Manager. Do Not re-offer shipment if carrier requires additional labels markings or paperwork inconsistent with your training or Shipping Determination without contacting the ARCADIS DOT Compliance Manager.	

PPE — Personal Protective Equipment

Type	Personal Protective Equipment	Description	Required
Eye Protection	safety glasses		Required
Hand Protection	chemical resistant gloves (specify type)	nitrile	Required
	work gloves (specify type)	leather	Required

Supplies

Type	Supply	Description	Required
Miscellaneous	Other	Scissors	Required

Review Comments

Reviewer		Comments
Employee: **Role** **Review Type** **Completed Date**	Moyers, Samuel HASP Reviewer Revise 5/11/2009	Kevlar is required? Leather work gloves are listed. i suggest just leather gloves.
Employee: **Role** **Review Type** **Completed Date**	Moyers, Samuel HASP Reviewer Approve 5/13/2009	

Job Safety Analysis

General

JSA ID	18741	**Status**	(3) Completed
Job Name	Environment-Other	**Created Date**	3/4/2022
Task Description	Utility Locate	**Completed Date**	03/07/2022
Template	False	**Auto Closed**	False

Client / Project

Client	GTE Operations Support, Inc.
Project Number	30245593 (updated PN on 7/1/2025)
Project Name	GTEOSI Seneca Falls
PIC	Mall, Richard (updated PIC on 7/1/2025)
Project Manager	Flusche, Mark

User Roles

Role	Employee	Due Date	Completed Date	Supervisor	Active
Developer	Kassel, Chris	3/18/2022	3/7/2022	McCune, Bill	☑
HASP Reviewer	Kassel, Chris	3/21/2022	9/4/2025	McCune, Bill	☐

Job Steps

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
1	Driving to work locations	1	Striking equipment/vehicles, pedestrians, or land/site attributes.	Staying alert while in the vehicle, following the Smith system for driving, avoiding distractions.	Utility Locate Procedures ARC_HSFS019
		2	Traffic hazards, subsurface/overhead utilities, property damage	Complete utility clearance checklist. Review site locations and survey specifications. Wear a fire resistant traffic vest. Follow the STAR Plan for traffic awareness.	
2	Set up in work area	1	Encountering dangerous biological hazards including; ticks, bees, snakes, poison ivy, exc.	Wear proper PPE, scan the area you are about to work in, and follow Health and Safety guidelines for poisonous plants. Open suspected bee hives or dangerous insect homes with caution. Do a regular body check. **Bring epi pen if allergic.**	Utility Locate Procedures ARC_HSFS019
		2	Slips trips and falls on wet, uneven or steep sloped surfaces	Identify and remove or minimize trip hazards. Check for wet/slippery walking surfaces, equipment, excavations, among others. Select the less dangerous and authorized access routes. Don't walk across barricaded or non-authorized areas. Don’t walk on berm slope – use designated stairs and ramps.	
		3	Awkward body positions and twisting	Plan activity to avoid twisting of body or awkward body positions. Use buddy system or job rotation to reduce exposure to conditions that cannot be avoided.	
3	Perform ground scan (GPR, EM, metal detector)	1	Pinch hazards to fingers from equipment cases	Keep away the fingers from "line of fire". Be careful when handle equipment cases during open/close task. Wear leather gloves.	Utility Locate Procedures ARC_HSFS019
		2	Lifting hazards from demobilizing equipment from work area	Use buddy system to lift heavy equipment. Implement good lifting / carrying techniques and proper body positioning practices.	
		3	Ergonomic injury form improper or prolonged use of carried devices that are long or bulky	Take breaks to reduce potential for injury. Implement proper lifting and body position practices. Use buddy system for carrying heavy devices or equipment.	
4	Opening utility corridors	1	Strains from opening manholes	Take breaks to reduce potential for injury. Implement proper lifting and body position practices. Use buddy system for carrying heavy devices or equipment. Do not bend at waist when removing.	Utility Locate Procedures ARC_HSFS019
		2	Electrical shocks	Maintain distance between down electrical lines, do not handle broken electrical equipment, turn power off and/or proceed with caution when surveying around running equipment.	

4	Opening utility corridors	3	Chemical exposure from site COCs	Use 4-gas or 5-gas meter in required areas (near tanks), and wear fire resistant (FR) clothing in process areas. Be cautious around sewer vapors and wear proper PPE.	

PPE — Personal Protective Equipment

Type	Personal Protective Equipment	Description	Required
Dermal Protection	long sleeve shirt/pants		Required
Eye Protection	safety glasses		Required
Foot Protection	steel-toe boots		Required
Hand Protection	chemical resistant gloves (specify type)	Nitrile	Required
	work gloves (specify type)	Leather	Required
Head Protection	hard hat		Required
Miscellaneous PPE	traffic vest--Class II or III		Required

Supplies

Type	Supply	Description	Required
Communication Devices	mobile phone		Required
	walkie talkie		Recommended
Decontamination	Decon supplies (specify type)		Required
Miscellaneous	fire extinguisher		Required
	first aid kit		Required
	flashlight		Required
	Vehicle Flag		Required
Personal	eye wash (specify type)	Bottle	Required
	insect repellent		Required
	sunscreen		Required
Traffic Control	traffic cones		Recommended

Review Comments

Reviewer		Comments
Employee: **Role** **Review Type** **Completed Date**	Crain, Talitha HASP Reviewer Revise 3/4/2022	Please add the utility locate H&S standard in the last column as it should be referenced for this activity.
Employee: **Role** **Review Type** **Completed Date**	Crain, Talitha HASP Reviewer Approve 3/7/2022	

Job Safety Analysis

General

JSA ID	18516	**Status**	(3) Completed
Job Name	Environment-Geophysical survey	**Created Date**	10/7/2021
Task Description	Geophysical Survey	**Completed Date**	11/04/2021
Template	False	**Auto Closed**	True

Client / Project

Client	GTE Operations Support, Inc.
Project Number	30245593 (updated PN on 7/1/2025)
Project Name	GTEOSI Seneca Falls
PIC	Mall, Richard (updated PIC on 7/1/2025)
Project Manager	Flusche, Mark

User Roles

Role	Employee	Due Date	Completed Date	Supervisor	Active
Developer	Kassel, Chris	10/28/2021	10/7/2021	McCune, Bill	☑
HASP Reviewer	Kassel, Chris	10/21/2021	9/4/2025	McCune, Bill	☑
Quality Reviewer	Vargas, Renato	11/15/2021	11/15/2021	Enam, Muhammad	☑

Job Steps

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
1	Mobilization of equipment to survey area	1	Lifting hazards (heavy or bulky equipment)	Use TRACK to plan lifts and routes to work location. Use proper lifting techniques.	US Field H&S Handbook Section 3.27 and 3.22
		2	Awkward body positions and twisting	Plan activity to avoid twisting of body or awkward body positions. Use buddy system or job rotation to reduce exposure to conditions that cannot be avoided.	
		3	Trip and fall hazards from uneven ground or restricted view when carrying equipment	Break loads down to manageable sizes that do not obstruct view of ground. Plan route and use TRACK, wear footwear with good tread and ankle support. Use buddy system for large or bulky items when carrying.	
2	Set up survey grid and control	1	Slip trip and fall hazards from wet, uneven ground or over vegetation.	See step one controls	US Field H&S Handbook Section 3.27 and 3.22
		2	Crush hazard or contact stress to hands/fingers from inserting pins or stakes.	Wear leather gloves when inserting pins, flagging, or stakes into the ground. Do not hurry task if hammering.	
		3	Struck by hazards by vehicles if working in traffic area.	Establish traffic control and wear a Class II traffic vest if in traffic area. Use vehicles to block work area when practical.	
		4	Repetitive stress from repeated bending or squatting during grid construction	Use job rotation when hazard exists, stretch before performing work activity. Use paint device that allows employee to stand up while spraying.	
		5	Chemical exposure from using spray paint	Stand upwind of paint spraying activities. Test spray at proper angle using proper force and amount on surface. Well-ventilated locations will protect from inhalation. Review SDS sheet for spray paint.	
3	Performing survey	1	Slips trips and falls on wet, uneven or steep sloped surfaces	See step one controls	US Field H&S Handbook Section 3.27 and 3.22
		2	Scrapes or cuts to hands, arms or legs from equipment or vegetation in area.	Wear leather or other suitable gloves when performing survey, wear long pants, wear heavy long sleeve shirt if arm hazard exists.	
		3	Noise hazards from survey equipment using percussion devices	Wear hearing protection, keep unnecessary workers away from devices when activated.	
		4	Ergonomic injury from improper or prolonged use of carried devices that are long or bulky.	Use job rotation to reduce potential for injury..	

4	Demobilization and clean up	1	Muscle strain from removing pins or stakes	Use devices that maintain neutral body positions to remove pins when practical. Do not bend at waist when removing.	US Field H&S Handbook Section 3.30
		2	Pinch hazards to fingers from equipment cases	Identify hazard and avoid, pack equipment properly so that no wires or cables protrude from case requiring fingers to push into case when closing.	
		3	Lifting hazards from demobilizing equipment from work area	See step one controls	
		4	Slips, trips, and falls carrying equipment that obstructs view or on wet or uneven surfaces.	Keep area clear of debris. Plan walking path prior to carrying view obstructing load. Make multiple trips if needed to avoid view obstruction hazard.	US Field H&S Handbook Section 3.9.

PPE — Personal Protective Equipment

Type	Personal Protective Equipment	Description	Required
Dermal Protection	long sleeve shirt/pants		Required
Eye Protection	safety glasses		Required
Foot Protection	steel-toe boots	supportive with new tread	Required
Hand Protection	work gloves (specify type)	ANSI Level 2 cut resistant gloves	Required
Head Protection	hard hat		Recommended
Miscellaneous PPE	traffic vest--Class II or III	Class II	Required

Supplies

Type	Supply	Description	Required
Communication Devices	mobile phone		Required
Miscellaneous	first aid kit		Required
Personal	insect repellent		Recommended
	sunscreen		Recommended

Review Comments

Reviewer		Comments
Employee: **Role** **Review Type** **Completed Date**	Vargas, Renato Quality Reviewer NA 11/15/2021	A comprehensive JSA for Environment-Geophysical survey. The following review comments are offered to improve the JSA: 1. Consider adding identifying location and best route to the closest hospital. Identify call number to report emergencies at the site. 2. Conduct a Tailgate Safety Meeting after the completion of work and annotate any additional potential hazard and critical action identified during the survey. 3. Include potential hazard and critical actions of surveying near bodies of water.

Job Safety Analysis

General

JSA ID	19566	**Status**	(3) Completed
Job Name	OM&M Component and Infrastructure Inspections	**Created Date**	5/8/2023
Task Description	Crawlspace Confined Space Entry	**Completed Date**	06/19/2023
Template	FALSE	**Auto Closed**	TRUE

Client / Project

Client	GTE Operations Support, Inc.
Project Number	30245593 (updated PN on 7/1/2025)
Project Name	GTEOSI Seneca Falls
PIC	Mall, Richard (updated PIC on 7/1/2025)
Project Manager	Flusche, Mark

User Roles

Role	Employee	Due Date	Completed Date	Supervisor	Active
Developer	Kassel, Chris	5/29/2023		McCune, Bill	☑

Job Steps

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
1	Inspect all entry equipment and verify that air monitoring equipment is calibrated and functioning properly.	1	Injury or death	Verify that the multigas monitor is properly calibrated and functioning. The meter must have the ability to measure oxygen, lower explosive limit (LEL),hydrogen sulfide (H2S), and carbon monoxide (CO).	ARCADIS H&S Standard (ARC HSFS003) Confined Space Entry/ US Field H&S Handbook Section 3.23.
		2	Injury or death	Verify that all equipment is explosion proof or intrinsically safe.	
		3	Injury or death.	Inspect entry equipment to assure they are in good working condition. If it is determined to be a permit required confined space, STOP WORK and Arcadis staff will not enter.	
2	Check weather forecast and coordinate entry operations with client's employees, police, fire and EMS agencies	1	Rain storm can cause flooding in confined space.	Check the weather forecast and weather history to ensure that there is not a chance of flooding during the entry into the confined space.	
		2	Injury in the confined space, as a result of emergency situations or incidents.	As applicable, contact the client, local safety forces (police & fire) and local EMS for any rescue type situations associated with the Confined Space entry work. Ensure that staff have the necessary training associated with emergency situations in the confined space.	
3	Pre-entry meeting	1	Injury due to personnel not knowing their job requirements.	Assign the roles of entrants, attendants, and supervisor to employees with the required Confined Space training.	ARCADIS H&S Standard (ARC HSFS003) Confined Space Entry, US Field H&S Handbook Section 3.23.
		2	Injury or death	Discuss the emergency procedures and review the names of personnel that will be contacted in the event of an emergency.	
		3	Injury or death	Conduct a Tailgate Meeting to review the planned work activities and associated hazards for the confined space work period.	
		4	Injury or death	Complete the Confined Space Entry Checklist in Section 5 of the ARCADIS H&S Standard (HSFS003 Confined Space Entry). If it determined to be a permit required confined space, STOP WORK and Arcadis staff will not enter.	

4	Prepare site and enter confined space.	1	Traffic hazards	Use the buddy system to set up traffic control equipment and devices. Refer to the Traffic Safety Plan to ensure proper setup.	ARCADIS H&S Standard (ARC HSFS003) Confined Space Entry/ US Field H&S Handbook Section 3.23.
		2	Injury, death, and inadequate oxygen levels.	Test the air in confined space with multi gas detector prior to entry. Obtain readings at top, middle, and bottom of confined space to determine atmospheric conditions.	
		3	Injury and death, inadequate oxygen, low lighting conditions.	A multi gas meter will be used to continually monitor the air conditions in the confined space. The attendant and the entrant will be in constant contact throughout the entry. Entrant will proceed slowly and will not lose contact with the attendant for any reason while in the confined space.	
		4	Slips, trips, falls, and pinch points	Wear steel-toe boots and leather gloves when lifting heavy objects. Bend at the knees when lifting and have a clear path to the location before lifting it.Use buddy system if object is too heavy or bulky.	
5	Demobilization	1	Traffic hazards, lifting strain, pinch points.	Use the buddy system while removing traffic controls. Wear leather gloves while handling barricades and confined space equipment. Bend at the knees when lifting heavy objects. Have a clear path and a location to place the objects before moving it. Cleanup entry equipment and work area.	

PPE — Personal Protective Equipment

Type	Personal Protective Equipment	Description	Required
Dermal Protection	chemical protective suit (specify type)	Tyvek	Required
	coveralls		Recommended
	long sleeve shirt/pants		Required
Eye Protection	safety glasses		Required
Foot Protection	outer boot covers		Recommended
	steel-toe boots		Required
Hand Protection	work gloves (specify type)	Leather & nitrile	Required
Head Protection	hard hat		Required
Miscellaneous PPE	traffic vest--Class II or III		Required

Supplies

Type	Supply	Description	Required
Communication Devices	mobile phone		Required
	walkie talkie		Recommended
Miscellaneous	auxilary lighting	Intrinsically safe Headlamp	Required
	fire extinguisher		Required
	first aid kit		Required
	flashlight	Intrinsically safe	Required
	Other	duct Tape	Required
	Other	Multi Gas meter	Required
Personal	eye wash (specify type)	Eye saline	Required
	insect repellent	deet>90	Recommended
	water/fluid replacement		Recommended
Traffic Control	barricades		Required
	traffic cones		Required

Job Safety Analysis

General

JSA ID	16911	**Status**	(3) Completed
Job Name	Environment-Other	**Created Date**	5/6/2019
Task Description	Decontamination	**Completed Date**	06/03/2019
Template	False	**Auto Closed**	True

Client / Project

Client	GTE Operations Support, Inc.
Project Number	30245593 (updated PN on 7/1/2025)
Project Name	GTEOSI Seneca Falls
PIC	Mall, Richard (updated PIC on 7/1/2025)
Project Manager	Mark Flusche

User Roles

Role		Due Date	Completed Date	Supervisor	Active
Developer	Kassel, Chris	5/27/2019	5/6/2019	McCune, Bill	☑
HASP Reviewer	Kassel, Chris	5/20/2019	9/4/2025	McCune, Bill	☑
Quality Reviewer	Caris, Elisabeth	7/3/2019	7/3/2019	Caris, Elisabeth	☐

Job Steps

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
1	Setting up decontamination area	1	Slip, trip, and fall caused by uneven surfaces	Check decontamination area for slip/trip/fall hazards (i.e., equipment, vegetation roots/limbs, rocks, potholes). Identify and remove trip hazards from walking path. If not possible to remove hazards, flag hazards with bright paint or flagging tape. Maintain good housekeeping of equipment. Verbally communicate location of flagged hazard to other field personnel working in the area to minimize slip/trip/fall hazards.	
		2	Pinch points or sharp edges	Prior to starting work, identify pinch points and sharp edges on equipment and avoid those areas when handling. Wear leather work gloves to protect hands and fingers during loading and unloading.	
		3	Back/neck strains/sprains from lifting equipment	Lift with legs and not back to prevent back strain. Use two field personnel to lift the load if it is over 50 pounds. Load items using two persons to minimize awkward positions to prevent back strains.	
		4	Dropping equipment on self or others	Do not carry wet equipment. If equipment is wet, wipe off excess moisture to prevent dropping it and causing a struck-by injury. Carry fewer items, make more trips to maintain balance. Do not stack equipment above chest height to maintain good line-of-sight to ground to scan for slip/trip/fall hazards. If items are stacked, make sure they are secured together before carrying. Maintain clear path while walking. Wear steel-toed boots to protect feet.	
2	Decontamination of tools and equipment	1	Exposure to/ contact with contaminated media	Establish and enforce a minimum 10-ft exclusion zone around decontamination area to prevent splashing on and exposure of decon water to others. Pour contaminated media from smaller temporary storage containers (i.e., buckets) into drums slowly to prevent splashing onto self. Close and secure drums with affected media immediately after use to prevent exposure to affected soils or decon water. Do not handle contaminated media with bare hands to prevent dermal irritation. Wear nitrile gloves over work gloves when handling contaminated equipment to protect hands from dermal exposure to chemicals.	US Field H&S Handbook 3.10.4.1

2	Decontamination of tools and equipment	2	Splashing face/skin with decon fluids in spray bottles	When cleaning equipment, minimize over-spraying to prevent backsplash. Make sure nozzle is adjusted properly as to not overspray. Shut nozzles on spray bottles when not in use to prevent dripping/leaking. Spray equipment down into dedicated container. Never spray equipment into the wind. Handle all decon fluids slowly and spray deliberately. Wear a face shield over safety glasses if necessary. Always handle decon cleaning bottles wearing nitrile gloves.	
		3	Slip/trip/fall hazards in walking path	Maintain good housekeeping. Keep work area neat with all unnecessary equipment stored to avoid trip hazards. Do not walk on plastic sheeting around decontamination area. Do not rush through tasks.	
		4	Spilling buckets of decontamination water on the ground	Do not place buckets or drums on unleveled ground to prevent contents from spilling and causing a release. Immediately empty any intermediate or temporary storage containers of decon water or affected media into drums that can be lidded securely when not in use to prevent contents from spilling and causing a release. Securely close lid on decon bucket/drum when not in use.	

PPE — Personal Protective Equipment

Type	Personal Protective Equipment	Description	Required
Dermal Protection	long sleeve shirt/pants		Required
Eye Protection	faceshield		Recommended
	safety glasses		Required
Foot Protection	steel-toe boots		Required
Hand Protection	texturized work gloves	rubber	Required

Supplies

Type	Supply	Description	Required
Communication Devices	mobile phone		Required
Decontamination	Decon supplies (specify type)	alconox, DI water, nitric acid, acetone	Required
Miscellaneous	fire extinguisher		Required
	first aid kit		Required
Personal	eye wash (specify type)	personal	Required
	insect repellent		Recommended
	sunscreen		Recommended
	water/fluid replacement		Required
Traffic Control	traffic cones		Recommended

Review Comments

Reviewer		Comments
Employee: **Role** **Review Type** **Completed Date**	Caris, Elisabeth Quality Reviewer NA 7/3/2019	This is very thorough, was easy to follow, and felt well thought out. I appreciated that each job description had multiple potential hazards and a well thought out critical action plan for each. There were two things missing - for steps 1 and 2, you cite specific H&S references; however, there are none listed for steps 3-6 even though you have thoroughly explained in the critical action component what you would do. Furthermore, under PPE - dermal protection - chemical protective suit and hand protection - work gloves, it states (specify type) but there is nothing listed.

Job Safety Analysis

General

JSA ID	5023	**Status**	(3) Completed
Job Name	Environment-Drilling, soil sampling, well installation	**Created Date**	4/28/2011
Task Description	Drilling, Direct-Push, Soil Sampling, Well Installation	**Completed Date**	04/28/2011
Template	False	**Auto Closed**	False

Client / Project

Client	GTE Operations Support, Inc.
Project Number	30245593 (updated PN on 7/1/2025)
Project Name	GTEOSI Seneca Falls
PIC	Mall, Richard (updated PIC on 7/1/2025)
Project Manager	Flusche, Mark

User Roles

Role	Employee	Due Date	Completed Date	Supervisor	Active
Developer	Kassel, Chris	5/19/2011	9/4/2025	McCune, Bill	☑

Job Steps

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
1	Set up necessary traffic and public access controls	1	Struck by vehicle due to improper traffic controls	Use a buddy system for placing site control cones and/or signage. Position vehicle so that you are protected from moving traffic. Wear Class II traffic vest	
2	Utility Clearance	1	Potential to encounter underground or aboveground utilities while drilling	Complete utility clearance in accordance with the ARCADIS H&S procedure	ARCADIS H&S Procedure ARCHSFS019
3	General drill rig operation	1	Excessive noise is generated by rig operation.	When the engine is used at high RPMs or soil samples are being collected, use hearing protection.	
		2	During drill rig operation, surfaces will become hot and cause burns if touched, and COCs in the soils more readily vaporize generating airborne contaminates.	Due to friction and lack of a drilling fluid, heat will be produced during this method. Mainly drill augers. Be careful handling split spoons. Wear proper work gloves. When soils and parts become heated, the COC could volatilize. Air monitoring should always be performed in accordance with the HASP.	
		3	Moving parts of the drilling rig can pull you in causing injury. Pinch points on the rig and auger connections can cause pinching or crushing of body parts.	Stay at least 5 feet away from moving parts of the drill rig. Know where the kill switch is, and have the drillers test it to verify that it is working. Do not wear loose clothing, and tie long hair back. Avoid wearing jewelry while drilling. Cone off the work area to keep general public away from the drilling rig	
		4	Dust and debris can cause eye injury and soil cuttings and/or water could contain COCs.	Wear safety glasses and stay as far away from actual drilling. W operation as practicable. Wear appropriate gloves to protect from COCs.	
		5	Drilling equipment laying on the ground (i.e. augers, split spoons, decon equipment, coolers, etc), create a tripping hazard. Water from decon buckets generate mud and cause a slipping hazard.	Keep equipment and trash picked up, and store away from the primary work area.	
		6	The raised derrick can strike overhead utilities, tree limbs or other elevated items	Never move the rig with the derrick up. Ensure there is proper clearance to raise the derrick, and that you are far enough away from overhead power lines. See the Utility Location H&S policy and procedure for guidance.	

4	Mudd rotary drilling	1	The raised derrick can strike overhead utilities, tree limbs or other elevated items	Never move the rig with the derrick up. Ensure there is proper clearance to raise the derrick, and that you are far enough away from overhead power lines. See the Utility Location H&S policy and procedure for guidance.	
		2	This technology uses fluid, which collects with sediments in large basin. Fluid can splash out and cause slipping/mud hazard. Liquid mixture can splash into your eyes.	Wear rubber boots if needed, and keep clear of muddy/wet area as much as practicable. If area becomes excessively muddy, consider mud spikes or covering the area with a material that improves traction. Wear safety glasses.	
5	Hollow stem auger drilling	1	All hazards in step 3 apply. Additionally,The raised derrick can strike overhead utilities, tree limbs or other elevated items	Never move the rig with the derrick up. Ensure there is proper clearance to raise the derrick, and that you are far enough away from overhead power lines. See the Utility Location H&S policy and procedure for guidance.	
6	Air rotary drilling	1	this drilling method works with high air pressure and can generate flying debris that can strike your body or get debris in your eyes.	When the drill rig is being driven into media, it will produce flying debris. The flaps behind the drill rig should stay closed whenever possible to reduce the risk of flying debris. Safety glasses and hard hat should always be worn when the drill rig is operating. When penetrating asphalt protect surrounding cars that may be present to avoid debris damage to paint or winshields.	
		2	The raised derrick can strike overhead utilities, tree limbs or other elevated items	Never move the rig with the derrick up. Ensure there is proper clearance to raise the derrick, and that you are far enough away from overhead power lines. See the Utility Location H&S policy and procedure for guidance.	
		3	When drilling through bedrock prior to groundwater dust can be produced from pulverization. Inhalation of dusts/powder can occur	Supplemental water should be used to manage dust creation and/or dust masks if necessary.	
7	Reverse rotary drilling	1	This method will use fresh water to pump out drill cuttings through the center of the casing. Water/sediment mixture is generated and could cause contact with impacted soils or groundwater	Ensure the pit construction can hold the amount of cuttings that are anticipated. Air monitoring should also be used of pit area	
		2	Fire hydrants are often used for water source. Hydrants deliver water at high pressure. Pressurized water can cause flying parts/debris and excessive slipping hazards.	Water usage from fire hydrants should be cleared with local muncipalities prior to use. Only persons that know how to use the hydrant should be performing this task. Ensure all connections are tight, and hose line is not run over to cut by traffic. Any leaks from the hydrant should be reported immediately.	
		3	Settling pit construction can cause tripping hazard from excavated soils, and plastic sheeting can cause slipping.	cone off the area to keep the general public/visitors away from the settling pit. Ensure proper sloping of excavation.	
		4	The raised derrick can strike overhead utilities, tree limbs or other elevated items	Never move the rig with the derrick up. Ensure there is proper clearance to raise the derrick, and that you are far enough away from overhead power lines. See the Utility Location H&S policy and procedure for guidance.	
8	Rotosonic drilling	1	Fire hydrants are often used for water source. Hydrants deliver water at high pressure. Pressurized water can cause flying parts/debris and excessive slipping hazards.	Water usage from fire hydrants should be cleared with local muncipalities prior to use. Only persons that know how to use the hydrant should be performing this task. Ensure all connections are tight, and hose line is not run over to cut by traffic. Any leaks from the hydrant should be reported immediately	

8	Rotosonic drilling	2	This method requires a lot of clearance. The drill head can turn 90 degrees to attach to the next drill flight or casing. This usually requires a large support truck to park directly behind the rig. As the drill head raises the new casing flight is angled down at the same time until it can be turned completely vertical.	Ensure sufficient overhead clearance.	
		3	Heavy lifting of cores can cause muscle strain.	Always use 2 people to move core containers. Use caution moving core samples to layout area. Plan layout area to ensure adequate aisle space between core runs for logging. Keep back straight and use job rotation.	
		4	The rotosonic drill head can move very quickly up and down while working on a borehole. Moving parts can strike someone or catch body parts	The operator and helper must communicate and stay clear of the path of the drill head. The drill utilizes two large hydrualic clamps to continuously hold casings while load/unloading previous casings. Do not wear loose clothing.	
9	Direct push drilling	1	The drill rods will be handled by workers most of the time rather than the rig doing it, therefore pinch points can cause lacerations and crushing of fingers/body parts.	Keep a minimum of 5 feet away from drill rig operation and moving parts.	
		2	The direct push rigs are uaually meant to fit in spaces where larger rig can't. Tight spaces can pin workers.	Do not put yourself between the rig and a fixed object. Use Spotters or a tape measure to ensure clearances in tight areas. Pre-plan equipment movement from one location to the next.	
		3	some direct push equipment is controlled by wireless devices. These controls can fail and equipment can strike workers or cause damage to property.	The drill rig should be used in a large open area to test wireless controls prior to moving to boring locations. The operator of the rig will test the kill switch with wireless remote prior to use. Operator will stay in range of rig while moving so that wireless signal will not be too weak and cause errors to the controls.	
		4	Sampling sleeves must be cut to obtain access to soil. Cutting can cause lacerations.	Preferably let the driller cut the sleeves open. Many drillers have holders for the sleeve to allow for stability when cutting. If we cut the sleeves, use a hook blade, change blade regularly, and cut away from the body.	
10	Rock Coring	1	flying debris can hit workers or cause debris to get in eyes.	Rock chips or overburden may become airborne from drilling method. Wear safety glasses and hard hat and remain at a safe distance from back of drill rig.	
		2	Heavy lifting of cores can cause muscle strain.	Always use 2 people to move core containers. Use caution moving core samples to layout area. Plan layout area to ensure adequate aisle space between core runs for logging. Keep back straight and use job rotation.	
11	Sample collection and processing	1	Injuries can result from pinch points on sampling equipment, and from breakage of sample containers.	Care should be taken when opening sampling equipment. Look at empty containers before picking them up, and do not over-tighten container caps. Use dividers to store containers in the cooler so they do not break.	Sample cooler handling JSA
		2	lifting heavy coolers can cause back injuries	Use two people to move heavy coolers. Use proper lifting techniques.	
12	Monitoring well installation	1	Same hazards as in Step 3 with general drill rig operation	See step 3	
		2	monitoring well construction materials can clutter the work area causing tripping hazards.	Well construction materials should be picked up during the well installation process.	

12	Monitoring well installation	3	Heavy lifting can cause muscle strains, and cutting open bags can cause lacerations.	Well construction materials are usually 50 lbs or greater. Team lift or use drill rig to hoist bags. Always use work gloves while cutting open bags.	
		4	Well pack material (i.e. sand, grout, bentonite) can become airborne and get in your eyes.	Wear safety glasses for protection from airborne sand and dust.	
		5	Cutting the top of the well to size can cause jagged/sharp edges on the top of the well casing.	Wear gloves when working with the top of the well casing, and file any sharp jagged edges that resulted from cutting to size.	
13	Soil cutting and purge water management	1	Moving full drums can cause back injury, or pinching/crushing injury.	Preferably have the drilling contractor move full drums with their equipment. If this is not practicable, use lift assist devices such as drum dollys, lift gates, etc. Employ proper lifting techniques, and perfrom TRACK to identify pinch/crush points. Wear leather work gloves, and clear all walking and work areas of debris prior to moving a drum.	Drum handling JSA

PPE — Personal Protective Equipment

Type	Personal Protective Equipment	Description	Required
Eye Protection	safety glasses		Required
Foot Protection	steel-toe boots		Required
Hand Protection	chemical resistant gloves (specify type)		Required
	work gloves (specify type)	leather	Required
Head Protection	hard hat		Required
Hearing Protection	ear plugs		Required
Miscellaneous PPE	traffic vest--Class II or III		Required
Respiratory Protection	dust mask		Recommended

Supplies

Type	Supply	Description	Required
Communication Devices	mobile phone		Required
Decontamination	Decon supplies (specify type)		Required
Miscellaneous	fire extinguisher		Required
	first aid kit		Required
Personal	eye wash (specify type)	bottle	Required
Traffic Control	traffic cones		Required

Job Safety Analysis

General

JSA ID	7983	**Status**	(3) Completed
Job Name	Environment-Drum sampling/handling	**Created Date**	7/26/2012
Task Description	Drum Handling, Sampling and Transfer of Drum Contents	**Completed Date**	07/26/2012
Template	True	**Auto Closed**	False

Client / Project

Client	GTE Operations Support, Inc.
Project Number	30245593 (updated PN on 7/1/2025)
Project Name	GTEOSI Seneca Falls
PIC	Mall, Richard (updated PIC on 7/1/2025)
Project Manager	Flusche, Mark

User Roles

Role	Employee	Due Date	Completed Date	Supervisor	Active
Developer	Kassel, Chris	8/16/2012	7/26/2012	McCune, Bill	☐
HASP Reviewer	Kassel, Chris	8/9/2012	9/4/2025	McCune, Bill	☐
Quality Reviewer	Hubbard, Lauren	7/27/2012	7/27/2012	Hubbard, Lauren	☐

Job Steps

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
1	Inspect Drums for signs of Bulging, Leaking, Crystals, Temperature, and Odor	1	Exposure to chemicals stored in drum or container.	Read drum labels for information about contents. Review all relevant MSDSs about chemical contents. If labels are not attached, call PM or Local H&S Representative.	None
		2	Contents of the drum can cause fire/explosion hazard.	Use air monitoring meters to screen drums. % LEL and VOCs (PPM). If either of the values are above the action levels described in the HASP or MSDS then Stop Work, move away from the area, and reassess the situation. Call PM and H&S staff for support.	
2	Remove lids or bungs from Drums	1	Hand Injuries can occur from sharp edges, pinch points, and from use of hand tools.	Wear appropriate work gloves. When removing ring from drum, fingers can get pinched between ring and drum. Keep fingers clear of this space. Select proper tool for task. If large amount of drums will be encountered, use a speed or drum wrench.	US Field H&S Handbook Section 3.31
		2	Rapid depressurization from empty or partially full drums can cause flying parts or volatile COCs releasing on staff.	Do not handle or open bulging drums (contact Corp H&S for assistance). Bleed any built up pressure by carefully loosening bung prior to removing ring. Keep face and arms away from bung opening when loosening. Slightly lift lid, insert end of air monitoring device to monitor air inside drum.	
		3	Use of mechanical tools to remove bolts from drum lids causes excessive noise.	Wear hearing protection.	
		4	Splashing can occur if filling drum, or collecting samples.	Wear eye and face protection. Pour liquids into drum slowly to minimize splashing.	
		5	When working with COCs that have fire/explosive properties, sparking or heat could cause fire/explosion.	Use brass or non Spark Hand Tools if such a hazard exists or is suspected.	
3	Sample Contents from Drums	1	Exposure to COCs can occur by contacting impacted contents.	Select proper dermal protection for task, at a minimum nitrile gloves should be worn. Wear appropriate eye face and body protection as outlined in the HASP.	
		2	Staff can be exposed to chemical vapors/fumes when sampling.	Conduct air monitoring as outlined in the HASP, and if required, select appropriate respiratory protection for the task.	
		3	Sharp edges and broken sample containers can cause lacerations.	Discard any broken sample ware or glass properly. Do not over tighten sample containers.	

3	Sample Contents from Drums	4	Chemical burns or skin irritation can occur from contact with sample preservatives.	Wear chemical protective gloves when collecting samples, or when handling damaged sample containers.	
4	Replace drum lids	1	Hand Injuries can occur from sharp edges, pinch points, and from use of hand tools.	see step 2 above	
5	Moving and Storing Drums	1	Drum storage areas can be accessed by the general public, or may not be secure.	Calculate how many drums will be stored in new location. Ensure that drums are not easily accessed by the general public. Do not store such that drums impede pedestrian or vehicular traffic.	
		2	Muscle strain can occur when lifting/pulling/pushing drums.	Drums that are full can weigh as much as 800 lbs. Use a lift assist device whenever possible, and use a team lift approach. When moving soil drum generated by drilling, have drillers use their equipment to move the drums. Using dolly, slightly lift drum away from dolly to install forks under drum. Slowly let drum come back down and rest on dolly. Using hook on top of dolly, ensure it latches on top of drum bung.	
		3	Body parts can be pinched between lift device, or drum and the ground.	Be aware of hand and foot placement during drum staging. Do not hurry through task.	
		4	When moving, the drum can tip or the dolly could become unstable from uneven ground surface.	Plan travel route with drum prior to moving. With drum secure on dolly, have one employee pull back on dolly, and other employee slowly push back on drum toward dolly. Have second worker act as spotter for traffic, pedestrians, and any trip hazards along the way.	

PPE — Personal Protective Equipment

Type	Personal Protective Equipment	Description	Required
Dermal Protection	chemical protective suit (specify type)		Required
Eye Protection	faceshield		Required
	safety goggles		Required
Hand Protection	chemical resistant gloves (specify type)	Nitrile	Required
	work gloves (specify type)		Required
Hearing Protection	ear plugs		Required

Supplies

Type	Supply	Description	Required
Miscellaneous	Other	dolly	Required

Review Comments

Reviewer		Comments
Employee: **Role** **Review Type** **Completed Date**	Hubbard, Lauren HASP Reviewer Approve 7/26/2012	
Employee: **Role** **Review Type** **Completed Date**	Hubbard, Lauren Quality Reviewer NA 7/27/2012	Reviewed by Corporate H&S Department

Job Safety Analysis

General

JSA ID	17809	**Status**	(3) Completed
Job Name	Construction-Excavation and trenching	**Created Date**	9/24/2020
Task Description	Excavation	**Completed Date**	09/24/2020
Template	False	**Auto Closed**	False

Client / Project

Client	GTE Operations Support, Inc.
Project Number	30245593 (updated PN on 7/1/2025)
Project Name	GTEOSI Seneca Falls
PIC	Mall, Richard (updated PIC on 7/1/2025)
Project Manager	Flusche, Mark

User Roles

Role	Employee	Due Date	Completed Date	Supervisor	Active
Developer	Kassel, Chris	10/15/2020	9/24/2020	McCune, Bill	☑
HASP Reviewer	Kassel, Chris	10/8/2020	9/4/2025	McCune, Bill	☑
Quality Reviewer	Tanner, Kim	9/28/2020	9/28/2020	Tymkiw, Peter	☑

Job Steps

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
1	Site preparation	1	Improper utility clearance may result in utility/equipment damage or injury.	Perform utility clearance with a minimum of 3 lines of evidence. Document utility clearance for reference including any ticket numbers or phone numbers of utilities.	
		2	Clearing vegetation may result in impact hazards.	Stand at least 25 ft from clearing operations using manual or mechanized methods. Larger vegetation like trees may be under stress and may break and wood parts my fly in any direction.	
		3	Slip trip and fall hazards from walkover activities (vegetation, uneven surfaces, etc and applies to all job steps in this JSA)	Plan route and focus on the task at hand (walking). Do not walk while looking at utility maps/drawings or talking on cell phones.	
2	Excavation and backfilling	1	Struck by equipment during excavation.	Stay at least 10 feet beyond the reach of excavation equipment unless establishing communication with operator. Wear PPE required by this JSA for increased visibility. Keep unneccessary workers away from the excavation area.	
		2	Equipment/worker falls into excavations from edge collapse	Stand at least 6 ft from edge of excavation. Competent person to oversee sloping, benching, bracing excavation to ensure stability.	
		3	Worker entrapment/suffocation/chemical overexposure/engulfment in excavation	Entry into excavations are prohibited unless approved by a Competent Person. Keep spoil piles at least 2 ft from excavation edge. Ensure proper slope/bench/shielding is in place prior to entry. Air monitor for toxic vapors and oxygen deficiency. Ensure proper means of access and egress.	
		4	Water from damaged utilities, groundwater, or surface water.	Ensure water is appropriately removed from excavation area so work may be safely completed.	
		5	Collapse	Follow proper sloping and shoring as approved by a competent person. Subcontractor to provide competent person. Ensure building foundations are not compromised and take appropriate steps to protect personal from engulfment, burial etc. (e.g., sloping and shoring ladder use etc.). Ensure excavation spoils are a safe distance from the edge of excavations and are appropriately staged.	

2	Excavation and backfilling	6	Chemical exposure to site contaminants.	Wear protective clothing specified in this JSA, avoid skin contact with soil materials or any liquids in the excavation. Use air monitoring to ensure TLVs are not exceeded. Wash hands and face prior to eating, drinking or consuming tobacco.	
		7	Noise from excavation equipment	Keep distance from equipment to reduce noise levels. If levels cannot be controlled wear hearing protection appropriate for the hazard.	
3	Excavation equipment decontamination	1	Slips and falls on wet surfaces.	Wear footwear appropriate for wet environments. Reduce amount of pressure washing required by removing soils using dry methods to extent practical	
		2	Flying particles from cleaning activities.	Wear eye and skin protection during decontamination activities. Use face shield if overspray or flying debris is a persistent problem. Avoid cleaning (pressure washing) in direction of other nearby workers, keep unneccessary workers clear of decontamination activity.	

PPE — Personal Protective Equipment

Type	Personal Protective Equipment	Description	Required
Dermal Protection	chemical protective suit (specify type)	Tyvek per SSO	Recommended
	Off road - long pants and long sleeve shirt		Required
Eye Protection	faceshield	if splash hazards	Recommended
	safety glasses		Required
	safety goggles	if minor splash hazards	Recommended
Foot Protection	rubber boots	Wet environments, steel toe required (per SSO)	Required
	steel-toe boots		Required
Hand Protection	chemical resistant gloves (specify type)	Nitrile when handling impacted soils	Required
	work gloves (specify type)	leather or equivalent (per SSO)	Required
Head Protection	hard hat		Required
Hearing Protection	ear plugs		Required
Miscellaneous PPE	traffic vest--Class II or III	Class II	Required

Supplies

Type	Supply	Description	Required
Communication Devices	mobile phone		Required
Miscellaneous	auxilary lighting	Light plant for night work	Required
	fire extinguisher	ABC 10 pound minimum	Required
	first aid kit		Required
Personal	eye wash (specify type)	Bottle	Required
	insect repellent		Recommended
	sunscreen		Recommended
Traffic Control	barricades	as needed	Recommended
	traffic cones	as needed	Required

Review Comments

Reviewer		Comments
Employee: **Role** **Review Type** **Completed Date**	Kassel, Chris HASP Reviewer Approve 9/24/2020	
Employee: **Role** **Review Type** **Completed Date**	Tanner, Kim Quality Reviewer NA 9/28/2020	Good comprehensive summary.

Job Safety Analysis

General

JSA ID	30245593-Mowing
Job Name	GTEOSI Seneca Falls
Task Description	Landfill Mowing
Template	FALSE

Client / Project

Client	GTE Operations Support Incorporated
Project Number	30245593
Project Name	GTEOSI Seneca Falls
Account Leader	Richard Mall
Project Manager	Mark Flusche

Job Steps

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
1	Loading and unloading mower from transport vehicle	1	Impact hazard from moving equipment	Stand clear of equipment loading and unloadinf from transport vehicles.	
		2	Equipment damage from improper removal or placement on vehicle	Ensure any ramps used are rated for weight and properly placed and secure prior to moving equipment across, ensure trailers being loaded or unloaded are properly secured against movement.	
		3	Ascending/Descending equipment	Do not hurry through task, wear footwear with good read and ankle support, maintain 3 points of contact while accessing or egressing equipment, no jumping off equipment.	
2	Pre-operation inspection	1	Pinch hazards to hands	Wear gloves appropriate for hazard while maintaining dexterity. Keep hand in field of vision and watch for and keep hands clear of obvious hazards like mower blade or cover closures. Do not hurry during the removal or placemnet of covers or equipment components.	
		2	Head injury from striking equipment covers or components	Wear hard hat, stay focused on surroundings, avoid standing or raising up suddenly easpecially if door cover is overhead.	
		3	Exposure to engine fluids or lubricants	Wear protective gloves, ensure SDS is available for engine fluids and lubricants, promptly wash exposed skin.	
		4	Awkward body positions and twisting	Plan inspection activity and do not hurry through task, stretch before crawling or squatting, Avoid overreaching.	
		5	Entanglement in equipment components.	Do not circumvent protective guards or shields, ensure equipment is not operational (LOTO is necessary) when accessing engine compartment if intrusion required.	
3	Inspect mowing area for debris and remove from area	1	Slips/trips/falls from uneven terrain resulting in contusions or fractures	While inspecting mowing area, scan the ground ahead for uneven terrain, trip hazards, and holes. Remove trip hazards and debris and mark holes, drop offs, and other non-movable hazards with cones or safety tape.	
		2	Exposure to hazardous insects resulting in painful stings or bites and potential allergic reaction	Keep eyes focused on the ground ahead of you as you walk and stop if you see signs of fire ants (e.g., mounted dirt) or bees nests. Keep at least 5 feet away from sire ant mounds and 10 feet away from bees nests. Do not place hands and fingers into areas that are not visible to prevent exposure to biting and stinging insects. Keep pants tucked into boots to reduce potential for fire ant exposure during inspection.	
		3	Exposure to snakes resulting in potentially posionous bites or wild animals resulting in bites and infections.	Scan the area for stray animals prior to walking the site. If stray animals are observed, leave the area. When vegetation is greater than 10 inches, use a long stick to rustle the ground ahead of you and wear snake chaps. Do not place hands and fingers into areas that are not visible to prevent expsoure to hidden snakes.	
		4	Exposure to hazardous plants resulting in skin irritation, rash, or hives.	Scan the area for posion ivy/oak. If present, maintain a distance of at least 3 feet. Weat gloves, long sleeves, and long pants to rpevent contact with poision ivy/oak.	
4	Mower Operation	1	Strike or impact hazars with other workers, equipment or structures.	Keep eyes moving and watch for other site workers. Maintain 360 degrees of awareness and ensure adequate communication method with other workers. All workers to know emergency stop signals. Verify backup alarms are functional (if equipped).	
		2	Rollovers on slopes or from improper usage.	Follow equipment manufacturer instructions for use on slopes and wear seatbelt at all times. Only use mower installed with roll cage and ensure roll cage is in good condition.	
		3	Noise from engine	Wear hearing protection as required, keep equipment well maintained.	

Job Safety Analysis

General

JSA ID	30245593-Mowing
Job Name	GTEOSI Seneca Falls
Task Description	Landfill Mowing
Template	FALSE

Client / Project

Client	GTE Operations Support Incorporated
Project Number	30245593
Project Name	GTEOSI Seneca Falls
Account Leader	Richard Mall
Project Manager	Mark Flusche

Job Steps

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
		4	Striking debris resulting in equipment damage or debris becoming a projectile	Keep the mower are least 2 feet from non-removable, marked debris that could become a projectile when struck by a mower blade or that could damage the equipment. Drive slowly and scan ahead for debris that may not have been located during site walk. If debris is noted; stop, turn off equipment, set the brake, and remove debris from the area or mark with cones before continuing. Verify guards around the mowing deck are present and in good condition prior to operation. Do not use equipment if guards are missing or damaged.	
		5	Striking buildings, wells, or fence resulting in equipment or facility damage	Keep equipment at least 2 feet from the edge of fence, wells, and buildings to prevent contact. Use a push mower or string trimmer for trim work around these features.	
		6	Slips and falls from accessing or egress from equipment	Maintain 3 points of contact when acessing or egressing eequipment, keep any steps on equipment clean and dry to extent practical.	
5	Fueling Equipment	1	Exposure to fuel resulting in dermal contact or environmental release	Visually observe the fuel level during filling and pour slowly to prevent spills and overfilling. Use a fuel can with apour spout or use a funnel to prevent spills and sloshing. Wear nitrile gloves over cut resistant gloves and long sleeves and pants to protect skin from contact with fuel. Wear safety glassdes to protect eyes from splashing.	
		2	Exposure to vapors resulitng in naseau/vomiting	Stand upwind and keep face at least 18 inches from the spout of the fuel can when dispensing fuel.	
		3	Fire/Explosion	Do not smoke or allow open flames or other ignition sources within 50 feet of fueling operations. Allow engine/muffler to cool 15 minuted prior to refueling. Verify that a working multi-purpose fire extinguisher is available in the wrk area prior to fueling.	
6	Routine maintenance	1	Awkward body positions and twisting	Plan inspection activity and do not hurry through task, stretch before crawling or squatting, Avoid overreaching.	
		2	Excessive force turning bolts or lifting heavy components	Use automated methods nto loosen tight bolts, do not use excessive force or torque when using hand tools. Do not use "cheater bars."	
		3	Contact with engine fluids or lubricants	Wear protective gloves, ensure SDS is available for engine fluids and lubricants, promptly wash exposed skin.	
		4	Exposure of hands and arms to hot engine components	Take the time to allow the engine to cool, wear protective gloves and forearm protection.	

PPE — Personal Protective Equipment

Type	Personal Protective Equipment	Description	Required
Eye Protection	safety glasses		Required
Hearing Protection	Ear muffs or ear plugs		Required
Hand Protection	chemical resistant gloves (specify	nitrile	As needed
	work gloves (specify type)	leather	Required
Miscellaneous	fire extinguisher		Required
	first aid kit		Required
Traffic Control	Other	Roadway emergency kit	Required

Attachment C
SDSs

SAFETY DATA SHEET

1. Identification

Product identifier **RP Ultra-Performance Grease 2**

Product Code RP0312

Other means of identification Not available.

Recommended use Not available.

Recommended restrictions None known.

Manufacturer / Importer / Supplier / Distributor information

Manufacturer

Company name Royal Purple, LLC

Address 1 Royal Purple Lane
Porter, Texas 77365
United States

Telephone 281-354-8600

E-mail technical@calumetspecialty.com

Emergency phone number CHEMTREC 1-800-424-9300

2. Hazard(s) identification

Physical hazards Not classified.

Health hazards Not classified.

Environmental hazards Not classified.

OSHA defined hazards Not classified.

Label elements

Hazard symbol None.

Signal word None.

Hazard statement The mixture does not meet the criteria for classification.

Precautionary statement

Prevention Observe good industrial hygiene practices.

Response Wash hands after handling.

Storage Store away from incompatible materials.

Disposal Dispose of waste and residues in accordance with local authority requirements.

Hazard(s) not otherwise classified (HNOC) None known.

Supplemental information None.

3. Composition / information on ingredients

Mixtures

The manufacturer lists no ingredients as hazardous according to OSHA 29 CFR 1910.1200.

4. First-aid measures

Inhalation Move to fresh air. Call a physician if symptoms develop or persist.

Skin contact Wash off with soap and water. Get medical attention if irritation develops and persists.

Eye contact Rinse with water. Get medical attention if irritation develops and persists.

Ingestion Rinse mouth. Do not induce vomiting. Get medical attention if symptoms occur. Never give liquid to an unconscious person.

Most important symptoms / effects, acute and delayed Irritation of eyes and mucous membranes. Skin irritation.

Indication of immediate medical attention and special treatment needed	Treat symptomatically.

5. Fire-fighting measures

Suitable extinguishing media	Water fog. Foam. Dry chemical powder. Carbon dioxide (CO2).
Unsuitable extinguishing media	Do not use water jet as an extinguisher, as this will spread the fire.
Specific hazards arising from the chemical	During fire, gases hazardous to health may be formed.
Special protective equipment and precautions for firefighters	Wear suitable protective equipment. Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Keep out of low areas. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. For personal protection, see section 8 of the SDS.
Methods and materials for containment and cleaning up	Large Spills: Stop the flow of material, if this is without risk. Use water spray to reduce vapors or divert vapor cloud drift. Dike the spilled material, where this is possible. Cover with plastic sheet to prevent spreading. Absorb in vermiculite, dry sand or earth and place into containers. Prevent entry into waterways, sewer, basements or confined areas. Following product recovery, flush area with water. Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination. Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.
Environmental precautions	Prevent further leakage or spillage if safe to do so.

7. Handling and storage

Precautions for safe handling	Observe good industrial hygiene practices.
Conditions for safe storage, including any incompatibilities	Store in original tightly closed container. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits	No exposure limits noted for ingredient(s).
Biological limit values	No biological exposure limits noted for the ingredient(s).
Appropriate engineering controls	Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Individual protection measures, such as personal protective equipment

Eye/face protection	Wear safety glasses with side shields (or goggles).
Skin protection	
Hand protection	Wear appropriate chemical resistant gloves.
Other	Wear suitable protective clothing.
Respiratory protection	In case of insufficient ventilation, wear suitable respiratory equipment.
Thermal hazards	Wear appropriate thermal protective clothing, when necessary.
General hygiene considerations	Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance	Semi-Solid. Grease
Physical state	Liquid.

Form	Liquid. Semi-Solid. Paste.
Color	Translucent. Purple
Odor	Sweet
Odor threshold	Not available.
pH	Not available.
Melting point/freezing point	Not available.
Initial boiling point and boiling range	680 °F (360 °C) estimated
Flash point	> 429.8 °F (> 221.0 °C) 275.0 °F (135.0 °C) estimated
Evaporation rate	Not available.
Flammability (solid, gas)	Not available.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	< 0.01 kPa 0.00001 hPa estimated
Density	0.91 g/cm3 0.88 g/cm3 estimated
Vapor density	Not available.
Relative density	Not available.
Solubility(ies)	
Solubility (water)	Not available.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	> 500 °F (> 260 °C) 500 °F (260 °C) estimated
Decomposition temperature	Not available.
Viscosity	Not available.
Other information	
Flammability class	Combustible IIIB estimated
Pour point	500 °F (260 °C)
Specific gravity	0.88 estimated

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	No dangerous reaction known under conditions of normal use.
Conditions to avoid	Contact with incompatible materials.
Incompatible materials	Strong oxidizing agents.
Hazardous decomposition products	Nitrogen oxides (NOx). At thermal decomposition temperatures, carbon monoxide and carbon dioxide.

11. Toxicological information

Information on likely routes of exposure

Inhalation	No adverse effects due to inhalation are expected.
Skin contact	No adverse effects due to skin contact are expected.

Eye contact Direct contact with eyes may cause temporary irritation.

Ingestion Expected to be a low ingestion hazard.

Symptoms related to the physical, chemical and toxicological characteristics Irritation of eyes and mucous membranes. Skin irritation.

Information on toxicological effects

Acute toxicity Respiratory tract irritation.

Product	Species	Test Results
RP Ultra-Performance Grease 2 (CAS Mixture)		
Acute		
Other		
LD50	Rabbit	27777.7832 mg/kg, 4 Hours estimated

* Estimates for product may be based on additional component data not shown.

Skin corrosion/irritation Based on available data, the classification criteria are not met.

Serious eye damage/eye irritation Based on available data, the classification criteria are not met.

Respiratory or skin sensitization

Respiratory sensitization Based on available data, the classification criteria are not met.

Skin sensitization Based on available data, the classification criteria are not met.

Germ cell mutagenicity Based on available data, the classification criteria are not met.

Carcinogenicity Based on available data, the classification criteria are not met.

Reproductive toxicity Based on available data, the classification criteria are not met.

Specific target organ toxicity - single exposure Based on available data, the classification criteria are not met.

Specific target organ toxicity - repeated exposure Based on available data, the classification criteria are not met.

Aspiration hazard Not an aspiration hazard.

12. Ecological information

Ecotoxicity The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

Product		Species	Test Results
RP Ultra-Performance Grease 2 (CAS Mixture)			
Aquatic			
Crustacea	EC50	Daphnia	20833.334 mg/l, 48 hours estimated
Fish	LC50	Fish	50000 mg/l, 96 hours estimated

* Estimates for product may be based on additional component data not shown.

Persistence and degradability No data is available on the degradability of this product.

Bioaccumulative potential No data available.

Mobility in soil No data available.

Other adverse effects No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

13. Disposal considerations

Disposal instructions Collect and reclaim or dispose in sealed containers at licensed waste disposal site.

Local disposal regulations Dispose in accordance with all applicable regulations.

Hazardous waste code The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

Waste from residues / unused products Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

Contaminated packaging Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied.

14. Transport information

DOT

Not regulated as dangerous goods.

IATA

Not regulated as dangerous goods.

IMDG

Not regulated as dangerous goods.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not established.

15. Regulatory information

US federal regulations One or more components are not listed on TSCA.
This product is not known to be a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories Immediate Hazard - No
Delayed Hazard - No
Fire Hazard - No
Pressure Hazard - No
Reactivity Hazard - No

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical No

SARA 313 (TRI reporting)

Not regulated.

Other federal regulations

Safe Drinking Water Act (SDWA) Not regulated.

US state regulations

US. California Proposition 65

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	No
Canada	Domestic Substances List (DSL)	No
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	No
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	No
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	No
New Zealand	New Zealand Inventory	No
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	No

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

Issue date	07-31-2015
Revision date	07-31-2015
Version #	1.0
Disclaimer	1 cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

SAFETY DATA SHEET

1. Identification

Identification

Product name: **AEON PD**

Additional identification

Chemical name: Mixture

Recommended use and restriction on use

Recommended use: Not determined.

Restrictions on use: Not determined.

Details of the supplier of the safety data sheet

Supplier

Gardner Denver
1800 Gardner Expressway,
Quincy, IL 62301
United States of America
Ph: 217-222-5400

Emergency telephone number:
FOR TRANSPORT EMERGENCY CALL CHEMTREC (+1)703 527 3887, OR WITHIN USA 800 424 9300 (LUBRIZOL)

2. Hazard(s) identification

Hazard Classification

Not classified

Label Elements:

Hazard Symbol: No symbol

Signal Word: No signal word.

Hazard Statement: not applicable

Precautionary Statement: not applicable

Other hazards which do not result in GHS classification: None identified.

3. Composition/information on ingredients

Chemical name	CAS number	Percent by Weight
Aryl thiophosphate	597-82-0	0.5 - 1%

4. First-aid measures

Ingestion: Treat symptomatically. Get medical attention.

Inhalation: Remove exposed person to fresh air if adverse effects are observed.

Skin Contact: Wash with soap and water. If skin irritation occurs, get medical attention. Launder contaminated clothing before reuse.

Eye contact: Any material that contacts the eye should be washed out immediately with water. If easy to do, remove contact lenses.

Most important symptoms/effects, acute and delayed

Symptoms: See section 11.

Indication of immediate medical attention and special treatment needed

Treatment: Treat symptomatically.

5. Fire-fighting measures

General Fire Hazards: Use water to cool containers exposed to fire.

Suitable (and unsuitable) extinguishing media

Suitable extinguishing media: CO_2, dry chemical, foam, water spray, water fog.

Unsuitable extinguishing media: Do not use water jet as an extinguisher, as this will spread the fire.

Specific hazards arising from the chemical: A solid stream of water will spread the burning material. Material creates a special hazard because it floats on water. See section 10 for additional information. Water may cause frothing

Special protective equipment and precautions for firefighters

Special fire fighting procedures: No data available.

Special protective equipment for fire-fighters: Recommend wearing self-contained breathing apparatus.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures: Personal Protective Equipment must be worn, see Personal Protection Section for PPE recommendations. Ventilate area if spilled in confined space or other poorly ventilated areas.

Methods and material for containment and cleaning up: Dike far ahead of larger spill for later recovery and disposal. Pick up free liquid for recycle and/or disposal. Residual liquid can be absorbed on inert material.

Environmental Precautions: Avoid release to the environment. Do not contaminate water sources or sewer. Environmental manager must be informed of all major spillages. Prevent further leakage or spillage if safe to do so.

7. Handling and storage

Precautions for safe handling: Observe good industrial hygiene practices. Provide adequate ventilation. Wear appropriate personal protective equipment.

	Keep containers closed when not in use. Wash thoroughly after handling. Launder contaminated clothing before reuse.
Maximum Handling Temperature:	Not determined.
Conditions for safe storage, including any incompatibilities:	Store away from incompatible materials. See section 10 for incompatible materials.
Maximum Storage Temperature:	Not determined.

8. Exposure controls/personal protection

Control Parameters:

Occupational Exposure Limits

None of the components have assigned exposure limits.

Appropriate engineering controls:	No special requirements under ordinary conditions of use and with adequate ventilation.

Individual protection measures, such as personal protective equipment

General information:	Use personal protective equipment as required.
Eye/face protection:	If contact is likely, safety glasses with side shields are recommended.
Skin Protection	
Hand Protection:	Polyvinyl alcohol. Note: polyvinyl alcohol gloves are water soluble and should not be used when there is potential for water contact. Suitable gloves can be recommended by the glove supplier.
Other:	Long sleeve shirt is recommended.
Respiratory Protection:	Use respirator if irritation is experienced or if the recommended exposure limit is exceeded. Consult with an industrial hygienist to determine the appropriate respiratory protection for your specific use of this material. A respiratory protection program compliant with all applicable regulations must be followed whenever workplace conditions require the use of a respirator. Use self-contained breathing apparatus for entry into confined space, for other poorly ventilated areas and for large spill clean-up sites.
Hygiene measures:	Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing to remove contaminants. Discard contaminated footwear that cannot be cleaned.

9. Physical and chemical properties

Appearance

Physical state:	liquid
Form:	liquid
Color:	Blue
Odor:	Mild
Odor threshold:	No data available.

pH:	No data available.
Freezing point:	No data available.
Boiling Point:	No data available.
Flash Point:	450.0 °F (232.2 °C) (Cleveland Open Cup)
Evaporation rate:	No data available.
Flammability (solid, gas):	No data available.
Upper/lower limit on flammability or explosive limits	
Flammability limit - upper (%):	No data available.
Flammability limit - lower (%):	No data available.
Explosive limit - upper (%):	No data available.
Explosive limit - lower (%):	No data available.
Vapor pressure:	No data available.
Vapor density:	No data available.
Relative density:	0.866 60.1 °F (15.6 °C)
Solubility(ies)	
Solubility in water:	Insoluble in water
Solubility (other):	No data available.
Partition coefficient (n-octanol/water):	No data available.
Auto-ignition temperature:	No data available.
Decomposition temperature:	No data available.
Viscosity:	220 mm2/s (104 °F (40 °C))

10. Stability and reactivity

Reactivity:	No data available.
Chemical Stability:	Material is stable under normal conditions.
Possibility of Hazardous Reactions:	Will not occur.
Conditions to Avoid:	Do not expose to excessive heat, ignition sources, or oxidizing materials.
Incompatible Materials:	Peroxides. Nitrates. Strong oxidizing agents. Chlorates
Hazardous Decomposition Products:	Thermal decomposition or combustion may generate smoke, carbon monoxide, carbon dioxide, and other products of incomplete combustion.

11. Toxicological information

Information on likely routes of exposure

Inhalation:	No data available.
Ingestion:	No data available.
Skin Contact:	No data available.
Eye contact:	No data available.

Information on toxicological effects

Acute toxicity

Oral

Product: Not classified for acute toxicity based on available data.

Dermal

Product: Not classified for acute toxicity based on available data.

Inhalation

Product: Not classified for acute toxicity based on available data.

Skin Corrosion/Irritation:

Product: Prolonged or repeated skin contact as from clothing wet with material may cause dermatitis. Symptoms may include redness, edema, drying, and cracking of the skin.
Remarks: Not classified as a primary skin irritant.

Serious Eye Damage/Eye Irritation:

Product: Remarks: Not classified as a primary eye irritant.

Respiratory sensitization:

No data available

Skin sensitization:

No data available

Specific Target Organ Toxicity - Single Exposure:

No data available

Aspiration Hazard:

No data available

Chronic Effects

Carcinogenicity:

No data available

IARC Monographs on the Evaluation of Carcinogenic Risks to Humans:

No carcinogenic components identified

US. National Toxicology Program (NTP) Report on Carcinogens:

No carcinogenic components identified

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050):

No carcinogenic components identified

Germ Cell Mutagenicity:

Aryl thiophosphate: This material has not exhibited mutagenic or genotoxic potential in laboratory tests.

Reproductive toxicity:

Aryl thiophosphate	Suspected of damaging fertility. Repeated oral gavage dosing of laboratory animals with aryl thiophosphate in a reproductive/developmental toxicity screening study resulted in litter loss and decreases in number of implantation sites at high doses.
Carboxylic ester	Not Classified based on available data.

Specific Target Organ Toxicity - Repeated Exposure:
No data available

12. Ecological information

Ecotoxicity

Fish
No data available

Aquatic Invertebrates
No data available

Toxicity to Aquatic Plants
No data available

Toxicity to soil dwelling organisms
No data available

Sediment Toxicity
No data available

Toxicity to Terrestrial Plants
No data available

Toxicity to Above-Ground Organisms
No data available

Toxicity to microorganisms
No data available

Persistence and Degradability

Biodegradation
No data available

Bioaccumulative Potential

Bioconcentration Factor (BCF)
No data available

Partition Coefficient n-octanol / water (log Kow)
No data available

Mobility:
No data available

Other Adverse Effects: No data available.

13. Disposal considerations

Disposal instructions: Treatment, storage, transportation, and disposal must be in accordance with applicable Federal, State/Provincial, and Local regulations.
Since emptied containers retain product residue, follow label warnings even after container is emptied.

Contaminated Packaging: Container packaging may exhibit hazards.

14. Transport information

DOT
Not regulated.

IMDG
Not regulated.

IATA
Not regulated.

Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code
None known.

Shipping descriptions may vary based on mode of transport, quantities ,temperature of the material, package size, and/or origin and destination It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material. Review classification requirements before shipping materials at elevated temperatures.

15. Regulatory information

US Federal Regulations

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)
None present or none present in regulated quantities.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories
None known.

SARA 302 Extremely Hazardous Substance
SARA 304 Emergency Release Notification
SARA 311/312 Hazardous Chemical
SARA 313 (TRI Reporting)
This product may contain chemical(s) regulated under the Superfund Amendments and Reauthorization Act (SARA). For additional information please contact Lubrizol Customer Assistance: America(s): AmerLZAMCustomerAssistance@Lubrizol.com ; Europe: EMEAICustomerAssistance@Lubrizol.com ; Asia: APCustomerAssistance@Lubrizol.com

US State Regulations

US. California Proposition 65
No ingredient regulated by CA Prop 65 present.

Inventory Status

Australia (AICS)
All components are in compliance with chemical notification requirements in Australia.

Canada (DSL/NDSL)
All components are in compliance with the Canadian Environmental Protection Act and are present on the Domestic Substances List.

China (IECSC)
All components of this product are listed on the Inventory of Existing Chemical Substances in China.

European Union (REACh)
To obtain information on the REACH compliance status of this product, please visit Lubrizol.com/REACH, or e-mail us at REACH_MSDS_INQUIRIES@Lubrizol.com

Japan (ENCS)
All components are in compliance with the Chemical Substances Control Law of Japan.

Korea (ECL)
All components are in compliance in Korea.

New Zealand (NZIoC)
All components are in compliance with chemical notification requirements in New Zealand.

Philippines (PICCS)
All components are in compliance with the Philippines Toxic Substances and Hazardous and Nuclear Wastes Control Act of 1990 (R.A. 6969).

Switzerland (SWISS)
All components are in compliance with the Environmentally Hazardous Substance Ordinance in Switzerland. Lubrizol must maintain records of all imports of this product into Switzerland. Third party importers are asked to report every import to The Lubrizol PSCD Manager (Europe), Hazelwood, Derby DE56 1QN, UK.

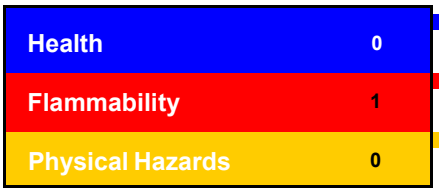
Taiwan (TCSCA)
All components of this product are listed on the Taiwan inventory.

United States (TSCA)
All components of this material are on the US TSCA Inventory.

The information that was used to confirm the compliance status of this product may deviate from the chemical information shown in Section 3.

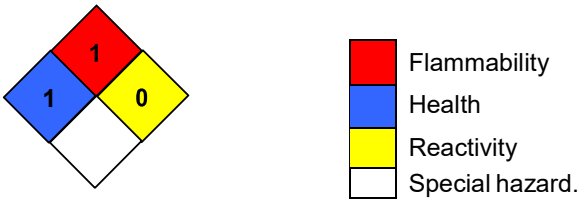
16.Other information, including date of preparation or last revision

HMIS Hazard ID



Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe; RNP - Rating not possible; *Chronic health effect

NFPA Hazard ID



Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe; RNP - Rating not possible

Issue Date:	03/07/2015
Version #:	1.0
Source of information:	Internal company data and other publically available resources.

Further Information:	Contact supplier (see Section 1)
Disclaimer:	As the conditions or methods of use are beyond our control, we do not assume any responsibility and expressly disclaim any liability for any use of this product. Information contained herein is believed to be true and accurate but all statements or suggestions are made without warranty, expressed or implied, regarding accuracy of the information, the hazards connected with the use of the material or the results to be obtained from the use thereof. Compliance with all applicable federal, state, and local regulations remains the responsibility of the user.

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 10.18.2017 **Revision**: 10.18.2017

Trade Name: Alconox

1 Identification of the substance/mixture and of the supplier

1.1 Product identifier

Trade Name: Alconox
Synonyms:
Product number: 1104-1, 1104, 1125, 1150, 1101, 1103, 1112-1, 1112

1.2 Application of the substance / the mixture : Cleaning material/Detergent

1.3 Details of the supplier of the Safety Data Sheet

Manufacturer
Alconox, Inc.
30 Glenn Street
White Plains, NY 10603
1-914-948-4040

Supplier

Emergency telephone number:
ChemTel Inc
North America: 1-800-255-3924
International: 01-813-248-0585

2 Hazards identification

2.1 Classification of the substance or mixture:

In compliance with EC regulation No. 1272/2008, 29CFR1910/1200 and GHS Rev. 3 and amendments.

Hazard-determining components of labeling:
Tetrasodium Pyrophosphate
Sodium tripolyphosphate
Sodium Alkylbenzene Sulfonate

2.2 Label elements:

Skin irritation, category 2.
Eye irritation, category 2A.

Hazard pictograms:



Signal word: Warning

Hazard statements:
H315 Causes skin irritation.
H319 Causes serious eye irritation.

Precautionary statements:
P264 Wash skin thoroughly after handling.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P302+P352 If on skin: Wash with soap and water.
P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.
P321 Specific treatment (see supplemental first aid instructions on this label).
P332+P313 If skin irritation occurs: Get medical advice/attention.
P362 Take off contaminated clothing and wash before reuse.
P501 Dispose of contents and container as instructed in Section 13.

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 10.18.2017 **Revision**: 10.18.2017

Trade Name: Alconox

Additional information: None.

Hazard description

Hazards Not Otherwise Classified (HNOC): None

Information concerning particular hazards for humans and environment:

The product has to be labelled due to the calculation procedure of the "General Classification guideline for preparations of the EU" in the latest valid version.

Classification system:

The classification is according to EC regulation No. 1272/2008, 29CFR1910/1200 and GHS Rev. 3 and amendments, and extended by company and literature data. The classification is in accordance with the latest editions of international substances lists, and is supplemented by information from technical literature and by information provided by the company.

3 Composition/information on ingredients

3.1 Chemical characterization : None

3.2 Description : None

3.3 Hazardous components (percentages by weight)

Identification	Chemical Name	Classification	Wt. %
CAS number: 7758-29-4	Sodium tripolyphosphate	Skin Irrit. 2 ; H315 Eye Irrit. 2; H319	12-28
CAS number: 68081-81-2	Sodium Alkylbenzene Sulfonate	Acute Tox. 4; H303 Skin Irrit. 2 ; H315 Eye Irrit. 2; H319	8-22
CAS number: 7722-88-5	Tetrasodium Pyrophosphate	Skin Irrit. 2 ; H315 Eye Irrit. 2; H319	2-16

3.4 Additional Information : None.

4 First aid measures

4.1 Description of first aid measures

General information: None.

After inhalation:

Maintain an unobstructed airway.

Loosen clothing as necessary and position individual in a comfortable position.

After skin contact:

Wash affected area with soap and water.

Seek medical attention if symptoms develop or persist.

After eye contact:

Rinse/flush exposed eye(s) gently using water for 15-20 minutes.

Remove contact lens(es) if able to do so during rinsing.

Seek medical attention if irritation persists or if concerned.

After swallowing:

Rinse mouth thoroughly.

Seek medical attention if irritation, discomfort, or vomiting persists.

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 10.18.2017 **Revision**: 10.18.2017

Trade Name: Alconox

4.2 Most important symptoms and effects, both acute and delayed

None

4.3 Indication of any immediate medical attention and special treatment needed:

No additional information.

5 Firefighting measures

5.1 Extinguishing media

Suitable extinguishing agents:

Use appropriate fire suppression agents for adjacent combustible materials or sources of ignition.

For safety reasons unsuitable extinguishing agents : None

5.2 Special hazards arising from the substance or mixture :

Thermal decomposition can lead to release of irritating gases and vapors.

5.3 Advice for firefighters

Protective equipment:

Wear protective eye wear, gloves and clothing.
Refer to Section 8.

5.4 Additional information :

Avoid inhaling gases, fumes, dust, mist, vapor and aerosols.
Avoid contact with skin, eyes and clothing.

6 Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures :

Ensure adequate ventilation.
Ensure air handling systems are operational.

6.2 Environmental precautions :

Should not be released into the environment.
Prevent from reaching drains, sewer or waterway.

6.3 Methods and material for containment and cleaning up :

Wear protective eye wear, gloves and clothing.

6.4 Reference to other sections : None

7 Handling and storage

7.1 Precautions for safe handling :

Avoid breathing mist or vapor.
Do not eat, drink, smoke or use personal products when handling chemical substances.

7.2 Conditions for safe storage, including any incompatibilities :

Store in a cool, well-ventilated area.

7.3 Specific end use(s):

No additional information.

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 10.18.2017 **Revision**: 10.18.2017

Trade Name: Alconox

8 Exposure controls/personal protection





8.1 Control parameters :

a) 7722-88-5, Tetrasodium Pyrophosphate, OSHA TWA 5 mg/m3

b) Dusts, non-specific OEL, Irish Code of Practice

(i) Total inhalable 10 mg/m3 (8hr)

(ii) Respirible 4mg/m3 (8hr)

(iii) Tetrasodium Pyrophosphate, OSHA TWA 5 mg/m3, (8hr)

8.2 Exposure controls

Appropriate engineering controls:

Emergency eye wash fountains and safety showers should be available in the immediate vicinity of use or handling.

Respiratory protection:

Not needed under normal use conditions.

Protection of skin:

Select glove material impermeable and resistant to the substance or preparation. Protective gloves recommended to comply with EN 374. Take note of break through times, permeability, and special workplace conditions, such as mechanical strain, duration of contact, etc. Protective gloves should be replaced at the first sign of wear.

Eye protection:

Safety goggles or glasses, or appropriate eye protection. Recommended to comply with ANSI Z87.1 and/or EN 166.

General hygienic measures:

Wash hands before breaks and at the end of work.

Avoid contact with skin, eyes and clothing.

9 Physical and chemical properties

Appearance (physical state, color):	White and cream colored flakes - powder	**Explosion limit lower**: **Explosion limit upper**:	Not determined or not available. Not determined or not available.
Odor:	Not determined or not available.	**Vapor pressure at 20°C**:	Not determined or not available.
Odor threshold:	Not determined or not available.	**Vapor density**:	Not determined or not available.
pH-value:	9.5 (aqueous solution)	**Relative density**:	Not determined or not available.
Melting/Freezing point:	Not determined or not available.	**Solubilities**:	Not determined or not available.
Boiling point/Boiling range:	Not determined or not available.	**Partition coefficient (n-octanol/water)**:	Not determined or not available.
Flash point (closed cup):	Not determined or not available.	**Auto/Self-ignition temperature**:	Not determined or not available.
Evaporation rate:	Not determined or not available.	**Decompositio n**	Not determined or not available.

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 10.18.2017 **Revision**: 10.18.2017

Trade Name: Alconox

Flammability (solid, gaseous):	Not determined or not available.	**Viscosity**:	a. Kinematic: Not determined or not available. b. Dynamic: Not determined or not available.
Density at 20°C:	Not determined or not available.		

10 Stability and reactivity

10.1 Reactivity : None

10.2 Chemical stability : None

10.3 Possibility hazardous reactions : None

10.4 Conditions to avoid : None

10.5 Incompatible materials : None

10.6 Hazardous decomposition products : None

11 Toxicological information

11.1 Information on toxicological effects :

Acute Toxicity:

Oral:

: LD50 > 5000 mg/kg oral rat - Product .

Chronic Toxicity: No additional information.

Skin corrosion/irritation:

Sodium Alkylbenzene Sulfonate: Causes skin irritation. .

Serious eye damage/irritation:

Sodium Alkylbenzene Sulfonate: Causes serious eye irritation .

Tetrasodium Pyrophosphate: Rabbit - Risk of serious damage to eyes .

Respiratory or skin sensitization: No additional information.

Carcinogenicity: No additional information.

IARC (International Agency for Research on Cancer): None of the ingredients are listed.

NTP (National Toxicology Program): None of the ingredients are listed.

Germ cell mutagenicity: No additional information.

Reproductive toxicity: No additional information.

STOT-single and repeated exposure: No additional information.

Additional toxicological information: No additional information.

12 Ecological information

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 10.18.2017 **Revision**: 10.18.2017

Trade Name: Alconox

12.1 Toxicity:

Sodium Alkylbenzene Sulfonate: Fish, LC50 1.67 mg/l, 96 hours.
Sodium Alkylbenzene Sulfonate: Aquatic invertebrates, EC50 Daphnia 2.4 mg/l, 48 hours. Sodium Alkylbenzene Sulfonate: Aquatic Plants, EC50 Algae 29 mg/l, 96 hours.
Tetrasodium Pyrophosphate: Fish, LC50 - other fish - 1,380 mg/l - 96 h.
Tetrasodium Pyrophosphate: Aquatic invertebrates, EC50 - Daphnia magna (Water flea) - 391 mg/l - 48 h.

12.2 Persistence and degradability: No additional information.

12.3 Bioaccumulative potential: No additional information.

12.4 Mobility in soil: No additional information.

General notes: No additional information.

12.5 Results of PBT and vPvB assessment:

PBT: No additional information.

vPvB: No additional information.

12.6 Other adverse effects: No additional information.

13 Disposal considerations

13.1 Waste treatment methods (consult local, regional and national authorities for proper disposal)

Relevant Information:

It is the responsibility of the waste generator to properly characterize all waste materials according to applicable regulatory entities. (US 40CFR262.11).

14 Transport information

14.1 UN Number: ADR, ADN, DOT, IMDG, IATA	None
14.2 UN Proper shipping name: ADR, ADN, DOT, IMDG, IATA	None
14.3 Transport hazard classes: ADR, ADN, DOT, IMDG, IATA	**Class:** None **Label:** None **LTD.QTY:** None

US DOT

Limited Quantity Exception: None

Bulk:	**Non Bulk:**
RQ (if applicable): None	**RQ (if applicable):** None
Proper shipping Name: None	**Proper shipping Name:** None
Hazard Class: None	**Hazard Class:** None
Packing Group: None	**Packing Group:** None
Marine Pollutant (if applicable): No additional information.	**Marine Pollutant (if applicable):** No additional information.

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 10.18.2017 **Revision**: 10.18.2017

Trade Name: Alconox

Comments: None	**Comments:** None
14.4 Packing group: ADR, ADN, DOT, IMDG, IATA	None
14.5 Environmental hazards :	None
14.6 Special precautions for user:	None
Danger code (Kemler):	None
EMS number:	None
Segregation groups:	None

14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code: Not applicable.

14.8 Transport/Additional information:

Transport category:	None
Tunnel restriction code:	None
UN "Model Regulation":	None

15 Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture.

North American

SARA

Section 313 (specific toxic chemical listings): None of the ingredients are listed.
Section 302 (extremely hazardous substances): None of the ingredients are listed.

CERCLA (Comprehensive Environmental Response, Clean up and Liability Act) Reportable

Spill Quantity: None of the ingredients are listed.

TSCA (Toxic Substances Control Act):

Inventory: All ingredients are listed.
Rules and Orders: Not applicable.

Proposition 65 (California):

Chemicals known to cause cancer: None of the ingredients are listed.

Chemicals known to cause reproductive toxicity for females: None of the ingredients are listed.

Chemicals known to cause reproductive toxicity for males: None of the ingredients are listed.

Chemicals known to cause developmental toxicity: None of the ingredients are listed.

Canadian

Canadian Domestic Substances List (DSL):
All ingredients are listed.

EU

REACH Article 57 (SVHC): None of the ingredients are listed.

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 10.18.2017 **Revision**: 10.18.2017

Trade Name: Alconox

Germany MAK: Not classified.
EC 648/2004 – This is an industrial detergent. Contains >30% phosphate, 15-30% anionic surfactant, <5% EDTA salts
EC 551/2009 – This is not a laundry or dishwasher detergent
EC 907/2006 – Contains no enzymes, optical brighteners, perfumes, allergenic fragrances, or preservative agents

Asia Pacific

Australia

Australian Inventory of Chemical Substances (AICS): All ingredients are listed.

China

Inventory of Existing Chemical Substances in China (IECSC): All ingredients are listed.

Japan

Inventory of Existing and New Chemical Substances (ENCS): All ingredients are listed.

Korea

Existing Chemicals List (ECL): All ingredients are listed.

New Zealand

New Zealand Inventory of Chemicals (NZOIC): All ingredients are listed.

Philippines

Philippine Inventory of Chemicals and Chemical Substances (PICCS): All ingredients are listed.

Taiwan

Taiwan Chemical Substance Inventory (TSCI): All ingredients are listed.

16 Other information

Abbreviations and Acronyms: None

Summary of Phrases

Hazard statements:
H315 Causes skin irritation.
H319 Causes serious eye irritation.

NFPA: 1-0-0
HMIS: 1-0-0

Precautionary statements:
P264 Wash skin thoroughly after handling.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P302+P352 If on skin: Wash with soap and water.
P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.
P321 Specific treatment (see supplemental first aid instructions on this label).
P332+P313 If skin irritation occurs: Get medical advice/attention.
P362 Take off contaminated clothing and wash before reuse.
P501 Dispose of contents and container as instructed in Section 13.

Manufacturer Statement:

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

SAFETY DATA SHEET

Revision Date 17-Jan-2018 **Revision Number** 3

1. Identification

Product Name **Cadmium**

Cat No. : **C3-500**

CAS-No 7440-43-9
Synonyms No information available

Recommended Use Laboratory chemicals.
Uses advised against Food, drug, pesticide or biocidal product use

Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Emergency Telephone Number
CHEMTREC®, Inside the USA: 800-424-9300
CHEMTREC®, Outside the USA: 001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Flammable solids	Category 2
Acute oral toxicity	Category 4
Acute dermal toxicity	Category 4
Acute Inhalation Toxicity - Dusts and Mists	Category 2
Germ Cell Mutagenicity	Category 2
Carcinogenicity	Category 1A
Reproductive Toxicity	Category 2
Specific target organ toxicity (single exposure) Target Organs - Respiratory system.	Category 3
Specific target organ toxicity - (repeated exposure) Target Organs - Kidney, Blood.	Category 1
Combustible dust	Yes

Label Elements

Signal Word
Danger

Hazard Statements
Flammable solid
May form combustible dust concentrations in air
Fatal if inhaled
Harmful if swallowed
Harmful in contact with skin
May cause respiratory irritation
Suspected of causing genetic defects
May cause cancer
Suspected of damaging fertility. Suspected of damaging the unborn child
Causes damage to organs through prolonged or repeated exposure



Precautionary Statements
Prevention
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Do not breathe dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area
Ground/bond container and receiving equipment
Use explosion-proof electrical/ventilating/lighting/equipment
Response
IF exposed or concerned: Get medical attention/advice
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Immediately call a POISON CENTER or doctor/physician
Skin
IF ON SKIN: Wash with plenty of soap and water
Wash contaminated clothing before reuse
Call a POISON CENTER or doctor/physician if you feel unwell
Ingestion
IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell
Rinse mouth
Fire
Fight fire with normal precautions from a reasonable distance
Evacuate area
Storage
Store locked up
Store in a well-ventilated place. Keep container tightly closed
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
Very toxic to aquatic life with long lasting effects
WARNING. Cancer and Reproductive Harm - https://www.p65warnings.ca.gov/.

3. Composition/Information on Ingredients

Component	CAS-No	Weight %

Cadmium	7440-43-9	100

4. First-aid measures

General Advice Show this safety data sheet to the doctor in attendance. Immediate medical attention is required.

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Immediate medical attention is required.

Inhalation Move to fresh air. If not breathing, give artificial respiration. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Immediate medical attention is required.

Ingestion Do not induce vomiting. Call a physician or Poison Control Center immediately.

Most important symptoms and effects None reasonably foreseeable. . Kidney disorders: May cause harm to the unborn child: Blood disorders

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Unsuitable Extinguishing Media No information available

Flash Point No information available
Method - No information available

Autoignition Temperature No information available

Explosion Limits
Upper No data available
Lower No data available
Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
Thermal decomposition can lead to release of irritating gases and vapors. Fine dust dispersed in air may ignite. Dust can form an explosive mixture in air. Pyrophoric properties of solids and liquids. Do not allow run-off from fire fighting to enter drains or water courses.

Hazardous Combustion Products
Highly toxic fumes

Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

NFPA

Health	Flammability	Instability	Physical hazards
4	1	0	N/A

6. Accidental release measures

Personal Precautions Ensure adequate ventilation. Use personal protective equipment. Avoid dust formation. Keep people away from and upwind of spill/leak. Evacuate personnel to safe areas.

Environmental Precautions Do not flush into surface water or sanitary sewer system. Do not allow material to contaminate ground water system. Prevent product from entering drains. Local authorities should be advised if significant spillages cannot be contained.

Methods for Containment and Clean Up Sweep up or vacuum up spillage and collect in suitable container for disposal. Avoid dust formation.

7. Handling and storage

Handling Wear personal protective equipment. Do not get in eyes, on skin, or on clothing. Avoid dust formation. Use only under a chemical fume hood. Do not breathe vapors/dust. Do not ingest.

Storage Keep containers tightly closed in a dry, cool and well-ventilated place. Store under an inert atmosphere.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
Cadmium	TWA: 0.01 mg/m³ TWA: 0.002 mg/m³	Ceiling: 0.3 mg/m³ Ceiling: 0.6 mg/m³ (Vacated) STEL: 0.3 ppm TWA: 0.1 mg/m³ TWA: 0.2 mg/m³ TWA: 5 µg/m³	IDLH: 9 mg/m³	TWA: 0.01 mg/m³ TWA: 0.002 mg/m³

Legend

ACGIH - American Conference of Governmental Industrial Hygienists
OSHA - Occupational Safety and Health Administration
NIOSH IDLH: The National Institute for Occupational Safety and Health Immediately Dangerous to Life or Health

Engineering Measures Use only under a chemical fume hood. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Long sleeved clothing.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures When using, do not eat, drink or smoke. Provide regular cleaning of equipment, work area and clothing. Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product. Keep away from food, drink and animal feeding stuffs.

9. Physical and chemical properties

Physical State	Solid
Appearance	Silver
Odor	Odorless
Odor Threshold	No information available
pH	No information available
Melting Point/Range	321 °C / 609.8 °F

Boiling Point/Range	765 °C / 1409 °F @ 760 mmHg
Flash Point	No information available
Evaporation Rate	Not applicable
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	No information available
Vapor Density	Not applicable
Specific Gravity	8.64 @ 25°C
Solubility	Insoluble in water
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	Not applicable
Molecular Formula	Cd
Molecular Weight	112.40

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under recommended storage conditions. Moisture sensitive. Air sensitive.

Conditions to Avoid Incompatible products. Excess heat. Avoid dust formation. Exposure to air or moisture over prolonged periods.

Incompatible Materials Strong oxidizing agents, Strong acids, Sulfur oxides

Hazardous Decomposition Products Highly toxic fumes

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Cadmium	LD50 = 2330 mg/kg (Rat)	Not listed	LC50 = 25 mg/m³ (Rat) 30 min

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation No information available

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Cadmium	7440-43-9	Group 1	Known	A2	X	A2

IARC: (International Agency for Research on Cancer)

NTP: (National Toxicity Program)

IARC: (International Agency for Research on Cancer)
Group 1 - Carcinogenic to Humans
Group 2A - Probably Carcinogenic to Humans
Group 2B - Possibly Carcinogenic to Humans
NTP: (National Toxicity Program)

	Known - Known Carcinogen *Reasonably Anticipated - Reasonably Anticipated to be a Human Carcinogen*
ACGIH: (American Conference of Governmental Industrial Hygienists)	*A1 - Known Human Carcinogen* *A2 - Suspected Human Carcinogen* *A3 - Animal Carcinogen* *ACGIH: (American Conference of Governmental Industrial Hygienists)*

Mutagenic Effects Possible risk of irreversible effects

Reproductive Effects Possible risk of impaired fertility. May cause harm to the unborn child.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure Respiratory system
STOT - repeated exposure Kidney Blood

Aspiration hazard No information available

Symptoms / effects,both acute and delayed Kidney disorders: May cause harm to the unborn child: Blood disorders

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information



Ecotoxicity

The product contains following substances which are hazardous for the environment. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Cadmium	Not listed	LC50: 0.0004 - 0.003 mg/L, 96h (Pimephales promelas) LC50: = 0.016 mg/L, 96h (Oryzias latipes) LC50: = 21.1 mg/L, 96h flow-through (Lepomis macrochirus) LC50: = 0.24 mg/L, 96h static (Cyprinus carpio) LC50: = 4.26 mg/L, 96h semi-static (Cyprinus carpio) LC50: = 0.002 mg/L, 96h (Cyprinus carpio) LC50: = 0.006 mg/L, 96h static (Oncorhynchus mykiss) LC50: = 0.003 mg/L, 96h	Not listed	EC50: = 0.0244 mg/L, 48h Static (Daphnia magna)

		flow-through (Oncorhynchus mykiss)		

Persistence and Degradability No information available

Bioaccumulation/ Accumulation No information available.

Mobility No information available.

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT

UN-No	UN2930
Proper Shipping Name	TOXIC SOLIDS, FLAMMABLE, ORGANIC, N.O.S.
Proper technical name	Cadmium
Hazard Class	6.1
Subsidiary Hazard Class	4.1
Packing Group	I

TDG

UN-No	UN2930
Proper Shipping Name	TOXIC SOLID, FLAMMABLE, ORGANIC, N.O.S.
Hazard Class	6.1
Subsidiary Hazard Class	4.1
Packing Group	I

IATA

UN-No	UN2930
Proper Shipping Name	TOXIC SOLID, FLAMMABLE, ORGANIC, N.O.S.
Hazard Class	6.1
Subsidiary Hazard Class	4.1
Packing Group	I

IMDG/IMO

UN-No	UN2930
Proper Shipping Name	TOXIC SOLID, FLAMMABLE, ORGANIC, N.O.S.
Hazard Class	6.1
Subsidiary Hazard Class	4.1
Packing Group	I

15. Regulatory information

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Cadmium	X	X	-	231-152-8	-		X	-	X	X	KE-04397

Legend:
X - Listed
E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
P - Indicates a commenced PMN substance
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule
T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B).
Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.

Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Cadmium	7440-43-9	100	0.1

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act)

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Cadmium	-	-	X	X

Clean Air Act

Component	HAPS Data	Class 1 Ozone Depletors	Class 2 Ozone Depletors
Cadmium	X		-

OSHA Occupational Safety and Health Administration
Not applicable

Component	Specifically Regulated Chemicals	Highly Hazardous Chemicals
Cadmium	5 µg/m³ TWA 2.5 µg/m³ Action Level	-

CERCLA This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Cadmium	10 lb	-

California Proposition 65 This product contains the following proposition 65 chemicals

Component	CAS-No	California Prop. 65	Prop 65 NSRL	Category
Cadmium	7440-43-9	Carcinogen Developmental Male Reproductive	0.05 µg/day	Developmental Carcinogen

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Cadmium	X	X	X	X	X

U.S. Department of Transportation

Reportable Quantity (RQ): Y
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security
This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

16. Other information

Prepared By	Regulatory Affairs Thermo Fisher Scientific Email: EMSDS.RA@thermofisher.com
Revision Date	17-Jan-2018
Print Date	17-Jan-2018
Revision Summary	This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

Conductivity Calibrator 1,000-100,000 micromho/cm

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Revision date: 09/11/2013 Supersedes: 04/04/2011 Version: 2.0

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY

Product Identifier

Product name: Conductivity Calibrator 1,000-100,000 micromho/cm

Product code: 3160**,** 3161, 3163, 3165, 3167, 3168, 3169

Intended Use Of The Product

Use of the substance/preparation: Calibration of YSI Analytical equipment

Name, Address, And Telephone Of The Responsible Party

YSI
1700/1725 Brannum Lane
Yellow Springs, OH 45387

T 937-767-7241

www.ysi.com
MSDSinfo@ysi.com

Emergency Telephone Number

Emergency number : Within USA and Canada: 1-800-424-9300 - Outside USA and Canada: +1 703-527-3887 (collect calls accepted) CHEMTREC

SECTION 2: HAZARDS IDENTIFICATION

Classification Of The Substance Or Mixture

Classification (GHS-US)

Not classified

Label Elements

GHS-US labeling No labeling applicable

Other Hazards Not available

Unknown acute toxicity (GHS US) Not available

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

Substances

Mixture

Name	Product identifier	% (w/w)	Classification (GHS-US)
Water	(CAS No.) 7732-18-5	93 - 100	Not classified
Potassium chloride	(CAS No.) 7447-40-7	0.1 - 7	Eye Irrit. 2B, H320

Full text of H-phrases: see section 16

SECTION 4: FIRST AID MEASURES

Description Of First Aid Measures

General: Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible).

Inhalation: When symptoms occur: go into open air and ventilate suspected area.

Skin Contact: Remove contaminated clothing. Drench affected area with water for at least 15 minutes.

Eye Contact: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Ingestion: Rinse mouth.Do NOT induce vomiting

Most Important Symptoms And Effects Both Acute and Delayed

General: Not available

Inhalation: None expected under normal conditions of use..

Skin Contact: May cause mild skin irritation..

Eye Contact: May cause eye irritation..

Ingestion: If a large quantity has been ingested: Diarrhea. Abdominal pain..

Chronic symptoms: Not available

Indication Of Any Immediate Medical Attention And Special Treatment Needed

If exposed or concerned, get medical advice and attention.

SECTION 5: FIREFIGHTING MEASURES

Extinguishing Media

Suitable extinguishing media: Alcohol foam, polymer foam, dry chemical powder, carbon dioxide, water spray, fog.

Unsuitable extinguishing media: None known.

Special Hazards Arising From The Substance Or Mixture

Fire hazard: Not flammable.

Explosion hazard: Product is not explosive.

Reactivity: Hazardous reactions will not occur under normal conditions.

Advice For Firefighters

Precautionary measures fire: Not available

Firefighting instructions: Exercise caution when fighting any chemical fire.

Protection during firefighting: Do not enter fire area without proper protective equipment, including respiratory protection..

Hazardous Combustion Products: Upon heating, toxic fumes are formed. (chlorine). Potassium oxides.

Reference To Other Sections

Refer to section 9 for flammability properties.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment And Emergency Procedures

General measures: Handle in accordance with good industrial hygiene and safety practice.

For Non-Emergency Personnel

Protective equipment: Use appropriate personal protection equipment (PPE).

Emergency procedures: Evacuate unnecessary personnel.

For Emergency Personnel

Protective equipment: Equip cleanup crew with proper protection.

Emergency procedures: Ventilate area.

Environmental Precautions

Prevent entry to sewers and public waters.

Methods And Material For Containment And Cleaning Up

For containment: Absorb and/or contain spill with inert material, then place in suitable container.

Methods for cleaning up: Clear up spills immediately and dispose of waste safely.

Reference To Other Sections

See heading 8, Exposure Controls and Personal Protection.

SECTION 7: HANDLING AND STORAGE

Precautions For Safe Handling

Hygiene measures: Handle in accordance with good industrial hygiene and safety procedures. Wash hands and other exposed areas with mild soap and water before eating, drinking, or smoking and again when leaving work.

Conditions For Safe Storage, Including Any Incompatibilities

Storage conditions: Store in a dry, cool and well-ventilated place. Keep container closed when not in use.

Incompatible materials: Strong acids. Strong oxidizers.

Specific End Use(s)

Calibration of YSI Analytical equipment

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters

No Occupational Exposure Limits (OELs) have been established for this product or its chemical components.

Exposure Controls

Appropriate engineering controls: Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure.

Personal protective equipment: Safety glasses. Gloves.



Materials for protective clothing: Not available

Hand protection: Wear chemically resistant protective gloves.

Eye protection: Chemical goggles or safety glasses.

Skin and body protection: Not available

Respiratory protection: Use NIOSH-approved air-purifying or supplied-air respirator where airborne concentrations of vapor or mist are expected to exceed exposure limits.

Other information: When using, do not eat, drink or smoke.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Information On Basic Physical And Chemical Properties

Physical state	:	Liquid
Appearance	:	Clear
Odor	:	Not available
Odor threshold	:	Not available
pH	:	6.5 - 7.5
Relative evaporation rate (butyl acetate=1)	:	Not available
Melting point	:	Not available
Freezing point	:	Not available
Boiling point	:	100 °C (212 °F)
Flash point	:	Not available
Auto-ignition temperature	:	Not available
Decomposition Temperature	:	Not available
Flammability (solid, gas)	:	Not available
Lower flammable limit	:	Not available
Upper flammable limit	:	Not available
Vapor pressure	:	Not available
Relative vapor density at 20 °C	:	Not available
Relative density	:	Not available
Specific gravity density	:	1 g/ml
Solubility	:	Not available
Log Pow	:	Not available
Log Kow	:	Not available
Viscosity, kinematic	:	Not available
Viscosity, dynamic	:	Not available

Explosion data - sensitivity to mechanical impact : Not available

Explosion data - sensitivity to static discharge : Not available

SECTION 10: STABILITY AND REACTIVITY

Reactivity Hazardous reactions will not occur under normal conditions.

Chemical Stability Stable under normal conditions.

Possibility Of Hazardous Reactions Hazardous polymerization will not occur.

Conditions To Avoid Direct sunlight. Extremely high or low temperatures.

Incompatible Materials Strong acids. Strong oxidizers

Hazardous Decomposition Products Potassium oxides. Upon heating, toxic fumes are formed. (chlorine)

SECTION 11: TOXICOLOGICAL INFORMATION

Information On Toxicological Effects - Product

Acute toxicity : Not classified

LD50 and LC50 Data Not available

Skin corrosion/irritation: Not classified pH: 6.5 - 7.5

Serious eye damage/irritation: Not classified pH: 6.5 - 7.5

Respiratory or skin sensitization: Not classified

Germ cell mutagenicity: Not classified

Teratogenicity: Not available

Carcinogenicity: Not classified

Specific target organ toxicity (repeated exposure): Not classified

Reproductive toxicity: Not classified

Specific target organ toxicity (single exposure): Not classified

Aspiration hazard: Not classified

Symptoms/injuries after inhalation: None expected under normal conditions of use.

Symptoms/injuries after skin contact: May cause mild skin irritation.

Symptoms/injuries after eye contact: May cause eye irritation.

Symptoms/injuries after ingestion: If a large quantity has been ingested: Diarrhea. Abdominal pain.

Information On Toxicological Effects - Ingredient(s)

LD50 and LC50 Data

Potassium chloride (7447-40-7)	
LD50 oral rat	2600 mg/kg

SECTION 12: ECOLOGICAL INFORMATION

Toxicity

Potassium chloride (7447-40-7)	
LC50 fish 1	1060 mg/l (Exposure time: 96 h - Species: Lepomis macrochirus [static])
EC50 Daphnia 1	825 mg/l (Exposure time: 48 h - Species: Daphnia magna)
EC50 other aquatic organisms 1	2500 mg/l (Exposure time: 72 h - Species: Desmodesmus subspicatus)
LC50 fish 2	750 - 1020 mg/l (Exposure time: 96 h - Species: Pimephales promelas [static])
EC50 Daphnia 2	83 mg/l (Exposure time: 48 h - Species: Daphnia magna [Static])

Persistence And Degradability

Conductivity Calibrator 1,000-100,000 micromho/cm	
Persistence and degradability	Not established.

Bioaccumulative Potential

Conductivity Calibrator 1,000-100,000 micromho/cm	
Bioaccumulative potential	Not established.

Mobility In Soil Not available

Other Adverse Effects

Other information: Avoid release to the environment.

SECTION 13: DISPOSAL CONSIDERATIONS

Waste disposal recommendations: Dispose of waste material in accordance with all local, regional, national, provincial, territorial and international regulations.

SECTION 14: TRANSPORT INFORMATION

In accordance with ICAO/IATA/DOT/TDG

UN Number Not regulated for transport

UN Proper Shipping Name Not regulated for transport

Additional information Not regulated for transport

Overland transport Not regulated for transport

Transport by sea Not regulated for transport

Air transport Not regulated for transport

SECTION 15: REGULATORY INFORMATION

US Federal regulations

Potassium chloride (7447-40-7)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

Water (7732-18-5)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

US State regulations

Potassium chloride (7447-40-7)
U.S. - Texas - Effects Screening Levels - Long Term
U.S. - Texas - Effects Screening Levels - Short Term

Canadian regulations

Conductivity Calibrator 1,000-100,000 micromho/cm	
Uncontrolled product according to WHMIS classification criteria	
Potassium chloride (7447-40-7)	
Listed on the Canadian DSL (Domestic Substances List) inventory.	
WHMIS Classification	Class D Division 2 Subdivision B - Toxic material causing other toxic effects
Water (7732-18-5)	
Listed on the Canadian DSL (Domestic Substances List) inventory.	
WHMIS Classification	Uncontrolled product according to WHMIS classification criteria

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by CPR.

SECTION 16: OTHER INFORMATION

Indication of changes : 04/04/2013

Other information : This document has been prepared in accordance with the SDS requirements of the OSHA Hazard Communication Standard 29 CFR 1910.1200.

GHS Full Text Phrases:

Eye Irrit. 2B	Serious eye damage/eye irritation Category 2B

Party Responsible For The Preparation Of This Document:

YSI, EHS Manager
1700/1725 Brannum Lane
Dayton, OH 45387
937-767-7241 x433

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.

North America GHS US 2012 & WHMIS

SAFETY DATA SHEET

Gasoline (All Grades)

HOLLYFRONTIER

Section 1. Identification

Product name : Gasoline (All Grades)

Product code : Not available.

Synonyms : Gasoline, Unleaded Gasoline, Regular Gasoline, Premium Gasoline, Oxyfuel, Reformulated Gasoline

Relevant identified uses of the substance or mixture and uses advised against

Product use : Use in fuel - Industrial use

Area of application : Industrial applications.

Manufacturer : HollyFrontier Refining & Marketing LLC
2828 North Harwood
Suite 1300
Dallas, Texas 75201
USA
Customer Service: (888) 286-8836

Emergency telephone number : CHEMTREC® (800) 424-9300
CCN 201319

Section 2. Hazards identification

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture :

H224	FLAMMABLE LIQUIDS - Category 1
H315	SKIN IRRITATION - Category 2
H319	EYE IRRITATION - Category 2A
H340	GERM CELL MUTAGENICITY - Category 1
H350	CARCINOGENICITY - Category 1B
H361	TOXIC TO REPRODUCTION (Fertility) - Category 2
H361	TOXIC TO REPRODUCTION (Unborn child) - Category 2
H336	SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Narcotic effects) - Category 3
H373	SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (liver) - Category 2
H304	ASPIRATION HAZARD - Category 1

Percentage of the mixture consisting of ingredient(s) of unknown dermal toxicity: 9%
Percentage of the mixture consisting of ingredient(s) of unknown inhalation toxicity: 4%

GHS label elements

Hazard pictograms :



Signal word : Danger

Hazard statements : H224 - Extremely flammable liquid and vapor.
H319 - Causes serious eye irritation.
H315 - Causes skin irritation.
H340 - May cause genetic defects.
H350 - May cause cancer.
H361 - Suspected of damaging fertility or the unborn child.
H304 - May be fatal if swallowed and enters airways.
H336 - May cause drowsiness or dizziness.
H373 - May cause damage to organs through prolonged or repeated exposure. (liver)

Precautionary statements

Prevention : Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Wear protective gloves. Wear eye or face protection. Wear protective clothing. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Use explosion-proof electrical, ventilating, lighting and all material-handling equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Keep container tightly closed. Use only outdoors or in a well-ventilated area. Do not breathe vapor. Wash hands thoroughly after handling.

Response : Get medical attention if you feel unwell. IF exposed or concerned: Get medical attention. IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or physician if you feel unwell. IF SWALLOWED: Immediately call a POISON CENTER or physician. Do NOT induce vomiting. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. IF ON SKIN: Wash with plenty of soap and water. Take off contaminated clothing and wash it before reuse. If skin irritation occurs: Get medical attention. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical attention.

Storage : Store in a well-ventilated place. Keep cool.

Disposal : Dispose of contents and container in accordance with all local, regional, national and international regulations.

Hazards not otherwise classified : None known.

Section 3. Composition/information on ingredients

Substance/mixture : Mixture

Ingredient name	Other names	%	CAS number
Gasoline	-	88 - 100	86290-81-5
ethanol	-	0 - 10	64-17-5
toluene	-	0 - 10	108-88-3
1,2,4-trimethylbenzene	-	0 - 5	95-63-6
benzene	-	0 - 5	71-43-2
n-hexane	-	0 - 3	110-54-3

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Get medical attention. Continue to rinse for at least 15 minutes.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If necessary, call a poison center or physician. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Skin contact : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Continue to rinse for at least 15 minutes. Get medical attention. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion : Aspiration hazard if swallowed. Can enter lungs and cause damage. Do not induce vomiting. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention immediately. Call a poison center or physician. Wash out mouth with water. Remove victim to fresh air and keep at rest in a position comfortable for breathing. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : Causes serious eye irritation.

Inhalation : Can cause central nervous system (CNS) depression. May cause drowsiness or dizziness.

Skin contact : Causes skin irritation.

Ingestion : Can cause central nervous system (CNS) depression. May be fatal if swallowed and enters airways.

Over-exposure signs/symptoms

Eye contact : pain or irritation; watering; redness

Inhalation : respiratory tract irritation; coughing; nausea or vomiting; headache; drowsiness/fatigue; dizziness/vertigo; unconsciousness

Skin contact : irritation; redness; dryness; cracking

Ingestion : nausea or vomiting

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled. Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in persons exposed to high concentrations of hydrocarbon solvents.

Specific treatments : No specific treatment.

Protection of medical responders : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Use dry chemical, CO_2, water spray (fog) or foam.

Unsuitable extinguishing media : Do not use water jet.

Specific hazards arising from the chemical : Extremely flammable liquid and vapor. Runoff to sewer may create fire or explosion hazard. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. The vapor/gas is heavier than air and will spread along the ground. Vapors may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders : If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Absorb with an inert material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

Large spill : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Approach release from upwind. Prevent entry into sewers, waterways, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Avoid exposure - obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not swallow. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use only non-sparking tools. Take precautionary measures against electrostatic discharges. Empty containers retain product residue and can be hazardous. Do not reuse container. High pressure skin injections are serious medical emergencies. Injury will not appear serious at first. Within a few hours, tissue will become swollen, discolored and extremely painful.

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
Gasoline	**ACGIH TLV (United States, 3/2017).** TWA: 300 ppm 8 hours. TWA: 890 mg/m³ 8 hours. STEL: 500 ppm 15 minutes. STEL: 1480 mg/m³ 15 minutes.
ethanol	**ACGIH TLV (United States, 3/2017).** STEL: 1000 ppm 15 minutes. **NIOSH REL (United States, 10/2016).** TWA: 1000 ppm 10 hours. TWA: 1900 mg/m³ 10 hours. **OSHA PEL (United States, 6/2016).** TWA: 1000 ppm 8 hours. TWA: 1900 mg/m³ 8 hours.
toluene	**OSHA PEL Z2 (United States, 2/2013).** TWA: 200 ppm 8 hours. CEIL: 300 ppm AMP: 500 ppm 10 minutes. **NIOSH REL (United States, 10/2016).** TWA: 100 ppm 10 hours. TWA: 375 mg/m³ 10 hours. STEL: 150 ppm 15 minutes. STEL: 560 mg/m³ 15 minutes. **ACGIH TLV (United States, 3/2017).** TWA: 20 ppm 8 hours.
1,2,4-trimethylbenzene	**ACGIH TLV (United States, 3/2017).** TWA: 25 ppm 8 hours. TWA: 123 mg/m³ 8 hours. **NIOSH REL (United States, 10/2016).** TWA: 25 ppm 10 hours. TWA: 125 mg/m³ 10 hours.
benzene	**ACGIH TLV (United States, 3/2017). Absorbed through skin.** TWA: 0.5 ppm 8 hours. TWA: 1.6 mg/m³ 8 hours. STEL: 2.5 ppm 15 minutes. STEL: 8 mg/m³ 15 minutes. **OSHA PEL Z2 (United States, 2/2013).** TWA: 10 ppm 8 hours. CEIL: 25 ppm AMP: 50 ppm 10 minutes. **NIOSH REL (United States, 10/2016).** TWA: 0.1 ppm 10 hours. STEL: 1 ppm 15 minutes. **OSHA PEL (United States, 6/2016).** TWA: 1 ppm 8 hours. STEL: 5 ppm 15 minutes.
n-hexane	**NIOSH REL (United States, 10/2016).** TWA: 50 ppm 10 hours. TWA: 180 mg/m³ 10 hours. **ACGIH TLV (United States, 3/2017). Absorbed through skin.** TWA: 50 ppm 8 hours. **OSHA PEL (United States, 6/2016).** TWA: 500 ppm 8 hours. TWA: 1800 mg/m³ 8 hours.

Appropriate engineering controls : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles.

Skin protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. When there is a risk of ignition from static electricity, wear anti-static protective clothing. For the greatest protection from static discharges, clothing should include anti-static overalls, boots and gloves.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use.

Section 9. Physical and chemical properties

Appearance

Physical state : Liquid.

Color : Clear to Amber

Odor : Gasoline

Odor threshold : Not available.

pH : Not available.

Melting point : Not available.

Boiling point : 26.667 to 226.67°C (80 to 440°F)

Flash point : -40°C (-40°F)

Evaporation rate : Not available.

Flammability (solid, gas) : Not applicable.

Lower and upper explosive (flammable) limits : Lower: 1.4%
Upper: 7.6%

Vapor pressure : 350-760 mm Hg at 37.8°C (100°F)

Vapor density : 3 to 4 [Air = 1]

Specific gravity : 0.75 [15.5°C (60°F)]

Density : Not available.

Solubility : Negligible

Partition coefficient: n-octanol/water : Not available.

Auto-ignition temperature : >260°C (>500°F)

Decomposition temperature : Not available.

Viscosity : Kinematic (40°C (104°F)): 0.0064 cm^2/s (0.64 cSt)

Flow time (ISO 2431) : Not available.

Section 10. Stability and reactivity

Reactivity : No specific test data related to reactivity available for this product or its ingredients.

Chemical stability : The product is stable.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.
Under normal conditions of storage and use, hazardous polymerization will not occur.

Conditions to avoid : Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Do not allow vapor to accumulate in low or confined areas.

Incompatible materials : Reactive or incompatible with the following materials:
oxidizing materials

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Gasoline	LC50 Inhalation Vapor	Rat	>5.2 mg/l	4 hours
	LD50 Dermal	Rabbit	>2000 mg/kg	-
	LD50 Oral	Rat	>5000 mg/kg	-
ethanol	LC50 Inhalation Dusts and mists	Rat	124700 mg/m³	4 hours
	LD50 Oral	Rat	7 g/kg	-

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
ethanol	Eyes - Moderate irritant	Rabbit	-	0.066666667 minutes 100 milligrams	-
	Eyes - Moderate irritant	Rabbit	-	100 microliters	-
	Eyes - Severe irritant	Rabbit	-	500 milligrams	-
	Skin - Mild irritant	Rabbit	-	400 milligrams	-

Sensitization

Product/ingredient name	Route of exposure	Species	Result
Gasoline	skin	Guinea pig	Not sensitizing

Carcinogenicity

Product/ingredient name	OSHA	IARC	NTP
toluene	-	3	-
benzene	+	1	Known to be a human carcinogen.

Specific target organ toxicity (single exposure)

Name	Category	Route of exposure	Target organs
Gasoline	Category 3	Not applicable.	Narcotic effects
ethanol	Category 3	Not applicable.	Respiratory tract irritation and Narcotic effects

Specific target organ toxicity (repeated exposure)

Name	Category	Route of exposure	Target organs
ethanol	Category 2	Not determined	liver

Aspiration hazard

Name	Result
Gasoline	ASPIRATION HAZARD - Category 1

Information on the likely routes of exposure : Routes of entry anticipated: Oral, Dermal, Inhalation.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Potential chronic health effects

General : May cause damage to organs through prolonged or repeated exposure.

Carcinogenicity : May cause cancer. Risk of cancer depends on duration and level of exposure.

Mutagenicity : May cause genetic defects.

Teratogenicity : Suspected of damaging the unborn child.

Developmental effects : reduced fetal weight; skeletal malformations

Fertility effects : Suspected of damaging fertility.

Numerical measures of toxicity

Acute toxicity estimates

Route	ATE value
Oral Inhalation (vapors)	9768.4 mg/kg 795.6 mg/l

Section 12. Ecological information

Toxicity

Product/ingredient name	Result	Species	Exposure
ethanol	Acute EC50 17.921 mg/l Marine water	Algae - Ulva pertusa	96 hours

Persistence and degradability

Product/ingredient name	Test	Result	Dose	Inoculum
toluene	301C Ready Biodegradability - Modified MITI Test (I)	100 % - 14 days	-	-
benzene	301C Ready Biodegradability - Modified MITI Test (I)	100 % - 14 days	-	-

Product/ingredient name	Aquatic half-life	Photolysis	Biodegradability
ethanol	-	-	Readily

Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
Gasoline ethanol	2 to 7 -0.35	10 to 2500 -	high low

Mobility in soil

Soil/water partition coefficient (K_{OC}) : Not available.

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Vapor from product residues may create a highly flammable or explosive atmosphere inside the container. Do not cut, weld or grind used containers unless they have been cleaned thoroughly internally. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

United States - RCRA Toxic hazardous waste "U" List

Ingredient	CAS #	Status	Reference number
Toluene; Benzene, methyl- Benzene (I,T)	108-88-3 71-43-2	Listed Listed	U220 U019

Section 14. Transport information

	DOT Classification	IMDG	IATA
UN number	UN1203	UN1203	UN1203
UN proper shipping name	Gasoline	GASOLINE	Gasoline
Transport hazard class(es)	3 	3 	3 
Packing group	II	II	II
Environmental hazards	No.	No.	Yes. The environmentally hazardous substance mark is not required.

Additional information

DOT Classification : **Reportable quantity** 400 lbs / 181.6 kg [63.965 gal / 242.13 L]. Package sizes shipped in quantities less than the product reportable quantity are not subject to the RQ (reportable quantity) transportation requirements.
Limited quantity Yes.
Packaging instruction Exceptions: 150. Non-bulk: 202. Bulk: 242.
Quantity limitation Passenger aircraft/rail: 5 L. Cargo aircraft: 60 L.
Special provisions 144, 177, B1, B33, IB2, T4

IMDG : **Emergency schedules** F-E, S-E
Special provisions 243

IATA : The environmentally hazardous substance mark may appear if required by other transportation regulations.
Quantity limitation Passenger and Cargo Aircraft: 5 L. Packaging instructions: 353. Cargo Aircraft Only: 60 L. Packaging instructions: 364. Limited Quantities - Passenger Aircraft: 1 L. Packaging instructions: Y341.
Special provisions A100

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Section 15. Regulatory information

U.S. Federal regulations : **United States inventory (TSCA 8b)**: All components are listed or exempted.
Clean Water Act (CWA) 307: toluene; benzene
Clean Water Act (CWA) 311: toluene; benzene

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Listed

DEA List II Chemicals (Essential Chemicals) : Listed

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : FLAMMABLE LIQUIDS - Category 1
SKIN IRRITATION - Category 2
EYE IRRITATION - Category 2A
GERM CELL MUTAGENICITY - Category 1
CARCINOGENICITY - Category 1B
TOXIC TO REPRODUCTION (Fertility) - Category 2
TOXIC TO REPRODUCTION (Unborn child) - Category 2
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Narcotic effects) - Category 3
SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (liver) - Category 2
ASPIRATION HAZARD - Category 1

Composition/information on ingredients

Name	%	Classification
Gasoline	88 - 100	FLAMMABLE LIQUIDS - Category 1 SKIN IRRITATION - Category 2 GERM CELL MUTAGENICITY - Category 1B CARCINOGENICITY - Category 1B TOXIC TO REPRODUCTION (Fertility) - Category 2 TOXIC TO REPRODUCTION (Unborn child) - Category 2 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Narcotic effects) - Category 3 ASPIRATION HAZARD - Category 1 HNOC - Defatting irritant
ethanol	0 - 10	FLAMMABLE LIQUIDS - Category 2

		SKIN IRRITATION - Category 2 EYE IRRITATION - Category 2A SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Narcotic effects) - Category 3 SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (liver) - Category 2 HNOC - Defatting irritant
toluene	0 - 10	FLAMMABLE LIQUIDS - Category 2 ACUTE TOXICITY (oral) - Category 4 SKIN IRRITATION - Category 2 EYE IRRITATION - Category 2A TOXIC TO REPRODUCTION (Unborn child) - Category 2 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Narcotic effects) - Category 3 SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 2 SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (nervous system) (inhalation) - Category 2 ASPIRATION HAZARD - Category 1 HNOC - Defatting irritant
1,2,4-trimethylbenzene	0 - 5	FLAMMABLE LIQUIDS - Category 3 ACUTE TOXICITY (inhalation) - Category 4 SKIN IRRITATION - Category 2 EYE IRRITATION - Category 2A SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Narcotic effects) - Category 3 ASPIRATION HAZARD - Category 1 HNOC - Defatting irritant
benzene	0 - 5	FLAMMABLE LIQUIDS - Category 2 ACUTE TOXICITY (oral) - Category 4 SKIN IRRITATION - Category 2 EYE IRRITATION - Category 2A GERM CELL MUTAGENICITY - Category 1B CARCINOGENICITY - Category 1A SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Narcotic effects) - Category 3 SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 1 SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (haematopoietic system) (oral) - Category 1 SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (haematopoietic system) (inhalation) - Category 1 ASPIRATION HAZARD - Category 1
n-hexane	0 - 3	FLAMMABLE LIQUIDS - Category 2 SKIN IRRITATION - Category 2 EYE IRRITATION - Category 2A TOXIC TO REPRODUCTION (Fertility) - Category 2 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Narcotic effects) - Category 3 SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (nervous system, peripheral nervous system) - Category 2 ASPIRATION HAZARD - Category 1 HNOC - Static-accumulating flammable liquid

SARA 313

	Product name	CAS number	%
Form R - Reporting requirements	toluene 1,2,4-trimethylbenzene benzene n-hexane	108-88-3 95-63-6 71-43-2 110-54-3	0 - 10 0 - 5 0 - 5 0 - 3
Supplier notification	toluene 1,2,4-trimethylbenzene benzene n-hexane	108-88-3 95-63-6 71-43-2 110-54-3	0 - 10 0 - 5 0 - 5 0 - 3

SARA 313 notifications must not be detached from the SDS and any copying and redistribution of the SDS shall include copying and redistribution of the notice attached to copies of the SDS subsequently redistributed.

State regulations

Massachusetts : The following components are listed: TOLUENE; METHYLBENZENE; PSEUDOCUMENE; BENZENE; HEXANE; N-HEXANE; ETHYL ALCOHOL; DENATURED ALCOHOL

New York : The following components are listed: Toluene; Benzene; Hexane

New Jersey : The following components are listed: TOLUENE; BENZENE, METHYL-; PSEUDOCUMENE; 1,2,4-TRIMETHYL BENZENE; BENZENE; n-HEXANE; HEXANE; ETHYL ALCOHOL; ALCOHOL

Pennsylvania : The following components are listed: GASOLINE; BENZENE, METHYL-; PSEUDOCUMENE; BENZENE; BENZOL DILUENT; HEXANE; DENATURED ALCOHOL; ETHANOL

California Prop. 65

⚠ **WARNING**: This product can expose you to Benzene, which is known to the State of California to cause cancer and birth defects or other reproductive harm. This product can expose you to Toluene, which is known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

Ingredient name	No significant risk level	Maximum acceptable dosage level
Toluene	-	Yes.
Benzene	Yes.	Yes.

International regulations

Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

Montreal Protocol (Annexes A, B, C, E)

Not listed.

Stockholm Convention on Persistent Organic Pollutants

Not listed.

Rotterdam Convention on Prior Informed Consent (PIC)

Not listed.

UNECE Aarhus Protocol on POPs and Heavy Metals

Not listed.

Section 16. Other information

National Fire Protection Association (U.S.A.)



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Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

Procedure used to derive the classification

Classification	Justification
Flam. Liq. 1, H224	On basis of test data
Skin Irrit. 2, H315	Calculation method
Eye Irrit. 2A, H319	Calculation method
Muta. 1, H340	Calculation method
Carc. 1B, H350	Expert judgment
Repr. 2, H361 (Fertility)	Calculation method
Repr. 2, H361 (Unborn child)	Calculation method
STOT SE 3, H336	Calculation method
STOT RE 2, H373 (liver)	Expert judgment
Asp. Tox. 1, H304	Calculation method

Date of issue/Date of revision : 11/08/2017

Date of previous issue : 03/18/2014

Version : 2

Key to abbreviations : ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
UN = United Nations

Indicates information that has changed from previously issued version.

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named manufacturer, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

Hydrochloric Acid,ACS

SECTION 1 : Identification of the substance/mixture and of the supplier

Product name : **Hydrochloric Acid,ACS**

Manufacturer/Supplier Trade name:

Manufacturer/Supplier Article number: **S25358**

Recommended uses of the product and uses restrictions on use:

Manufacturer Details:

AquaPhoenix Scientific
9 Barnhart Drive, Hanover, PA 17331

Supplier Details:

Fisher Science Education
15 Jet View Drive, Rochester, NY 14624

Emergency telephone number:

Fisher Science Education Emergency Telephone No.: 800-535-5053

SECTION 2 : Hazards identification

Classification of the substance or mixture:



Corrosive
Serious eye damage, category 1
Corrosive to metals, category 1
Skin corrosion, category 1B



Irritant
Specific target organ toxicity following single exposure, category 3

Corr. Metals 1
Corr. Skin 1B
Eye Damage 1
STOT. SE 3

Signal word :Danger

Hazard statements:
May be corrosive to metals
Causes severe skin burns and eye damage
May cause respiratory irritation

Precautionary statements:
If medical advice is needed, have product container or label at hand
Keep out of reach of children
Read label before use
Use only outdoors or in a well-ventilated area
Wear protective gloves/protective clothing/eye protection/face protection
Keep only in original container
Do not get in eyes, on skin, or on clothing
Wash skin thoroughly after handling
IF SWALLOWED: Rinse mouth. Do NOT induce vomiting

IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing
Immediately call a POISON CENTER or doctor/physician
Specific treatment (see supplemental first aid instructions on this label)
Wash contaminated clothing before reuse
Absorb spillage to prevent material damage
Store in a well ventilated place. Keep container tightly closed
Store locked up
Store in corrosive resistant stainless steel container with a resistant inner liner
Dispose of contents and container to an approved waste disposal plant

Other Non-GHS Classification:

WHMIS

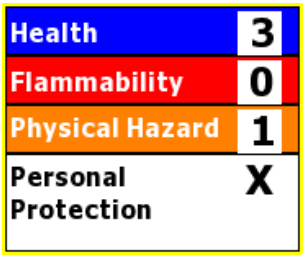
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NFPA/HMIS



NFPA SCALE (0-4)



HMIS RATINGS (0-4)

SECTION 3 : Composition/information on ingredients

Ingredients:		
CAS 7647-01-0	Hydrochloric Acid, ACS	30-50 %
CAS 7732-18-5	Water	50-70 %
		Percentages are by weight

SECTION 4 : First aid measures

Description of first aid measures

After inhalation: Move exposed individual to fresh air. Loosen clothing as necessary and position individual in a comfortable position.Seek medical attention if irritation or coughing persists.

After skin contact: Wash affected area with soap and water. Immediately remove contaminated clothing and shoes.Rinse thoroughly with plenty of water for at least 15 minutes.Immediately seek medical attention.

After eye contact: Protect unexposed eye. Flush thoroughly with plenty of water for at least 15

minutes.Remove contact lenses while rinsing.Continue rinsing eyes during transport to hospital.

After swallowing: Rinse mouth thoroughly. Do not induce vomiting. Have exposed individual drink sips of water. Immediately seek medical attention.

Most important symptoms and effects, both acute and delayed:

Inhalation may cause irritation to nose and upper respiratory tract, ulceration, coughing, chest tightness and shortness of breath. Higher concentrations cause tachypnoea, pulmonary oedema and suffocation . Ingestion may cause corrosion of lips, mouth, oesophagus and stomach, dysphagia and vomiting.Pain, eye ulceration, conjunctival irritation, cataracts and glaucoma may occur following eye exposure.Erythema and skin irritation, as well as chemical burns to skin and mucous membranes may arise following skin exposure.;Potential sequelae following ingestion of hydrochloric acid include perforation, scarring of the oesophagus or stomach and stricture formation causing dysphagia or gastric outlet obstruction. In some cases, RADS may develop. Respiratory symptoms may take up to 36 hours to develop.Symptoms of burning sensation, cough, wheezing, laryngitis, shortness of breath, spasm, inflammation, edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema. Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin.

Indication of any immediate medical attention and special treatment needed:

Provide SDS to Physician.Physician should treat symptomatically.

SECTION 5 : Firefighting measures

Extinguishing media

Suitable extinguishing agents: Use water, dry chemical, chemical foam, carbon dioxide, or alcohol-resistant foam.

For safety reasons unsuitable extinguishing agents:

Special hazards arising from the substance or mixture:

Combustion products may include carbon oxides or other toxic vapors.If in contact with metals toxic fumes may be released.

Advice for firefighters:

Protective equipment: Wear protective eyeware, gloves, and clothing. Refer to Section 8. Wear respiratory protection.

Additional information (precautions): Thermal decomposition can produce poisoning chlorine. Hydrochloric acid reacts also with many organic materials with liberation of heat.Avoid inhaling gases, fumes, dust, mist, vapor, and aerosols. Avoid contact with skin, eyes, and clothing.

SECTION 6 : Accidental release measures

Personal precautions, protective equipment and emergency procedures:

Ensure adequate ventilation. Ensure that air-handling systems are operational.

Environmental precautions:

Should not be released into environment. Prevent from reaching drains, sewer, or waterway.

Methods and material for containment and cleaning up:

Always obey local regulations. If necessary use trained response staff or contractor. Evacuate personnel to safe areas. Containerize for disposal. Refer to Section 13. Keep in suitable closed containers for disposal. Soak up with inert absorbent material and dispose of as hazardous waste. Cover spill with soda ash or calcium carbonate. Mix and add water to form slurry.Wear protective eyeware, gloves, and clothing. Refer to Section 8.

Reference to other sections:

SECTION 7 : Handling and storage

Precautions for safe handling:

Prevent formation of aerosols. Never use hot water and never add water to the acid.Do not allow contact between hydrochloric acid, metal, and organics.Follow good hygiene procedures when handling chemical materials. Refer to Section 8. Prevent contact with skin, eyes, and clothing. Follow proper disposal methods. Refer to Section 13. Do not eat, drink, smoke, or use personal products when handling chemical substances. Use only in well ventilated areas.Avoid splashes or spray in enclosed areas.

Conditions for safe storage, including any incompatibilities:

Store in a cool location. Keep away from food and beverages. Protect from freezing and physical damage. Store away from incompatible materials. Provide ventilation for containers. Keep container tightly sealed.Containers for hydrochloric acid must be made from corrosion resistant materials: glass, polyethylene, polypropylene, polyvinyl chloride, carbon steel lined with rubber or ebonite.

SECTION 8 : Exposure controls/personal protection






Control Parameters:	7647-01-0, Hydrochloric Acid, ACGIH: 2 ppm Ceiling 7647-01-0, Hydrochloric Acid, NIOSH: 5 ppm Ceiling; 7 mg/m3 Ceiling
Appropriate Engineering controls:	Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapor and mists below the applicable workplace exposure limits (Occupational Exposure Limits-OELs) indicated above. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of handling.
Respiratory protection:	Not required under normal conditions of use. Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. When necessary use NIOSH approved breathing equipment.
Protection of skin:	Select glove material impermeable and resistant to the substance. Select glove material based on rates of diffusion and degradation. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Use proper glove removal technique without touching outer surface. Avoid skin contact with used gloves. Wear protective clothing.
Eye protection:	Faceshield (8-inch minimum).Tightly fitting safety goggles.
General hygienic measures:	Perform routine housekeeping. Wash hands before breaks and immediately after handling the product. Avoid contact with skin, eyes, and clothing. Before rewearing wash contaminated clothing.

SECTION 9 : Physical and chemical properties

Appearance (physical state,color):	Clear, colorless liquid.	**Explosion limit lower**: **Explosion limit upper**:	Non Explosive Non Explosive
Odor:	Pungent odor	**Vapor pressure**:	5.7mmHg @ 0C
Odor threshold:	0.3 – 14.9 mg/m3	**Vapor density**:	1.27 (Air=1)
pH-value:	< 1	**Relative density**:	1.0 - 1.2

Melting/Freezing point:	- 74 C	**Solubilities**:	Miscible
Boiling point/Boiling range:	81.5 - 110 C	**Partition coefficient (n-octanol/water)**:	Not Determined
Flash point (closed cup):	Not Applicable	**Auto/Self-ignition temperature**:	Not Determined
Evaporation rate:	>1.00	**Decomposition temperature**:	Not Determined
Flammability (solid,gaseous):	non combustible	**Viscosity**:	a. Kinematic:Not Determined b. Dynamic: Not Determined
Density: Not Determined **Hydrochloric Acid:**MW is36.46			

SECTION 10 : Stability and reactivity

Reactivity: Reacts violently with bases and is corrosive.
Chemical stability: No decomposition if used and stored according to specifications.
Possible hazardous reactions: Attacks many metals in the presence of water forming flammable explosive gas (hydrogen).Reacts violently with oxidants forming toxic gas (chlorine).
Conditions to avoid: Incompatible materials.
Incompatible materials: Bases, Amines, Alkali metals, Metals, permanganates (potassium permanganate), Fluorine, Metal acetylides, Hexalithium disilicide.
Hazardous decomposition products: Hydrogen chloride gas.Carbon oxides.

SECTION 11 : Toxicological information

Acute Toxicity:		
Inhalation:	7647-01-0	LD50 Rat 3124 ppm/hour
Oral:	7647-01-0	LD50 Rat 238 - 277 mg/kg
Dermal:	7647-01-0	LD50 Rabbit >5010 mg/kg
Chronic Toxicity: No additional information.		
Corrosion Irritation:		
Dermal:	7647-01-0	Skin - rabbit Result: Causes burns.
Ocular:	7647-01-0	Eyes - rabbit Result: Corrosive to eyes
Sensitization:		No additional information.
Single Target Organ (STOT):		7647-01-0: The substance or mixture is classified as specific target organ toxicant, single exposure, category 3 with respiratory tract irritation.
Numerical Measures:		No additional information.
Carcinogenicity:		No additional information.
Mutagenicity:		No additional information.

Reproductive Toxicity:	No additional information.

SECTION 12 : Ecological information

Ecotoxicity

7647-01-0: Toxicity to fish LC50 - Gambusia affinis (Mosquito fish) - 282 mg/l - 96 h (Hydrochloric acid)

Persistence and degradability:
Bioaccumulative potential:
Mobility in soil:
Other adverse effects:

SECTION 13 : Disposal considerations

Waste disposal recommendations:

Do not allow product to reach sewage system or open water.It is the responsibility of the waste generator to properly characterize all waste materials according to applicable regulatory entities (US 40CFR262.11). Contact a licensed professional waste disposal service to dispose of this material. Dispose of empty containers as unused product. Product or containers must not be disposed together with household garbage. Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations. Ensure complete and accurate classification.

SECTION 14 : Transport information

UN-Number

1789

UN proper shipping name

HYDROCHLORIC ACID

Transport hazard class(es)



Class:
8 Corrosive substances

Packing group:II
Environmental hazard:
Transport in bulk:
Special precautions for user:

SECTION 15 : Regulatory information

United States (USA)

SARA Section 311/312 (Specific toxic chemical listings):

Acute

SARA Section 313 (Specific toxic chemical listings):

7647-01-0 Hydrochloric Acid

RCRA (hazardous waste code):

None of the ingredients is listed

TSCA (Toxic Substances Control Act):

All ingredients are listed.

CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act):

7647-01-0 Hydrochloric Acid 5000 lbs

Proposition 65 (California):

Chemicals known to cause cancer:

None of the ingredients is listed

Chemicals known to cause reproductive toxicity for females:

None of the ingredients is listed

Chemicals known to cause reproductive toxicity for males:

None of the ingredients is listed

Chemicals known to cause developmental toxicity:

None of the ingredients is listed

Canada

Canadian Domestic Substances List (DSL):

All ingredients are listed.

Canadian NPRI Ingredient Disclosure list (limit 0.1%):

None of the ingredients is listed

Canadian NPRI Ingredient Disclosure list (limit 1%):

7647-01-0 Hydrochloric Acid

SECTION 16 : Other information

This product has been classified in accordance with hazard criteria of the Controlled Products Regulations and the SDS contains all the information required by the Controlled Products Regulations.Note:. The responsibility to provide a safe workplace remains with the user.The user should consider the health hazards and safety information contained herein as a guide and should take those precautions required in an individual operation to instruct employees and develop work practice procedures for a safe work environment.The information contained herein is, to the best of our knowledge and belief, accurate.However, since the conditions of handling and use are beyond our control, we make no guarantee of results, and assume no liability for damages incurred by the use of this material.It is the responsibility of the user to comply with all applicable laws and regulations applicable to this material.

GHS Full Text Phrases:

Abbreviations and acronyms:

IMDG: International Maritime Code for Dangerous Goods
PNEC: Predicted No-Effect Concentration (REACH)
CFR: Code of Federal Regulations (USA)
SARA: Superfund Amendments and Reauthorization Act (USA)
RCRA: Resource Conservation and Recovery Act (USA)
TSCA: Toxic Substances Control Act (USA)
NPRI: National Pollutant Release Inventory (Canada)
DOT: US Department of Transportation
IATA: International Air Transport Association
GHS: Globally Harmonized System of Classification and Labelling of Chemicals
ACGIH: American Conference of Governmental Industrial Hygienists
CAS: Chemical Abstracts Service (division of the American Chemical Society)
NFPA: National Fire Protection Association (USA)

HMIS: Hazardous Materials Identification System (USA)
WHMIS: Workplace Hazardous Materials Information System (Canada)
DNEL: Derived No-Effect Level (REACH)

Effective date : 01.08.2015
Last updated : 03.20.2015

Isobutylene

Safety Data Sheet P-4614

This SDS conforms to U.S. Code of Federal Regulations 29 CFR 1910.1200, Hazard Communication.

Date of issue: 01/01/1979 Revision date: 10/17/2016 Supersedes: 02/27/2015

SECTION: 1. Product and company identification

1.1. Product identifier

Product form	:	Substance
Name	:	Isobutylene
CAS No	:	115-11-7
Formula	:	C4H8 / CH2=C(CH3)2
Other means of identification	:	Isobutene, 2-methylpropene

1.2. Relevant identified uses of the substance or mixture and uses advised against

Use of the substance/mixture	:	Industrial use. Use as directed.

1.3. Details of the supplier of the safety data sheet

Praxair, Inc.
10 Riverview Drive
Danbury, CT 06810-6268 - USA
T 1-800-772-9247 (1-800-PRAXAIR) - F 1-716-879-2146
www.praxair.com

1.4. Emergency telephone number

Emergency number	:	Onsite Emergency: 1-800-645-4633

CHEMTREC, 24hr/day 7days/week
— Within USA: 1-800-424-9300, Outside USA: 001-703-527-3887
(collect calls accepted, Contract 17729)

SECTION 2: Hazard identification

2.1. Classification of the substance or mixture

GHS-US classification

Flam. Gas 1 H220
Liquefied gas H280

2.2. Label elements

GHS-US labeling

Hazard pictograms (GHS-US) :



GHS02 GHS04

Signal word (GHS-US) : DANGER

Hazard statements (GHS-US) :
H220 - **EXTREMELY FLAMMABLE GAS**
H280 - CONTAINS GAS UNDER PRESSURE; MAY EXPLODE IF HEATED
OSHA-H01 - MAY DISPLACE OXYGEN AND CAUSE RAPID SUFFOCATION
CGA-HG04 - MAY FORM EXPLOSIVE MIXTURES WITH AIR
CGA-HG01 - MAY CAUSE FROSTBITE

Precautionary statements (GHS-US) :
P202 - Do not handle until all safety precautions have been read and understood
P210 - Keep away from Heat, Open flames, Sparks, Hot surfaces. - No smoking
P271+P403 - Use and store only outdoors or in a well-ventilated place
P377 - Leaking gas fire: Do not extinguish, unless leak can be stopped safely
P381 - Eliminate all ignition sources if safe to do so
CGA-PG05 - Use a back flow preventive device in the piping
CGA-PG12 - Do not open valve until connected to equipment prepared for use
CGA-PG06 - Close valve after each use and when empty
CGA-PG11 - Never put cylinders into unventilated areas of passenger vehicles
CGA-PG02 - Protect from sunlight when ambient temperature exceeds 52°C (125°F)

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2.3. Other hazards

Other hazards not contributing to the classification : None.

2.4. Unknown acute toxicity (GHS US)

No data available

SECTION 3: Composition/Information on ingredients

3.1. Substance

Name	Product identifier	%
Isobutylene (Main constituent)	(CAS No) 115-11-7	100

3.2. Mixture

Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures after inhalation : Remove to fresh air and keep at rest in a position comfortable for breathing. If not breathing, give artificial respiration. If breathing is difficult, trained personnel should give oxygen. Call a physician.

First-aid measures after skin contact : The liquid may cause frostbite. For exposure to liquid, immediately warm frostbite area with warm water not to exceed 105°F (41°C). Water temperature should be tolerable to normal skin. Maintain skin warming for at least 15 minutes or until normal coloring and sensation have returned to the affected area. In case of massive exposure, remove clothing while showering with warm water. Seek medical evaluation and treatment as soon as possible.

First-aid measures after eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly. Contact an ophthalmologist immediately.

First-aid measures after ingestion : Ingestion is not considered a potential route of exposure.

4.2. Most important symptoms and effects, both acute and delayed

No additional information available

4.3. Indication of any immediate medical attention and special treatment needed

None.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : Carbon dioxide, Dry chemical, Water spray or fog.

5.2. Special hazards arising from the substance or mixture

Fire hazard : **EXTREMELY FLAMMABLE GAS**. If venting or leaking gas catches fire, do not extinguish flames. Flammable vapors may spread from leak, creating an explosive reignition hazard. Vapors can be ignited by pilot lights, other flames, smoking, sparks, heaters, electrical equipment, static discharge, or other ignition sources at locations distant from product handling point. Explosive atmospheres may linger. Before entering an area, especially a confined area, check the atmosphere with an appropriate device.

Explosion hazard : **EXTREMELY FLAMMABLE GAS**. Forms explosive mixtures with air and oxidizing agents.

Reactivity : No reactivity hazard other than the effects described in sub-sections below.

5.3. Advice for firefighters

Firefighting instructions : **DANGER: FLAMMABLE LIQUID AND VAPOR.** Evacuate all personnel from danger area. Use self-contained breathing apparatus. Immediately cool surrounding containers with water spray from maximum distance, taking care not to extinguish flames. Avoid spreading burning liquid with water. Remove ignition sources if safe to do so. If flames are accidentally extinguished, explosive reignition may occur. Reduce vapors with water spray or fog. Stop flow of liquid if safe to do so, while continuing cooling water spray. Remove all containers from area of fire if safe to do so. Allow fire to burn out. On-site fire brigades must comply with OSHA 29 CFR 1910.156 and applicable standards under 29 CFR 1919 Subpart L - Fire Protection.

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Special protective equipment for fire fighters	:	Standard protective clothing and equipment (Self Contained Breathing Apparatus) for fire fighters.
Other information	:	Containers are equipped with a pressure relief device. (Exceptions may exist where authorized by DOT.).

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures : **DANGER: Flammable, liquefied gas.** FORMS EXPLOSIVE MIXTURES WITH AIR. Immediately evacuate all personnel from danger area. Use self-contained breathing apparatus where needed. Remove all sources of ignition if safe to do so. Reduce vapors with fog or fine water spray, taking care not to spread liquid with water. Shut off flow if safe to do so. Ventilate area or move container to a well-ventilated area. Flammable vapors may spread from leak and could explode if reignited by sparks or flames. Explosive atmospheres may linger. Before entering area, especially confined areas, check atmosphere with an appropriate device.

6.1.1. For non-emergency personnel

No additional information available

6.1.2. For emergency responders

No additional information available

6.2. Environmental precautions

Try to stop release. Prevent waste from contaminating the surrounding environment. Prevent soil and water pollution. Dispose of contents/container in accordance with local/regional/national/international regulations. Contact supplier for any special requirements.

6.3. Methods and material for containment and cleaning up

No additional information available

6.4. Reference to other sections

See also sections 8 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Use only non-sparking tools. Use only explosion-proof equipment

Wear leather safety gloves and safety shoes when handling cylinders. Protect cylinders from physical damage; do not drag, roll, slide or drop. While moving cylinder, always keep in place removable valve cover. Never attempt to lift a cylinder by its cap; the cap is intended solely to protect the valve. When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders. Never insert an object (e.g, wrench, screwdriver, pry bar) into cap openings; doing so may damage the valve and cause a leak. Use an adjustable strap wrench to remove over-tight or rusted caps. Slowly open the valve. If the valve is hard to open, discontinue use and contact your supplier. Close the container valve after each use; keep closed even when empty. Never apply flame or localized heat directly to any part of the container. High temperatures may damage the container and could cause the pressure relief device to fail prematurely, venting the container contents. For other precautions in using this product, see section 16.

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7.2. Conditions for safe storage, including any incompatibilities

Storage conditions : Store only where temperature will not exceed 125°F (52°C). Post "No Smoking/No Open Flames" signs in storage and use areas. There must be no sources of ignition. Separate packages and protect against potential fire and/or explosion damage following appropriate codes and requirements (e.g, NFPA 30, NFPA 55, NFPA 70, and/or NFPA 221 in the U.S.) or according to requirements determined by the Authority Having Jurisdiction (AHJ). Always secure containers upright to keep them from falling or being knocked over. Install valve protection cap, if provided, firmly in place by hand when the container is not in use. Store full and empty containers separately. Use a first-in, first-out inventory system to prevent storing full containers for long periods. For other precautions in using this product, see section 16

OTHER PRECAUTIONS FOR HANDLING, STORAGE, AND USE: When handling product under pressure, use piping and equipment adequately designed to withstand the pressures to be encountered. Never work on a pressurized system. Use a back flow preventive device in the piping. Gases can cause rapid suffocation because of oxygen deficiency; store and use with adequate ventilation. If a leak occurs, close the container valve and blow down the system in a safe and environmentally correct manner in compliance with all international, federal/national, state/provincial, and local laws; then repair the leak. Never place a container where it may become part of an electrical circuit.

7.3. Specific end use(s)

None.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Isobutylene (115-11-7)		
ACGIH	ACGIH TLV-TWA (ppm)	250 ppm

8.2. Exposure controls

Appropriate engineering controls : Use an explosion-proof local exhaust system. Local exhaust and general ventilation must be adequate to meet exposure standards. MECHANICAL (GENERAL): **Inadequate - Use only in a closed system.** Use explosion proof equipment and lighting.

Eye protection : Wear safety glasses when handling cylinders; vapor-proof goggles and a face shield during cylinder changeout or whenever contact with product is possible. Select eye protection in accordance with OSHA 29 CFR 1910.133.

Skin and body protection : Wear metatarsal shoes and work gloves for cylinder handling, and protective clothing where needed. Wear appropriate chemical gloves during cylinder changeout or wherever contact with product is possible. Select per OSHA 29 CFR 1910.132, 1910.136, and 1910.138.

Respiratory protection : When workplace conditions warrant respirator use, follow a respiratory protection program that meets OSHA 29 CFR 1910.134, ANSI Z88.2, or MSHA 30 CFR 72.710 (where applicable). Use an air-supplied or air-purifying cartridge if the action level is exceeded. Ensure that the respirator has the appropriate protection factor for the exposure level. If cartridge type respirators are used, the cartridge must be appropriate for the chemical exposure. For emergencies or instances with unknown exposure levels, use a self-contained breathing apparatus (SCBA).

Thermal hazard protection : Wear cold insulating gloves when transfilling or breaking transfer connections.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state : Gas

Molecular mass : 56 g/mol

Color : Colorless.

Odor : Poor warning properties at low concentrations. Sweetish.

Odor threshold : Odor threshold is subjective and inadequate to warn for overexposure.

pH : Not applicable.

Relative evaporation rate (butyl acetate=1) : No data available

Relative evaporation rate (ether=1) : Not applicable.

Melting point : -140.3 °C

Freezing point : No data available

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Boiling point	:	-6.9 °C
Flash point	:	-80 °C (closed cup)
Critical temperature	:	144.7 °C
Auto-ignition temperature	:	465 °C
Decomposition temperature	:	No data available
Flammability (solid, gas)	:	1.8 - 8.8 vol %
Vapor pressure	:	260 kPa
Critical pressure	:	4000 kPa
Relative vapor density at 20 °C	:	No data available
Relative density	:	0.63
Density	:	0.599 g/cm³ (at 20 °C)
Relative gas density	:	2
Solubility	:	Water: 388 mg/l
Log Pow	:	2.35
Log Kow	:	Not applicable.
Viscosity, kinematic	:	Not applicable.
Viscosity, dynamic	:	Not applicable.
Explosive properties	:	Not applicable.
Oxidizing properties	:	None.
Explosion limits	:	No data available

9.2. Other information

Gas group	:	Liquefied gas
Additional information	:	Gas/vapor heavier than air. May accumulate in confined spaces, particularly at or below ground level

SECTION 10: Stability and reactivity

10.1. Reactivity

No reactivity hazard other than the effects described in sub-sections below.

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

May occur.

10.4. Conditions to avoid

High temperature. Catalyst.

10.5. Incompatible materials

Halogens. Oxidizing agents. Acids.

10.6. Hazardous decomposition products

Thermal decomposition may produce : Carbon monoxide. Carbon dioxide.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity : Not classified

Isobutylene (\f)115-11-7	
LC50 inhalation rat (mg/l)	620 mg/l/4h
LC50 inhalation rat (ppm)	541657 ppm/1h
ATE US (gases)	270828.500 ppmV/4h
ATE US (vapors)	620.000 mg/l/4h
ATE US (dust, mist)	620.000 mg/l/4h

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Skin corrosion/irritation : Not classified

pH: Not applicable.

Serious eye damage/irritation : Not classified

pH: Not applicable.

Respiratory or skin sensitization : Not classified

Germ cell mutagenicity : Not classified

Carcinogenicity : Not classified

Isobutylene (115-11-7)	
National Toxicology Program (NTP) Status	1 - Evidence of Carcinogenicity

Reproductive toxicity : Not classified

Specific target organ toxicity (single exposure) : Not classified

Specific target organ toxicity (repeated exposure) : Not classified

Aspiration hazard : Not classified

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : No known ecological damage caused by this product.

12.2. Persistence and degradability

Isobutylene (115-11-7)	
Persistence and degradability	The substance is biodegradable. Unlikely to persist.

12.3. Bioaccumulative potential

Isobutylene (115-11-7)	
Log Pow	2.35
Log Kow	Not applicable.
Bioaccumulative potential	Not expected to bioaccumulate due to the low log Kow (log Kow < 4). Refer to section 9.

12.4. Mobility in soil

Isobutylene (115-11-7)	
Mobility in soil	No data available.
Ecology - soil	Because of its high volatility, the product is unlikely to cause ground or water pollution.

12.5. Other adverse effects

Effect on ozone layer : None

Effect on the global warming : No known effects from this product

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste disposal recommendations : Do not attempt to dispose of residual or unused quantities. Return container to supplier.

SECTION 14: Transport information

In accordance with DOT

Transport document description : UN1055 Isobutylene, 2.1

UN-No.(DOT) : UN1055

Proper Shipping Name (DOT) : Isobutylene

Class (DOT) : 2.1 - Class 2.1 - Flammable gas 49 CFR 173.115

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Hazard labels (DOT) : 2.1 - Flammable gas



DOT Special Provisions (49 CFR 172.102) : 19 - For domestic transportation only, the identification number UN1075 may be used in place of the identification number specified in column (4) of the 172.101 table. The identification number used must be consistent on package markings, shipping papers and emergency response information
T50 - When portable tank instruction T50 is referenced in Column (7) of the 172.101 Table, the applicable liquefied compressed gases are authorized to be transported in portable tanks in accordance with the requirements of 173.313 of this subchapter

Additional information

Emergency Response Guide (ERG) Number : 115 (UN1055)

Other information : No supplementary information available.

Special transport precautions : Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency. Before transporting product containers: - Ensure there is adequate ventilation. - Ensure that containers are firmly secured. - Ensure cylinder valve is closed and not leaking. - Ensure valve outlet cap nut or plug (where provided) is correctly fitted. - Ensure valve protection device (where provided) is correctly fitted.

Transport by sea

UN-No. (IMDG) : 1055

Proper Shipping Name (IMDG) : ISOBUTYLENE

Class (IMDG) : 2 - Gases

MFAG-No : 115

Air transport

UN-No. (IATA) : 1055

Proper Shipping Name (IATA) : Isobutylene

Class (IATA) : 2

Civil Aeronautics Law : Gases under pressure/Gases flammable under pressure

SECTION 15: Regulatory information

15.1. US Federal regulations

Isobutylene (115-11-7)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
SARA Section 311/312 Hazard Classes	Immediate (acute) health hazard Delayed (chronic) health hazard Sudden release of pressure hazard Fire hazard

15.2. International regulations

CANADA

Isobutylene (115-11-7)
Listed on the Canadian DSL (Domestic Substances List)

EU-Regulations

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Isobutylene (115-11-7)
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

15.2.2. National regulations

Isobutylene (115-11-7)
Listed on the AICS (Australian Inventory of Chemical Substances) Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China) Listed on the Japanese ENCS (Existing & New Chemical Substances) inventory Listed on the Korean ECL (Existing Chemicals List) Listed on NZIoC (New Zealand Inventory of Chemicals) Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances) Listed on INSQ (Mexican National Inventory of Chemical Substances)

15.3. US State regulations

Isobutylene(115-11-7)	
U.S. - California - Proposition 65 - Carcinogens List	No
U.S. - California - Proposition 65 - Developmental Toxicity	No
U.S. - California - Proposition 65 - Reproductive Toxicity - Female	No
U.S. - California - Proposition 65 - Reproductive Toxicity - Male	No
State or local regulations	U.S. - Massachusetts - Right To Know List U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) List

SECTION 16: Other information

Other information : When you mix two or more chemicals, you can create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an industrial hygienist or other trained person when you evaluate the end product. Before using any plastics, confirm their compatibility with this product

Praxair asks users of this product to study this SDS and become aware of the product hazards and safety information. To promote safe use of this product, a user should (1) notify employees, agents, and contractors of the information in this SDS and of any other known product hazards and safety information, (2) furnish this information to each purchaser of the product, and (3) ask each purchaser to notify its employees and customers of the product hazards and safety information

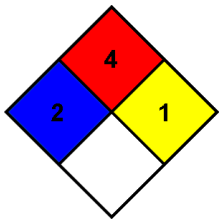
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NFPA health hazard	: 2 - Intense or continued exposure could cause temporary incapacitation or possible residual injury unless prompt medical attention is given.
NFPA fire hazard	: 4 - Will rapidly or completely vaporize at normal pressure and temperature, or is readily dispersed in air and will burn readily.
NFPA reactivity	: 1 - Normally stable, but can become unstable at elevated temperatures and pressures or may react with water with some release of energy, but not violently.



HMIS III Rating

Health	: 1 Slight Hazard - Irritation or minor reversible injury possible
Flammability	: 4 Severe Hazard
Physical	: 2 Moderate Hazard

SDS US (GHS HazCom 2012) - Praxair

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.

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Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 05/17/2017 **Revision** : 05/17/2017

Trade Name: Liquinox

1 Identification of the substance/mixture and of the supplier

1.1 Product identifier

Trade Name: Liquinox
Synonyms:
Product number: 1232-1, 1232, 1201-1, 1201, 1205, 1215, 1255

1.2 Application of the substance / the mixture : Cleaning material/Detergent

1.3 Details of the supplier of the Safety Data Sheet

Manufacturer **Supplier**
Alconox, Inc.
30 Glenn Street
White Plains, NY 10603
1-914-948-4040

Emergency telephone number:
ChemTel Inc
North America: 1-800-255-3924
International: 01-813-248-0585

2 Hazards identification

2.1 Classification of the substance or mixture:

In compliance with EC regulation No. 1272/2008, 29CFR1910/1200 and GHS Rev. 3 and amendments.

Hazard-determining components of labeling:
Alcohol ethoxylate
Sodium alkylbenzene sulfonate
Sodium xylenesulphonate
Lauramine oxide

2.2 Label elements:

Eye irritation, category 2A.
Skin irritation, category 2.

Hazard pictograms:



Signal word: Warning

Hazard statements:
H315 Causes skin irritation.
H319 Causes serious eye irritation.

Precautionary statements:
P264 Wash skin thoroughly after handling.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P302+P352 If on skin: Wash with soap and water.
P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.
P332+P313 If skin irritation occurs: Get medical advice/attention.
P501 Dispose of contents and container as instructed in Section 13.

Additional information: None.

Hazard description

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 05/17/2017 **Revision** : 05/17/2017

Trade Name: Liquinox

Hazards Not Otherwise Classified (HNOC): None

Information concerning particular hazards for humans and environment:

The product has to be labelled due to the calculation procedure of the "General Classification guideline for preparations of the EU" in the latest valid version.

Classification system:

The classification is according to EC regulation No. 1272/2008, 29CFR1910/1200 and GHS Rev. 3 and amendments, and extended by company and literature data. The classification is in accordance with the latest editions of international substances lists, and is supplemented by information from technical literature and by information provided by the company.

3 Composition/information on ingredients

3.1 Chemical characterization : None

3.2 Description : None

3.3 Hazardous components (percentages by weight)

Identification	Chemical Name	Classification	Wt. %
CAS number: 68081-81-2	Sodium Alkylbenzene Sulfonate	Acute Tox. 4; H303 Skin Irrit. 2 ; H315 Eye Irrit. 2; H319	10-25
CAS number: 1300-72-7	Sodium Xylenesulphonate	Eye Irrit. 2; H319	2.5-10
CAS number: 84133-50-6	Alcohol Ethoxylate	Skin Irrit. 2 ; H315 Eye Dam. 1; H318	2.5-10
CAS number: 1643-20-5	Lauramine oxide	Skin Irrit. 2 ; H315 Eye Dam. 1; H318	1-2

3.4 Additional Information: None.

4 First aid measures

4.1 Description of first aid measures

General information: None.

After inhalation:

Maintain an unobstructed airway.

Loosen clothing as necessary and position individual in a comfortable position.

After skin contact:

Wash affected area with soap and water.

Seek medical attention if symptoms develop or persist.

After eye contact:

Rinse/flush exposed eye(s) gently using water for 15-20 minutes.

Remove contact lens(es) if able to do so during rinsing.

Seek medical attention if irritation persists or if concerned.

After swallowing:

Rinse mouth thoroughly.

Seek medical attention if irritation, discomfort, or vomiting persists.

4.2 Most important symptoms and effects, both acute and delayed

None

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 05/17/2017 **Revision** : 05/17/2017

Trade Name: Liquinox

4.3 Indication of any immediate medical attention and special treatment needed:

No additional information.

5 Firefighting measures

5.1 Extinguishing media

Suitable extinguishing agents:

Use appropriate fire suppression agents for adjacent combustible materials or sources of ignition.

For safety reasons unsuitable extinguishing agents : None

5.2 Special hazards arising from the substance or mixture :

Thermal decomposition can lead to release of irritating gases and vapors.

5.3 Advice for firefighters

Protective equipment:

Wear protective eye wear, gloves and clothing.
Refer to Section 8.

5.4 Additional information :

Avoid inhaling gases, fumes, dust, mist, vapor and aerosols.
Avoid contact with skin, eyes and clothing.

6 Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures :

Ensure adequate ventilation.
Ensure air handling systems are operational.

6.2 Environmental precautions :

Should not be released into the environment.
Prevent from reaching drains, sewer or waterway.

6.3 Methods and material for containment and cleaning up :

Wear protective eye wear, gloves and clothing.

6.4 Reference to other sections : None

7 Handling and storage

7.1 Precautions for safe handling :

Avoid breathing mist or vapor.
Do not eat, drink, smoke or use personal products when handling chemical substances.
Conditions for safe storage, including any incompatibilities:
Store closed upright and in a cool dry place, should be 15 - 30 deg C or 60 - 90 deg F.

7.2 Specific end use(s):

No additional information.

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 05/17/2017 **Revision** : 05/17/2017

Trade Name: Liquinox

8 Exposure controls/personal protection





8.1 Control parameters :

No applicable occupational exposure limits

8.2 Exposure controls

Appropriate engineering controls:

Emergency eye wash fountains and safety showers should be available in the immediate vicinity of use or handling.

Respiratory protection:

Not needed under normal conditions.

Protection of skin:

Select glove material impermeable and resistant to the substance.

Eye protection:

Safety goggles or glasses, or appropriate eye protection.

General hygienic measures:

Wash hands before breaks and at the end of work.
Avoid contact with skin, eyes and clothing.

9 Physical and chemical properties

Appearance (physical state, color):	Pale yellow liquid	**Explosion limit lower**: **Explosion limit upper**:	Not determined or not available. Not determined or not available.
Odor:	Not determined or not available.	**Vapor pressure at 20°C**:	Not determined or not available.
Odor threshold:	Not determined or not available.	**Vapor density**:	Not determined or not available.
pH-value:	8.5 as is	**Relative density**:	Not determined or not available.
Melting/Freezing point:	Not determined or not available.	**Solubilities**:	Not determined or not available.
Boiling point/Boiling range:	Not determined or not available.	**Partition coefficient (n-octanol/water)**:	Not determined or not available.
Flash point (closed cup):	Not determined or not available.	**Auto/Self-ignition temperature**:	Not determined or not available.

Evaporation rate:	Not determined or not available.	**Decomposition temperature**:	Not determined or not available.
Flammability (solid, gaseous):	Not determined or not available.	**Viscosity**:	a. Kinematic: Not determined or not available. b. Dynamic: Not determined or not available.

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 05/17/2017 **Revision** : 05/17/2017

Trade Name: Liquinox	
Density at 20°C:	Not determined or not available.

10 Stability and reactivity

10.1 Reactivity : None

10.2 Chemical stability : None

10.3 Possibility hazardous reactions : None

10.4 Conditions to avoid : None

10.5 Incompatible materials : None

10.6 Hazardous decomposition products : None

11 Toxicological information

11.1 Information on toxicological effects :

Acute Toxicity:

Oral:

: LD50 >5000 mg per kg Rat, Oral) - product .

Chronic Toxicity: No additional information.

Skin corrosion/irritation:

Alcohol Ethoxylate: May cause mild to moderate skin irritation.

Sodium Alkylbenzene Sulfonate: Causes skin irritation.

Lauramine oxide: Causes skin irritation.

Serious eye damage/irritation:

Sodium Alkylbenzene Sulfonate: Causes serious eye irritation.

Alcohol Ethoxylate: Causes moderate to severe eye irritation and conjunctivitis.

Sodium xylenesulphonate: Rabbit: irritating to eyes.

Lauramine oxide: Causes serious eye damage.

Respiratory or skin sensitization: No additional information.

Carcinogenicity: No additional information.

IARC (International Agency for Research on Cancer): None of the ingredients are listed.

NTP (National Toxicology Program): None of the ingredients are listed.

Germ cell mutagenicity: No additional information.

Reproductive toxicity: No additional information.

STOT-single and repeated exposure: No additional information.

Additional toxicological information: No additional information.

12 Ecological information

12.1 Toxicity:

Sodium Alkylbenzene Sulfonate: Fish, LC50 1.67 mg/l, 96 hours.

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 05/17/2017 **Revision** : 05/17/2017

Trade Name: Liquinox

Sodium Alkylbenzene Sulfonate: Aquatic invertebrates, EC50 Daphnia 2.4 mg/l, 48 hours.
Sodium Alkylbenzene Sulfonate: Aquatic Plants, EC50 Algae 29 mg/l, 96 hours.
Lauramine oxide: Fish, LC0 24.3 mg/l, 96h [Killifish (Cyprinodontidae)]
Lauramine oxide: Aquatic invertebrates, (LC50): 3.6 mg/l 96 hours [Daphnia (Daphnia)].
Lauramine oxide: Aquatic plants, EC50 Algae 0.31 mg/l 72 hours [Algae]
Alcohol Ethoxylate: Aquatic invertebrates, (LC50): 4.01 mg/l 48 hours [Daphnia (daphnia)].

12.2 Persistence and degradability: No additional information.

12.3 Bioaccumulative potential: No additional information.

12.4 Mobility in soil: No additional information.

General notes: No additional information.

12.5 Results of PBT and vPvB assessment:

PBT: No additional information.

vPvB: No additional information.

12.6 Other adverse effects: No additional information.

13 Disposal considerations

13.1 Waste treatment methods (consult local, regional and national authorities for proper disposal)

Relevant Information:

It is the responsibility of the waste generator to properly characterize all waste materials according to applicable regulatory entities. (US 40CFR262.11).

14 Transport information

14.1 UN Number: None
ADR, ADN, DOT, IMDG, IATA

14.2 UN Proper shipping name: None
ADR, ADN, DOT, IMDG, IATA

14.3 Transport hazard classes:
ADR, ADN, DOT, IMDG, IATA

Class: None
Label: None
LTD. QTY: None

US DOT
Limited Quantity Exception: None

Bulk:
RQ (if applicable): None
Proper shipping Name: None
Hazard Class: None
Packing Group: None
Marine Pollutant (if applicable): No additional information.
Comments: None

Non Bulk:
RQ (if applicable): None
Proper shipping Name: None
Hazard Class: None
Packing Group: None
Marine Pollutant (if applicable): No additional information.
Comments: None

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 05/17/2017 **Revision** : 05/17/2017

Trade Name: Liquinox

14.4 Packing group: ADR, ADN, DOT, IMDG, IATA	None
14.5 Environmental hazards :	None
14.6 Special precautions for user:	None
Danger code (Kemler):	None
EMS number:	None
Segregation groups:	None

14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code: Not applicable.

14.8 Transport/Additional information:

Transport category:	None
Tunnel restriction code:	None
UN "Model Regulation":	None

15 Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture.

North American

SARA

Section 313 (specific toxic chemical listings): None of the ingredients are listed.
Section 302 (extremely hazardous substances): None of the ingredients are listed.

CERCLA (Comprehensive Environmental Response, Clean up and Liability Act) Reportable

Spill Quantity: None of the ingredients are listed.

TSCA (Toxic Substances Control Act):

Inventory: All ingredients are listed.
Rules and Orders: Not applicable.

Proposition 65 (California):

Chemicals known to cause cancer: None of the ingredients are listed.

Chemicals known to cause reproductive toxicity for females: None of the ingredients are listed.

Chemicals known to cause reproductive toxicity for males: None of the ingredients are listed.

Chemicals known to cause developmental toxicity: None of the ingredients are listed.

Canadian

Canadian Domestic Substances List (DSL):
All ingredients are listed.

EU

REACH Article 57 (SVHC): None of the ingredients are listed.

Germany MAK: Not classified.

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 05/17/2017 **Revision** : 05/17/2017

Trade Name: Liquinox

Asia Pacific

Australia

Australian Inventory of Chemical Substances (AICS): All ingredients are listed.

China

Inventory of Existing Chemical Substances in China (IECSC): All ingredients are listed.

Japan

Inventory of Existing and New Chemical Substances (ENCS): All ingredients are listed.

Korea

Existing Chemicals List (ECL): All ingredients are listed.

New Zealand

New Zealand Inventory of Chemicals (NZOIC): All ingredients are listed.

Philippines

Philippine Inventory of Chemicals and Chemical Substances (PICCS): All ingredients are listed.

Taiwan

Taiwan Chemical Substance Inventory (TSCI): All ingredients are listed.

16 Other information

Abbreviations and Acronyms: None

Summary of Phrases

Hazard statements:

H315 Causes skin irritation.
H319 Causes serious eye irritation.

Precautionary statements:

P264 Wash skin thoroughly after handling.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P302+P352 If on skin: Wash with soap and water.
P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.
P332+P313 If skin irritation occurs: Get medical advice/attention.
P501 Dispose of contents and container as instructed in Section 13.

Manufacturer Statement:

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as guidance for safe handling,

use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

NFPA: 1-0-0

HMIS: 1-0-0

Nitric Acid, 10% v/v (1+9)

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Date of issue: 10/31/2013 Revision date: 10/01/2015 Supersedes: 10/01/2015 Version: 1.1

SECTION 1: Identification

1.1. Identification

Product form : Mixture

Product name : Nitric Acid, 10% v/v (1+9)

Product code : LC17730

1.2. Relevant identified uses of the substance or mixture and uses advised against

Use of the substance/mixture : For laboratory and manufacturing use only.

1.3. Details of the supplier of the safety data sheet

LabChem Inc
Jackson's Pointe Commerce Park Building 1000, 1010 Jackson's Pointe Court
Zelienople, PA 16063 - USA
T 412-826-5230 - F 724-473-0647
info@labchem.com - www.labchem.com

1.4. Emergency telephone number

Emergency number : CHEMTREC: 1-800-424-9300 or 011-703-527-3887

SECTION 2: Hazard(s) identification

2.1. Classification of the substance or mixture

Classification (GHS-US)

Met. Corr. 1 H290 - May be corrosive to metals
Skin Corr. 1B H314 - Causes severe skin burns and eye damage
Eye Dam. 1 H318 - Causes serious eye damage

Full text of H-phrases: see section 16

2.2. Label elements

GHS-US labeling

Hazard pictograms (GHS-US) :



GHS05

Signal word (GHS-US) : Danger

Hazard statements (GHS-US) : H290 - May be corrosive to metals
H314 - Causes severe skin burns and eye damage

Precautionary statements (GHS-US) : P234 - Keep only in original container
P260 - Do not breathe mist, vapors, spray
P264 - Wash exposed skin thoroughly after handling
P280 - Wear protective gloves, protective clothing, eye protection, face protection
P301+P330+P331 - IF SWALLOWED: rinse mouth. Do NOT induce vomiting
P303+P361+P353 - IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower
P305+P351+P338 - If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P310 - Immediately call a poison center or doctor/physician
P363 - Wash contaminated clothing before reuse
P390 - Absorb spillage to prevent material damage
P405 - Store locked up
P406 - Store in corrosive resistant container with a resistant inner liner
P501 - Dispose of contents/container to comply with local, state and federal regulations
If inhaled: Remove person to fresh air and keep comfortable for breathing

2.3. Other hazards

Other hazards not contributing to the classification : None.

2.4. Unknown acute toxicity (GHS US)

Not applicable

SECTION 3: Composition/information on ingredients

3.1. Substance

Not applicable

3.2. Mixture

Name	Product identifier	%	Classification (GHS-US)
Water	(CAS No) 7732-18-5	90.5	Not classified
Nitric Acid, 70% w/w	(CAS No) 7697-37-2	9.5	Ox. Liq. 3, H272 Met. Corr. 1, H290 Skin Corr. 1A, H314 Eye Dam. 1, H318

Full text of H-phrases: see section 16

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures general : Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible).

First-aid measures after inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a poison center or doctor/physician.

First-aid measures after skin contact : Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. Immediately call a poison center or doctor/physician.

First-aid measures after eye contact : Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center or doctor/physician.

First-aid measures after ingestion : Rinse mouth. Do NOT induce vomiting. Immediately call a poison center or doctor/physician.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/injuries : Causes severe skin burns and eye damage.

Symptoms/injuries after eye contact : Causes serious eye damage.

4.3. Indication of any immediate medical attention and special treatment needed

No additional information available

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : Foam. Dry powder. Carbon dioxide. Water spray. Sand.

Unsuitable extinguishing media : Do not use a heavy water stream.

5.2. Special hazards arising from the substance or mixture

Reactivity : Thermal decomposition generates : Corrosive vapors.

5.3. Advice for firefighters

Firefighting instructions : Use water spray or fog for cooling exposed containers. Exercise caution when fighting any chemical fire. Prevent fire-fighting water from entering environment.

Protection during firefighting : Do not enter fire area without proper protective equipment, including respiratory protection.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. For non-emergency personnel

Protective equipment : Protective goggles. Protective clothing. Gloves. Combined gas/dust mask with filter type B/P3.

Emergency procedures : Evacuate unnecessary personnel.

6.1.2. For emergency responders

Protective equipment : Equip cleanup crew with proper protection.

Emergency procedures : Ventilate area.

6.2. Environmental precautions

Prevent entry to sewers and public waters. Notify authorities if liquid enters sewers or public waters.

6.3. Methods and material for containment and cleaning up

Methods for cleaning up : Soak up spills with inert solids, such as clay or diatomaceous earth as soon as possible. Collect spillage. Store away from other materials. Absorb spillage to prevent material damage.

6.4. Reference to other sections

See Heading 8. Exposure controls and personal protection.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Additional hazards when processed : May be corrosive to metals.

Precautions for safe handling : Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Provide good ventilation in process area to prevent formation of vapor. Do not breathe mist, vapors, spray.

Hygiene measures : Wash exposed skin thoroughly after handling. Wash contaminated clothing before reuse.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures : Comply with applicable regulations.

Storage conditions : Keep only in the original container in a cool, well ventilated place away from : incompatible materials. Keep container closed when not in use.

Incompatible products : Strong bases. Halogens. metals. aluminum. Strong reducing agents.

Incompatible materials : Sources of ignition. Direct sunlight.

Packaging materials : Store in corrosive resistant/… container with a resistant inner liner.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Nitric Acid, 70% w/w (7697-37-2)		
ACGIH	ACGIH TWA (ppm)	2 ppm
ACGIH	ACGIH STEL (ppm)	2 ppm
OSHA	OSHA PEL (TWA) (mg/m³)	5 mg/m³
OSHA	OSHA PEL (TWA) (ppm)	2 ppm

8.2. Exposure controls

Appropriate engineering controls : Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Provide adequate general and local exhaust ventilation.

Personal protective equipment : Avoid all unnecessary exposure. Combined gas/dust mask with filter type B/P3. Gloves. Protective clothing. Protective goggles.



Hand protection : Wear protective gloves.

Eye protection : Chemical goggles or face shield.

Skin and body protection : Wear suitable protective clothing.

Respiratory protection : Wear appropriate mask.

Other information : Do not eat, drink or smoke during use.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state : Liquid

Appearance : Colorless to pale yellow liquid.

Color : Colourless to light yellow

Odor : characteristic Pungent

Odor threshold : No data available

pH : No data available

Melting point : No data available

Freezing point : No data available

Boiling point : No data available

Flash point : No data available

Relative evaporation rate (butyl acetate=1) : No data available

Flammability (solid, gas) : No data available

Explosion limits	:	No data available
Explosive properties	:	No data available
Oxidizing properties	:	No data available
Vapor pressure	:	No data available
Relative density	:	No data available
Relative vapor density at 20 °C	:	No data available
Specific gravity / density	:	1.05 g/ml
Solubility	:	Soluble in water. Water: Solubility in water of component(s) of the mixture : • Nitric Acid, 70% w/w:
Log Pow	:	No data available
Auto-ignition temperature	:	No data available
Decomposition temperature	:	No data available
Viscosity	:	No data available
Viscosity, kinematic	:	0.99 cSt
Viscosity, dynamic	:	No data available

9.2. Other information

No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity

Thermal decomposition generates : Corrosive vapors.

10.2. Chemical stability

Not established.

10.3. Possibility of hazardous reactions

Not established.

10.4. Conditions to avoid

Direct sunlight. Extremely high or low temperatures.

10.5. Incompatible materials

Strong reducing agents. Strong bases. metals. aluminum. Ammonia. combustible materials. Halogens.

10.6. Hazardous decomposition products

Nitrogen oxides. Thermal decomposition generates : Corrosive vapors.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Likely routes of exposure	:	Inhalation; Skin and eye contact
Acute toxicity	:	Not classified

Water (7732-18-5)	
LD50 oral rat	≥ 90000 mg/kg
ATE US (oral)	90000.000 mg/kg body weight

Skin corrosion/irritation	:	Causes severe skin burns and eye damage.
Serious eye damage/irritation	:	Causes serious eye damage.
Respiratory or skin sensitization	:	Not classified
Germ cell mutagenicity	:	Not classified
Carcinogenicity	:	Not classified
Reproductive toxicity	:	Not classified
Specific target organ toxicity (single exposure)	:	Not classified
Specific target organ toxicity (repeated exposure)	:	Not classified

Aspiration hazard	:	Not classified
Potential Adverse human health effects and symptoms	:	Based on available data, the classification criteria are not met.
Symptoms/injuries after eye contact	:	Causes serious eye damage.

SECTION 12: Ecological information

12.1. Toxicity

Nitric Acid, 70% w/w (7697-37-2)	
LC50 fish 1	25 - 36 mg/l (96 h; Lepomis macrochirus; Pure substance)
EC50 Daphnia 1	180 mg/l (48 h; Daphnia magna; Pure substance)
LC50 fish 2	72 ppm (Gambusia affinis; Pure substance)
Threshold limit algae 1	> 19 mg/l (Algae; Pure substance)

12.2. Persistence and degradability

Nitric Acid, 10% v/v (1+9)	
Persistence and degradability	Not established.

Nitric Acid, 70% w/w (7697-37-2)	
Persistence and degradability	Biodegradability: not applicable. No test data on mobility of the components available.
Biochemical oxygen demand (BOD)	Not applicable
Chemical oxygen demand (COD)	Not applicable
ThOD	Not applicable
BOD (% of ThOD)	Not applicable

Water (7732-18-5)	
Persistence and degradability	Not established.

12.3. Bioaccumulative potential

Nitric Acid, 10% v/v (1+9)	
Bioaccumulative potential	Not established.

Nitric Acid, 70% w/w (7697-37-2)	
BCF fish 1	<= 1 (Pisces)
Log Pow	-2.3 (OECD 107: Partition Coefficient (n-octanol/water): Shake Flask Method)
Bioaccumulative potential	Bioaccumulation: not applicable.

Water (7732-18-5)	
Bioaccumulative potential	Not established.

12.4. Mobility in soil

No additional information available

12.5. Other adverse effects

Effect on the global warming	:	No known ecological damage caused by this product.
Other information	:	Avoid release to the environment.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste disposal recommendations	:	Dispose in a safe manner in accordance with local/national regulations. Dispose of contents/container to comply with local, state and federal regulations.
Ecology - waste materials	:	Avoid release to the environment.

SECTION 14: Transport information

Department of Transportation (DOT)

In accordance with DOT

Transport document description	:	UN2031 Nitric acid other than (red fuming, with not more than 20 percent nitric acid), 8, II
UN-No.(DOT)	:	UN2031

Proper Shipping Name (DOT)	:	Nitric acid other than red fuming, with not more than 20 percent nitric acid
Transport hazard class(es) (DOT)	:	8 - Class 8 - Corrosive material 49 CFR 173.136
Hazard labels (DOT)	:	8 - Corrosive



Packing group (DOT)	:	II - Medium Danger
DOT Packaging Non Bulk (49 CFR 173.xxx)	:	158
DOT Packaging Bulk (49 CFR 173.xxx)	:	242
DOT Special Provisions (49 CFR 172.102)	:	A6 - For combination packaging, if plastic inner packaging are used, they must be packed in tightly closed metal receptacles before packing in outer packaging. B2 - MC 300, MC 301, MC 302, MC 303, MC 305, and MC 306 and DOT 406 cargo tanks are not authorized. B47 - Each tank may have a reclosing pressure relief device having a start-to-discharge pressure setting of 310 kPa (45 psig). B53 - Packaging must be made of either aluminum or steel. IB2 - Authorized IBCs: Metal (31A, 31B and 31N); Rigid plastics (31H1 and 31H2); Composite (31HZ1). Additional Requirement: Only liquids with a vapor pressure less than or equal to 110 kPa at 50 C (1.1 bar at 122 F), or 130 kPa at 55 C (1.3 bar at 131 F) are authorized. T8 - 4 178.274(d)(2) Normal..... Prohibited TP2 - a. The maximum degree of filling must not exceed the degree of filling determined by the following: (image) Where: tr is the maximum mean bulk temperature during transport, tf is the temperature in degrees celsius of the liquid during filling, and a is the mean coefficient of cubical expansion of the liquid between the mean temperature of the liquid during filling (tf) and the maximum mean bulk temperature during transportation (tr) both in degrees celsius. b. For liquids transported under ambient conditions may be calculated using the formula: (image) Where: d15 and d50 are the densities (in units of mass per unit volume) of the liquid at 15 C (59 F) and 50 C (122 F), respectively. TP12 - This material is considered highly corrosive to steel.
DOT Packaging Exceptions (49 CFR 173.xxx)	:	None
DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27)	:	1 L
DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75)	:	30 L
DOT Vessel Stowage Location	:	D - The material must be stowed ‘‘on deck only’’ on a cargo vessel and on a passenger vessel carrying a number of passengers limited to not more than the larger of 25 passengers or one passenger per each 3 m of overall vessel length, but the material is prohibited on passenger vessels in which the limiting number of passengers is exceeded.
Other information	:	No supplementary information available.

TDG

No additional information available

Transport by sea

No additional information available

Air transport

No additional information available

SECTION 15: Regulatory information

15.1. US Federal regulations

Nitric Acid, 10% v/v (1+9)	
SARA Section 311/312 Hazard Classes	Immediate (acute) health hazard

Nitric Acid, 70% w/w (7697-37-2)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory Listed on United States SARA Section 313	
RQ (Reportable quantity, section 304 of EPA's List of Lists)	1000 lb
SARA Section 311/312 Hazard Classes	Immediate (acute) health hazard

Water (7732-18-5)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

15.2. International regulations

CANADA

Nitric Acid, 10% v/v (1+9)	
WHMIS Classification	Class E - Corrosive Material

Nitric Acid, 70% w/w (7697-37-2)	
Listed on the Canadian DSL (Domestic Substances List)	
WHMIS Classification	Class E - Corrosive Material Class C - Oxidizing Material

Water (7732-18-5)	
WHMIS Classification	Uncontrolled product according to WHMIS classification criteria

EU-Regulations

No additional information available

National regulations

Nitric Acid, 70% w/w (7697-37-2)
Listed on the Canadian IDL (Ingredient Disclosure List)

15.3. US State regulations

No additional information available

SECTION 16: Other information

Revision date : 10/01/2015

Other information : None.

Full text of H-phrases: see section 16:

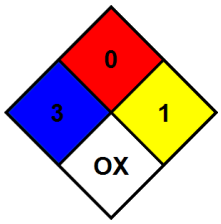
Eye Dam. 1	Serious eye damage/eye irritation Category 1
Met. Corr. 1	Corrosive to metals Category 1
Ox. Liq. 3	Oxidizing liquids Category 3
Skin Corr. 1A	Skin corrosion/irritation Category 1A
Skin Corr. 1B	Skin corrosion/irritation Category 1B
H272	May intensify fire; oxidizer
H290	May be corrosive to metals
H314	Causes severe skin burns and eye damage
H318	Causes serious eye damage

NFPA health hazard : 3 - Short exposure could cause serious temporary or residual injury even though prompt medical attention was given.

NFPA fire hazard : 0 - Materials that will not burn.

NFPA reactivity : 1 - Normally stable, but can become unstable at elevated temperatures and pressures or may react with water with some release of energy, but not violently.

NFPA specific hazard : OX - This denotes an oxidizer, a chemical which can greatly increase the rate of combustion/fire.



HMIS III Rating

Health : 3 Serious Hazard - Major injury likely unless prompt action is taken and medical treatment is given

Flammability : 0 Minimal Hazard - Materials that will not burn

Physical : 1 Slight Hazard - Materials that are normally stable but can become unstable (self-react) at high temperatures and pressures. Materials may react non-violently with water or undergo hazardous polymerization in the absence of inhibitors.

Personal Protection : H

H - Splash goggles, Gloves, Synthetic apron, Vapor respirator

Information in this SDS is from available published sources and is believed to be accurate. No warranty, express or implied, is made and LabChem Inc assumes no liability resulting from the use of this SDS. The user must determine suitability of this information for his application.

ORP Calibration Solution Safety Datasheet

Section 1 Product Description

Product Name	ORP Calibration Solution
Recommended Use	Equipment Calibration
Synonyms	Zobell's Solution
Distributor	Atlas Scientific 43-15 11th Street, Long Island City, NY 11101 718-387-2075
Chemical Information	800-227-1150 (8am-5pm M-F)
Chemtrec	800-424-9300 (Transportation Spill Response 24 hours)

Section 2 Hazard Identification

Classification of the chemical in accordance with paragraph (d) of §1910.1200

Not a dangerous substance according to GHS classification criteria. No known OSHA hazards.

GHS Classification

Section 3 Composition / Information on Ingredients

Chemical Name	CAS #	%
Water	7732-18-5	97
Potassium Ferrocyanide	13746-66-2	1
Potassium Ferricyanide	14459-95-1	1
Potassium Chloride	7440-09-7	1

Section 4 First Aid Measures

Emergency and First Aid Procedures

Inhalation	In case of accident by inhalation: remove casualty to fresh air and keep at rest.
Eyes	In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
Skin Contact	After contact with skin, wash immediately with plenty of water.
Ingestion	If swallowed, do not induce vomiting: seek medical advice immediately and show this container or label.

Section 5 Firefighting Procedures

Extinguishing Media	Use media suitable to extinguish surrounding fire.
Fire Fighting Methods and Protection	Firefighters should wear full protective equipment and NIOSH approved self-contained breathing apparatus.
Fire and/or Explosion Hazards	Fire or excessive heat may produce hazardous decomposition products.
Hazardous Combustion Products	Phosphorus compounds, Potassium Oxide, Sodium Oxides

Section 6 Spill or Leak Procedures

Steps to Take in Case Material are Released or Spilled	No health affects expected from the clean-up of this material if contact can be avoided. Follow personal protective equipment recommendations found in Section 8 of this (M)SDS
Environmental Precautions	Avoid breathing material. Avoid contact with skin and eyes. Prevent the spread of any spill to minimize harm to human health and the environment if safe to do so. Wear complete and proper personal protective equipment following the recommendation of Section 8 at a minimum. Dike with suitable absorbent material like granulated clay. Gather and store in a sealed container pending a waste disposal evaluation.

Section 7 Handling and Storage

Handling	Avoid contact with skin and eyes.

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Storage	Keep container tightly closed in a cool, well-ventilated place.
Storage Code	Green - general chemical storage

Section 8 Protection Information

	ACGIH		OSHA PEL	
Chemical Name	**(TWA)**	**(STEL)**	**(TWA)**	**(STEL)**
Potassium Ferrocyanide	N/A	N/A	N/A	N/A
Potassium Ferricyanide	N/A	N/A	N/A	N/A
Potassium Chloride	N/A	N/A	2 mg/m3 TWA	N/A

Control Parameters	
Engineering Measures	Local exhaust ventilation or other engineering controls are normally required when handling or using this product to avoid overexposure.
Personal Protective Equipment (PPE)	Lab coat, apron, eye wash, safety shower.
Respiratory Protection	No respiratory protection required under normal conditions of use.
Respirator Type(s)	None required where adequate ventilation is provided. If airborne concentrations are above the applicable exposure limits, use NIOSH/MSHA approved respiratory protection. Eye Protection Wear chemical splash goggles when handling this product. Have an eye wash station available.
Skin Protection	Avoid skin contact by wearing chemically resistant gloves, an apron and other protective equipment depending upon conditions of use. Inspect gloves for chemical break-through and replace at regular intervals. Clean protective equipment regularly. Wash hands and other exposed areas with mild soap and water before eating, drinking, and when leaving work.
Gloves	No information available

Section 9 Physical Data

Formula See Section 3
Molecular Weight No data available
Appearance Colorless Yellow Depends upon product selection. The color additives do not affect product hazards. Liquid
Odor None
Odor Threshold No data available
ORP Calibration Solution
Melting Point Estimated 0°C
Boiling Point 100°C
Flash Point No data available
Flammable Limits in Air No data available

Vapor Pressure No data available
Evaporation Rate (BuAc=1) No data available
Vapor Density (Air=1) No data available

Specific Gravity Approx. 1
Solubility in Water Soluble
Log Pow (calculated) No data available
Autoignition Temperature No data available
Decomposition Temperature No data available
Viscosity No data available
Percent Volatile by Volume No data available

Section 10 Reactivity Data

Reactivity	Not generally reactive under normal conditions.
Chemical Stability	Stable under normal conditions.
Conditions to Avoid	None known.
Incompatible Materials	Water-reactive materials
Hazardous Decomposition Products	Sodium Oxides, Potassium Oxide, Phosphorus compounds
Hazardous Polymerization	Will not occur

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Section 11 Toxicity Data

Routes of Entry Ingestion, skin and eye contact.
Symptoms (Acute) No data available
Delayed Effects No data available

Acute Toxicity

Chemical Name	CAS Number	Oral LD50	Dermal LD50	Inhalation LC50
Water	7732-18-5	Oral LD50 Rat 90000 mg/kg		

Carcinogenicity

Chemical Name	CAS Number	IARC	NTP	OSHA
Potassium Ferrocyanide	13746-66-2	Not listed	Not listed	Not listed
Potassium Ferricyanide	14459-95-1	Not listed	Not listed	Not listed
Potassium Chloride	7440-09-7	Not listed	Not listed	Not listed

Chronic Effects
Mutagenicity No evidence of a mutagenic effect.
Teratogenicity No evidence of a teratogenic effect (birth defect).
Sensitization No evidence of a sensitization effect.
Reproductive No evidence of negative reproductive effects.
Target Organ Effects
Acute Respiratory system, Cardiovascular system, Musculoskeletal system
Chronic No information available

Section 12 Ecological Data

Overview: This material is not expected to be harmful to the ecology.
Mobility: This material is expected to have high mobility in soil. It absorbs weakly to most soil types.
Persistence: Dissolved into water
Bioaccumulation: Bioconcentration is not expected to occur.
Degradability: No data
Other Adverse Effects: No data

Chemical Name	CAS Number	Eco Toxicity
Water	7732-18-5	No data available
Potassium Ferrocyanide	13746-66-2	
Potassium Ferricyanide	14459-95-1	
Potassium Chloride	7440-09-7	

Section 13 Disposal Information

Disposal Methods Dispose in accordance with all applicable Federal, State and Local regulations. Always contact a permitted waste disposer (TSD) to assure compliance.
Waste Disposal Code(s) Not Determined

Section 14 Transport Information

Ground - DOT Proper Shipping Name
Not regulated for transport by US DOT.

Air - IATA Proper Shipping Name
Not regulated for air transport by IATA.

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Section 15 Regulatory Information

TSCA Status **All components in this product are on the TSCA Inventory.**

Chemical Name	CAS Name	§ 313 Name	§ 304 RQ	CERCLA RQ	§ 302 TPQ	CAA 112(2) TQ
Potassium Ferrocyanide	13746-66-2	No	No	No	No	No
Potassium Ferricyanide	14459-95-1	No	No	No	No	No
Potassium Chloride	7440-09-7	No	No	No	No	No

Section 16 Additional Information

Revised 09/16/2015 **Replaces** 09/16/2015 **Printed** 09/16/2015

The information provided in this (Material) Safety Data Sheet represents a compilation of data drawn directly from various sources available to us. Atlas Scientific makes no representation or guarantee as to the suitability of this information to a particular application of the substance covered in the (Material) Safety Data Sheet.

Glossary

ACGIH	American Conference of Governmental Industrial Hygienists
CAS	Chemical Abstract Service Number
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
DOT	U.S. Department of Transportation
IARC	International Agency for Research on Cancer
N/A	Not Available
NTP	National Toxicology Program
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
ppm	Parts per million
RCRA	Resource Conservation and Recovery Act
SARA	Superfund Amendments and Reauthorization Act
TLV	Threshold Limit Value
TSCA	Toxic Substances Control Act
IDLH	Immediately dangerous to life and health

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SAFETY DATA SHEET

Revision Date 06-Nov-2018 **WAI1 - AGHS - OSHA** **Revision Number** 2

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Product Identifier

Product Name pH 4.01 Buffer

Product No 910104, 910460, 9104CB, 910425, 910410-WA

Pure substance/mixture Mixture

Relevant identified uses of the substance or mixture and uses advised against

Recommended Use Use as laboratory reagent

Uses advised against No Information available

Manufacturer, Importer, Supplier

Thermo Fisher Scientific©
Water and Lab Products
22 Alpha Road
Chelmsford, MA 01824, USA
1-978-232-6000

E-mail address info.water@thermo.com

Made in USA

Emergency Telephone

24 Hour Emergency Phone Number
CHEMTREC®
Within USA and Canada: 1-800-424-9300
Outside USA and Canada: 1-703-527-3887
(collect calls accepted)

2. HAZARDS IDENTIFICATION

Classification

OSHA Regulatory Status
This chemical is not considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Not a dangerous substance or mixture according to the Globally Harmonized System (GHS)

Label Elements

Emergency Overview

The product contains no substances which at their given concentration, are considered to be hazardous to health

Appearance Light red **Physical State** Liquid **Odor** Odorless

Precautionary Statements

Hazards not otherwise classified (HNOC)
No information available

Other Information
No information available

3. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS-No	Weight %
Water	7732-18-5	>90.0%
Potassium Hydrogen Phthalate	877-24-7	0.1 - 1.0%
Potassium Hydroxide	1310-58-3	<0.1%
Amaranth Red No. 27	915-67-3	<0.1%

*The exact percentage (concentration) of composition has been withheld as a trade secret.

4. FIRST AID MEASURES

First aid measures

General Advice Use first aid treatment according to the nature of the injury. Get medical attention immediately if symptoms occur. Show this safety data sheet to the doctor in attendance.

Eye Contact Rinse thoroughly with plenty of water, also under the eyelids. Get medical attention.

Skin Contact Wash off immediately with soap and plenty of water for at least 15 minutes. Take off contaminated clothing and shoes immediately. In case of skin reactions, consult a physician.

Inhalation Move to fresh air. If breathing is difficult, give oxygen. Get medical attention if symptoms occur.

Ingestion Clean mouth with water and drink afterwards plenty of water. Do not induce vomiting. Call a physician or Poison Control Center immediately.

Self-Protection of the First Aider Use personal protective equipment. See section 8 for more information. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.

Most important symptoms and effects, both acute and delayed

Most important symptoms and effects No information available

Indication of any immediate medical attention and special treatment needed

Notes to Physician Treat symptomatically

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable Extinguishing Media
No information available

Specific Hazards Arising from the Chemical
No information available.

Explosion Data
Sensitivity to Mechanical Impact None
Sensitivity to Static Discharge None

Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures

Personal Precautions Use personal protective equipment. For further specification, refer to section 8 of the SDS. Evacuate personnel to safe areas.

Environmental Precautions Beware of vapors accumulating to form explosive concentrations. Vapors can accumulate in low areas.

Methods and Material for Containment and Cleaning Up

Methods for Containment Prevent further leakage or spillage if safe to do so.

Methods for Cleaning Up Soak up with inert absorbent material. Pick up and transfer to properly labeled containers.

7. HANDLING AND STORAGE

Precautions for Safe Handling

Handling To avoid risks to human health and the environment, comply with the instructions for use
Wear personal protective equipment
Avoid breathing dust/fume/gas/mist/vapors/spray
Ensure adequate ventilation, especially in confined areas

Conditions for Safe Storage, Including any Incompatibilities

Storage
Keep container tightly closed in a dry and well-ventilated place
Store at room temperature in the original container
Keep away from direct sunlight

Incompatible Products
No information available

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines .

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH
Potassium Hydroxide 1310-58-3	Ceiling: 2 mg/m³	(Vacated) Ceiling: 2 mg/m³	Ceiling: 2 mg/m³

Appropriate engineering controls

Engineering Measures
Showers
Eyewash stations
Ventilation systems

Individual protection measures, such as personal protective equipment

Eye/face Protection
Wear chemical splash goggles and face shield. If splashes are likely to occur, wear:.
Face-shield.

Skin and Body Protection
Wear protective gloves/clothing.

Respiratory Protection
None under normal use conditions. In case of inadequate ventilation wear respiratory protection.

Hygiene Measures
Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical State Liquid
Appearance Light red
Odor Odorless
Odor Threshold No information available
pH 4.01
PH Range No information available

Property	Values	Remarks • Method
Melting point/freezing point	No information available	
Boiling Point/Range	~ 100 °C / 212 °F	
Flash Point (High in °C)	N/A	
Evaporation Rate	No information available	
Flammability (solid, gas)	No information available	
Flammability Limit in Air		
Upper flammability limit:	No information available	
Lower flammability limit:	No information available	
Vapor pressure	No information available	
Vapor Density	No information available	
Specific Gravity	No information available	
Water Solubility	soluble	
Solubility in other solvents	No information available	

Partition coefficient	No information available
Autoignition Temperature	-
Decomposition Temperature	No information available
Kinematic viscosity	No information available
Dynamic viscosity	No information available
Explosive Properties	No information available
Oxidizing Properties	No information available

Other Information

Softening Point	No information available
Molecular Weight	No information available
VOC Content(%)	0
Density	No Information available
Bulk Density	No information available

10. STABILITY AND REACTIVITY

Reactivity
No Information available

Chemical Stability
Stable under normal conditions

Possibility of Hazardous Reactions
None under normal processing

Conditions to Avoid
Extremes of temperature and direct sunlight.

Incompatible Materials
No information available

Hazardous Decomposition Products
Thermal decomposition can lead to release of irritating gases and vapors.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Inhalation	No information available
Eye Contact	No information available
Skin Contact	No information available
Ingestion	No information available

Information on Toxicological Effects

Symptoms	No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Sensitization	No information available
Mutagenic Effects	No information available
Carcinogenicity	No information available.

Reproductive Effects No information available

STOT - single exposure No information available

STOT - repeated exposure No information available

Aspiration hazard No information available

Numerical measures of toxicity - Product Information

12. ECOLOGICAL INFORMATION

Ecotoxicity

1.01% of the mixture consists of components(s) of unknown hazards to the aquatic environment

Component	Freshwater Algae	Freshwater Fish	Water Flea
Potassium Hydroxide 1310-58-3	-	LC50: = 80 mg/L, 96h static (Gambusia affinis)	-

Persistence and Degradability
No information available

Bioaccumulation/ Accumulation
No information available

Mobility
No information available.

Component	log Pow
Potassium Hydroxide 1310-58-3	0.83

Other adverse effects
No information available

13. DISPOSAL CONSIDERATIONS

Waste treatment methods

Waste Disposal Methods Disposal should be in accordance with applicable regional, national and local laws and regulations.

Contaminated Packaging Improper disposal or reuse of this container may be dangerous and illegal.

Component	CAWAST
Potassium Hydroxide 1310-58-3	Toxic Corrosive

14. TRANSPORT INFORMATION

DOT Not regulated

ICAO Not regulated

IATA Not regulated

IMDG/IMO Not regulated

15. REGULATORY INFORMATION

International Inventories

USINV	Complies
CANINV	Complies
EINECS/ELINCS	Complies
ENCS	Complies
IECSC	Complies
KECL	Complies
PICCS	Complies
AICS	Complies

Legend:

USINV/ TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
CANINV/ DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
EINECS/ELINCS - European Inventory of Existing Commercial Chemical Substances/EU List of Notified Chemical Substances
ENCS - Japanese Existing and New Chemical Substances
IECSC - Chinese Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
AICS - Australian Inventory of Chemical Substances

U.S. Federal Regulations

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

SARA 311/312 Hazard Categories

Should this product meet EPCRA 311/312 Tier reporting criteria at 40 CFR 370, refer to Section 2 of this SDS for appropriate classifications. Under the amended regulations at 40 CFR 370, EPCRA 311/312 Tier II reporting for the 2017 calendar year will need to be consistent with updated hazard classifications.

CWA (Clean Water Act)

Component	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants	CWA - Hazardous Substances
Potassium Hydroxide 1310-58-3	1000 lb	-	-	X

CERCLA

This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs	RQ
Potassium Hydroxide 1310-58-3	1000 lb	-	RQ 1000 lb final RQ RQ 454 kg final RQ

U.S. State Regulations

California Proposition 65

This product does not contain any Proposition 65 chemicals

U.S. State Right-to-Know Regulations

U.S. EPA Label Information
No information available

16. OTHER INFORMATION

Prepared By	Regulatory Affairs
Prepared For	Thermo Fisher Scientific Inc.©
Issue Date	No information available
Revision Date	06-Nov-2018
Reason for revision	SDS sections updated.

Disclaimer
IMPORTANT: The information contained in this SDS is correct to the best of our knowledge as of the issue date (or subsequent revision date, if any), and is to be used only as a guide. This SDS does not constitute a guarantee (express or implied) of any kind and we make no warranties of any kind as to the accuracy or completeness of the information contained herein or the merchantability or fitness of the product or this information for a particular purpose. It is the responsibility of each individual buyer/user to determine the suitability of this information and the product for its intended purposes. Product sales are subject to Thermo Fisher Scientifics standard terms and conditions of sale. This information relates only to the designated product as shipped and may not be valid if the product is used in combination with any other materials or is not used in accordance with our instructions, or is altered in any way. It is the responsibility of the buyer/user to ensure that its activities comply with all applicable government requirements. Since conditions of use of the product are not under direct control of Thermo Fisher Scientific, it is the duty of the buyer/user to determine the necessary conditions for the safe use of the product. Thermo Fisher Scientific will not be liable for any injuries or damages resulting from handling, use, misuse or contact with the product.

End of Safety Data Sheet

SAFETY DATA SHEET

Revision Date 04-Jan-2017 **WAI1 - AGHS - OSHA** **Revision Number** 2

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Product Identifier

Product Name pH 7.00 Buffer

Product No 910107

Pure substance/mixture Mixture

Relevant identified uses of the substance or mixture and uses advised against

Recommended Use Use as laboratory reagent

Uses advised against No Information available

Manufacturer, Importer, Supplier

Thermo Fisher Scientific©
Water and Lab Products
22 Alpha Road
Chelmsford, MA 01824, USA
1-978-232-6000

E-mail address info.water@thermo.com

Made in USA

Emergency Telephone

24 Hour Emergency Phone Number
CHEMTREC®
Within USA and Canada: 1-800-424-9300
Outside USA and Canada: 1-703-527-3887
(collect calls accepted)

2. HAZARDS IDENTIFICATION

Classification

OSHA Regulatory Status
This chemical is not considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Not a dangerous substance or mixture according to the Globally Harmonized System (GHS)

Label Elements

Emergency Overview

The product contains no substances which at their given concentration, are considered to be hazardous to health

Appearance Light yellow **Physical State** Liquid **Odor** None

Precautionary Statements

Hazards not otherwise classified (HNOC)
No information available

Other Information
No information available

3. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS-No	Weight %
Water	7732-18-5	>90.0%
Sodium Phosphate, Dibasic	7558-79-4	0.1 - 1.0%
Potassium Dihydrogen Phosphate	7778-77-0	0.1 - 1.0%
5-Bromo-5-Nitro-1,3-Dioxane	30007-47-7	0.1 - 1.0%
FD & C Yellow #5	1934-21-0	<0.1%

*The exact percentage (concentration) of composition has been withheld as a trade secret.

4. FIRST AID MEASURES

First aid measures

General Advice Use first aid treatment according to the nature of the injury. Get medical attention immediately if symptoms occur. Show this safety data sheet to the doctor in attendance.

Eye Contact Rinse thoroughly with plenty of water, also under the eyelids. Get medical attention.

Skin Contact Wash off immediately with soap and plenty of water for at least 15 minutes. Take off contaminated clothing and shoes immediately. In case of skin reactions, consult a physician.

Inhalation Move to fresh air. If breathing is difficult, give oxygen. Get medical attention if symptoms

occur.

Ingestion Clean mouth with water and drink afterwards plenty of water. Do not induce vomiting. Call a physician or Poison Control Center immediately.

Self-Protection of the First Aider Use personal protective equipment. See section 8 for more information. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.

Most important symptoms and effects, both acute and delayed

Most important symptoms and effects No information available

Indication of any immediate medical attention and special treatment needed

Notes to Physician Treat symptomatically

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable Extinguishing Media
No information available

Specific Hazards Arising from the Chemical
No information available.

Explosion Data
Sensitivity to Mechanical Impact None
Sensitivity to Static Discharge None

Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures

Personal Precautions Use personal protective equipment. For further specification, refer to section 8 of the SDS. Evacuate personnel to safe areas.

Environmental Precautions Beware of vapors accumulating to form explosive concentrations. Vapors can accumulate in low areas.

Methods and Material for Containment and Cleaning Up

Methods for Containment Prevent further leakage or spillage if safe to do so.

Methods for Cleaning Up Soak up with inert absorbent material. Pick up and transfer to properly labeled containers.

7. HANDLING AND STORAGE

Precautions for Safe Handling

Handling To avoid risks to human health and the environment, comply with the instructions for use
Wear personal protective equipment
Avoid breathing dust/fume/gas/mist/vapors/spray

Ensure adequate ventilation, especially in confined areas

Conditions for Safe Storage, Including any Incompatibilities

Storage
Keep container tightly closed in a dry and well-ventilated place
Store at room temperature in the original container
Keep away from direct sunlight

Incompatible Products
No information available

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines
This product does not contain any known or suspected reproductive hazards.

Appropriate engineering controls

Engineering Measures
Showers
Eyewash stations
Ventilation systems

Individual protection measures, such as personal protective equipment

Eye/face Protection
Wear chemical splash goggles and face shield. If splashes are likely to occur, wear:.
Face-shield.

Skin and Body Protection
Wear protective gloves/clothing.

Respiratory Protection
None under normal use conditions. In case of inadequate ventilation wear respiratory protection.

Hygiene Measures
Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical State	Liquid
Appearance	Light yellow
Odor	None
Odor Threshold	No information available
pH	7.00
PH Range	5.8 - 8.2

Property	**Values**	**Remarks • Method**
Melting point/freezing point	No information available	
Boiling Point/Range	~ 100 °C / 212 °F	
Flash Point (High in °C)	N/A	
Evaporation Rate	No information available	
Flammability (solid, gas)	No information available	
Flammability Limit in Air		
Upper flammability limit:	No information available	
Lower flammability limit:	No information available	
Vapor pressure	No information available	
Vapor Density	No information available	
Specific Gravity	No information available	
Water Solubility	soluble	
Solubility in other solvents	No information available	
Partition coefficient	No information available	
Autoignition Temperature	-	

Decomposition Temperature	No information available
Kinematic viscosity	No information available
Dynamic viscosity	No information available
Explosive Properties	No information available
Oxidizing Properties	No information available

Other Information

Softening Point	No information available
Molecular Weight	No information available
VOC Content(%)	No information available
Density	No Information available
Bulk Density	No information available

10. STABILITY AND REACTIVITY

Reactivity
No Information available

Chemical Stability
Stable under normal conditions

Possibility of Hazardous Reactions
None under normal processing

Conditions to Avoid
Extremes of temperature and direct sunlight.

Incompatible Materials
No information available

Hazardous Decomposition Products
Thermal decomposition can lead to release of irritating gases and vapors.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Inhalation	No information available
Eye Contact	No information available
Skin Contact	No information available
Ingestion	No information available

Information on Toxicological Effects

Symptoms	No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Sensitization	No information available
Mutagenic Effects	No information available
Carcinogenicity	No information available.
Reproductive Effects	No information available

STOT - single exposure No information available

STOT - repeated exposure No information available

Aspiration hazard No information available

Numerical measures of toxicity - Product Information

The following values are calculated based on chapter 3.1 of the GHS document .
ATEmix (oral) 44314 mg/kg

12. ECOLOGICAL INFORMATION

Ecotoxicity

3.02% of the mixture consists of components(s) of unknown hazards to the aquatic environment

Persistence and Degradability
No information available

Bioaccumulation/ Accumulation
No information available

Mobility
No information available.

Other adverse effects
No information available

13. DISPOSAL CONSIDERATIONS

Waste treatment methods

Waste Disposal Methods Disposal should be in accordance with applicable regional, national and local laws and regulations.

Contaminated Packaging Improper disposal or reuse of this container may be dangerous and illegal.

14. TRANSPORT INFORMATION

DOT Not regulated

ICAO Not regulated

IATA Not regulated

IMDG/IMO Not regulated

15. REGULATORY INFORMATION

International Inventories

USINV	Complies
CANINV	Complies
EINECS/ELINCS	Complies

ENCS	Does not Comply
IECSC	Complies
KECL	Complies
PICCS	Complies
AICS	Complies

Legend:
USINV/ TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
CANINV/ DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
EINECS/ELINCS - European Inventory of Existing Commercial Chemical Substances/EU List of Notified Chemical Substances
ENCS - Japanese Existing and New Chemical Substances
IECSC - Chinese Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
AICS - Australian Inventory of Chemical Substances

U.S. Federal Regulations

SARA 313
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

SARA 311/312 Hazard Categories
Should this product meet EPCRA 311/312 Tier reporting criteria at 40 CFR 370, refer to Section 2 of this SDS for appropriate classifications. Under the amended regulations at 40 CFR 370, EPCRA 311/312 Tier II reporting for the 2017 calendar year will need to be consistent with updated hazard classifications.

CWA (Clean Water Act)

Component	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants	CWA - Hazardous Substances
Sodium Phosphate, Dibasic 7558-79-4	5000 lb	-	-	X

CERCLA
This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs	RQ
Sodium Phosphate, Dibasic 7558-79-4	5000 lb	-	RQ 5000 lb final RQ RQ 2270 kg final RQ

U.S. State Regulations

California Proposition 65
This product does not contain any Proposition 65 chemicals

U.S. State Right-to-Know Regulations

U.S. EPA Label Information
No information available

16. OTHER INFORMATION

Prepared By Regulatory Affairs

Prepared For Thermo Fisher Scientific Inc.©

Issue Date	No information available
Revision Date	04-Jan-2017
Reason for revision	SDS sections updated.

Disclaimer

IMPORTANT: The information contained in this SDS is correct to the best of our knowledge as of the issue date (or subsequent revision date, if any), and is to be used only as a guide. This SDS does not constitute a guarantee (express or implied) of any kind and we make no warranties of any kind as to the accuracy or completeness of the information contained herein or the merchantability or fitness of the product or this information for a particular purpose. It is the responsibility of each individual buyer/user to determine the suitability of this information and the product for its intended purposes. Product sales are subject to Thermo Fisher Scientifics standard terms and conditions of sale. This information relates only to the designated product as shipped and may not be valid if the product is used in combination with any other materials or is not used in accordance with our instructions, or is altered in any way. It is the responsibility of the buyer/user to ensure that its activities comply with all applicable government requirements. Since conditions of use of the product are not under direct control of Thermo Fisher Scientific, it is the duty of the buyer/user to determine the necessary conditions for the safe use of the product. Thermo Fisher Scientific will not be liable for any injuries or damages resulting from handling, use, misuse or contact with the product.

End of Safety Data Sheet

SAFETY DATA SHEET

Revision Date 11-Aug-2016 **WAI1 - AGHS - OSHA** **Revision Number** 2

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Product Identifier

Product Name pH 10.01 Buffer

Product No 910110

Pure substance/mixture Mixture

Relevant identified uses of the substance or mixture and uses advised against

Recommended Use Use as laboratory reagent

Uses advised against No Information available

Manufacturer, Importer, Supplier

Thermo Fisher Scientific©
Water and Lab Products
22 Alpha Road
Chelmsford, MA 01824, USA
1-978-232-6000

E-mail address info.water@thermo.com

Made in USA

Emergency Telephone

24 Hour Emergency Phone Number
CHEMTREC®
Within USA and Canada: 1-800-424-9300
Outside USA and Canada: 1-703-527-3887
(collect calls accepted)

2. HAZARDS IDENTIFICATION

Classification

OSHA Regulatory Status
This chemical is not considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Not a dangerous substance or mixture according to the Globally Harmonized System (GHS)

Label Elements

Emergency Overview

The product contains no substances which at their given concentration, are considered to be hazardous to health

Appearance Light blue **Physical State** Liquid **Odor** None

Precautionary Statements

Hazards not otherwise classified (HNOC)
No information available

Other Information
No information available

3. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS-No	Weight %
Water	7732-18-5	>90.0%
Sodium Carbonate	497-19-8	0.1 - 1.0%
Sodium Bicarbonate	144-55-8	0.1 - 1.0%
Methylparaben	99-76-3	<0.1%
FD & C Blue #1	3844-45-9	<0.1%

*The exact percentage (concentration) of composition has been withheld as a trade secret.

4. FIRST AID MEASURES

First aid measures

General Advice Use first aid treatment according to the nature of the injury. Get medical attention immediately if symptoms occur. Show this safety data sheet to the doctor in attendance.

Eye Contact Rinse thoroughly with plenty of water, also under the eyelids. Obtain medical attention.

Skin Contact Wash off immediately with soap and plenty of water for at least 15 minutes. Take off contaminated clothing and shoes immediately. In case of skin reactions, consult a physician.

Inhalation Move to fresh air. If breathing is difficult, give oxygen. Get medical attention if symptoms

occur.

Ingestion Clean mouth with water and drink afterwards plenty of water. Do not induce vomiting. Call a physician or Poison Control Center immediately.

Protection of First-aiders Use personal protective equipment. See section 8 for more information. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.

Most important symptoms and effects, both acute and delayed

Most important symptoms/effects No information available

Indication of any immediate medical attention and special treatment needed

Notes to Physician Treat symptomatically

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable Extinguishing Media
No information available

Specific Hazards Arising from the Chemical
No information available.

Explosion Data
Sensitivity to Mechanical Impact None
Sensitivity to Static Discharge None

Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures

Personal Precautions Use personal protective equipment. For further specification, refer to section 8 of the SDS. Evacuate personnel to safe areas.

Environmental Precautions Beware of vapors accumulating to form explosive concentrations. Vapors can accumulate in low areas.

Methods and Material for Containment and Cleaning Up

Methods for Containment Prevent further leakage or spillage if safe to do so.

Methods for Cleaning Up Soak up with inert absorbent material. Pick up and transfer to properly labeled containers.

7. HANDLING AND STORAGE

Precautions for Safe Handling

Handling To avoid risks to human health and the environment, comply with the instructions for use
Wear personal protective equipment
Avoid breathing dust/fume/gas/mist/vapors/spray
Ensure adequate ventilation, especially in confined areas

Conditions for Safe Storage, Including any Incompatibilities

Storage
Keep container tightly closed in a dry and well-ventilated place
Store at room temperature in the original container
Keep away from direct sunlight

Incompatible Products
No information available

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines
This product does not contain any known or suspected reproductive hazards.

Appropriate engineering controls

Engineering Measures
Showers
Eyewash stations
Ventilation systems

Individual protection measures, such as personal protective equipment

Eye/face Protection
Wear chemical splash goggles and face shield. If splashes are likely to occur, wear:.
Face-shield.

Skin and Body Protection
Wear protective gloves/clothing.

Respiratory Protection
None under normal use conditions. In case of inadequate ventilation wear respiratory protection.

Hygiene Measures
Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical State	Liquid
Appearance	Light blue
Odor	None
Odor Threshold	No information available
PH Range	8.51 - 11.51

Property	**Values**	**Remarks • Method**
Melting point/freezing point	No information available	
Boiling Point/Range	~ 100 °C / 212 °F	
Flash Point (High in °C)	N/A	
Evaporation Rate	No information available	
Flammability (solid, gas)	No information available	
Flammability Limit in Air		
Upper flammability limit:	No information available	
Lower flammability limit:	No information available	
Vapor pressure	No information available	
Vapor Density	No information available	
Specific Gravity	No information available	
Water Solubility	soluble	
Solubility in other solvents	No information available	
Partition coefficient	No information available	
Autoignition Temperature		
Decomposition Temperature	No information available	
Kinematic viscosity	No information available	
Dynamic viscosity	No information available	
Explosive Properties	No information available	

Oxidizing Properties No information available

Other Information

Softening Point No information available
Molecular Weight No information available
VOC Content(%) No information available
Density No Information available
Bulk Density No information available

10. STABILITY AND REACTIVITY

Reactivity
No Information available

Chemical Stability
Stable under normal conditions

Possibility of Hazardous Reactions
None under normal processing

Conditions to Avoid
Extremes of temperature and direct sunlight

Incompatible Materials
No information available

Hazardous Decomposition Products
Thermal decomposition can lead to release of irritating gases and vapors

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Inhalation No information available

Eye Contact No information available

Skin Contact No information available

Ingestion No information available

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Water 7732-18-5	LD50 > 90 mL/kg (Rat)	-	-
Sodium Carbonate 497-19-8	LD50 = 4090 mg/kg (Rat)	-	LC50 = 2300 mg/m³ (Rat) 2 h
Sodium Bicarbonate 144-55-8	LD50 = 4220 mg/kg (Rat)	-	-
Methylparaben 99-76-3	LD50 = 2100 mg/kg (Rat)	-	-

Information on Toxicological Effects

Symptoms No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Sensitization No information available

Mutagenic Effects No information available

Carcinogenicity No information available.

Reproductive Effects No information available

STOT - single exposure No information available

STOT - repeated exposure No information available

Aspiration hazard No information available

Numerical measures of toxicity - Product Information

12. ECOLOGICAL INFORMATION

Ecotoxicity

0.01% of the mixture consists of components(s) of unknown hazards to the aquatic environment

Component	Freshwater Algae	Freshwater Fish	Water Flea
Sodium Carbonate 497-19-8	EC50: = 242 mg/L, 120h (Nitzschia)	LC50: 310 - 1220 mg/L, 96h static (Pimephales promelas) LC50: = 300 mg/L, 96h static (Lepomis macrochirus)	EC50: = 265 mg/L, 48h (Daphnia magna)
Sodium Bicarbonate 144-55-8	EC50: = 650 mg/L, 120h (Nitzschia linearis)	LC50: 8250 - 9000 mg/L, 96h static (Lepomis macrochirus)	EC50: = 2350 mg/L, 48h (Daphnia magna)

Persistence and Degradability
No information available

Bioaccumulation/ Accumulation
No information available

Mobility
No information available.

Other adverse effects
No information available

13. DISPOSAL CONSIDERATIONS

Waste treatment methods

Waste Disposal Methods Disposal should be in accordance with applicable regional, national and local laws and regulations.

Contaminated Packaging Improper disposal or reuse of this container may be dangerous and illegal.

Component	CAWAST
Sodium Carbonate 497-19-8	Corrosive

14. TRANSPORT INFORMATION

DOT Not regulated

ICAO Not regulated

IATA Not regulated

IMDG/IMO Not regulated

15. REGULATORY INFORMATION

International Inventories

USINV	Complies
CANINV	Complies
EINECS/ELINCS	Complies
ENCS	Complies
IECSC	Complies
KECL	Does not Comply
PICCS	Complies
AICS	Complies

USINV/ TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
CANINV/ DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
EINECS/ELINCS - European Inventory of Existing Commercial Chemical Substances/EU List of Notified Chemical Substances
ENCS - Japanese Existing and New Chemical Substances
IECSC - Chinese Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
AICS - Australian Inventory of Chemical Substances

U.S. Federal Regulations

SARA 313
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

SARA 311/312 Hazard Categories

Acute Health Hazard	No
Chronic Health Hazard	No
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

CWA (Clean Water Act)
Not applicable

CERCLA
This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material

U.S. State Regulations

California Proposition 65
This product does not contain any Proposition 65 chemicals

U.S. State Right-to-Know Regulations

Component	New Jersey	Massachusetts	Pennsylvania
Water 7732-18-5	-	-	X

FD & C Blue #1 3844-45-9	-	X	-

U.S. EPA Label Information
No information available

16. OTHER INFORMATION

Prepared By	Environmental, Health and Safety
Prepared For	Thermo Fisher Scientific Inc.©
Issue Date	No information available
Revision Date	11-Aug-2016
Reason for revision	SDS sections updated.

Disclaimer
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End of Safety Data Sheet

SAFETY DATA SHEET

SDS 0074

Section 1 -- PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME
Gene 404L Low VOC

PRODUCT CODES
55011, 55013, 55014, 55015, 55017, 55019, 55021, 55023, 55901, 55902, 55904, 55906, 55908

CHEMICAL FAMILY
Organic

USE
PVC Solvent Cement

MANUFACTURER'S NAME
The RectorSeal Corporation
2601 Spenwick Drive
Houston, Texas 77055 USA

EMERGENCY TELEPHONE NO.
Chemtrec 24 Hours
(800)424-9300 USA
(703)527-3887 International

DATE OF VALIDATION
January 23, 2015

TECHNICAL SERVICE TELEPHONE NO.
(800)231-3345 or (713)263-8001

DATE OF PREPARATION
October 27, 2014

HMIS CODES

Health	2
Flammability	3
Reactivity	1
PPI	B

Section 2 -- HAZARDS IDENTIFICATION

GHS CLASSIFICATION
PHYSICAL HAZARDS: Flammable Liquid, Category 2
HEALTH HAZARDS
Acute Toxicity:
Oral: Category 4
Dermal: Category 5
Inhalation: Category 4
Skin Corrosion/Irritation: Category 3
Serious Eye Damage/Eye Irritation: Category 2A
Skin Sensitization: Not Classified
Respiratory Sensitization: Not Classified
Germ Cell Mutagenicity: Not Classified
Carcinogenicity: Category 2
Reproductive Toxicology: Not Classified
Target Organ Systemic Toxicity - Single Exposure: Category 3
Target Organ Systemic Toxicity - Repeated Exposure: Not Classified
Aspiration Toxicity: Not Classified

GHS Label elements, including precautionary statements
Pictogram: GHS 02-Flammable Materials, GHS 08-Severe Health Hazards
Signal Word: Danger
Hazard Statements:
H225 - Highly flammable liquid and vapor
H302 - Harmful if swallowed.
H313 - May be harmful in contact with skin.
H316 - Causes mild skin irritation.
H318 - Causes serious eye damage.
H319 - Causes serious eye irritation
H335 + H336 - May cause respiratory irritation, and drowsiness or dizziness.
H351 – Suspected of causing cancer.

Contains a chemical classified by the US EPA as a suspected possible carcinogen.
Precautionary Statements:
P102 - Keep out of reach of children.
P210 - Keep away from heat/sparks/open flames/hot surfaces. - No smoking
P240 - Ground/Bond container and receiving equipment
P261 - Avoid breathing dust/fume/gas/mist/vapors/spray
P262 - Do not get in eyes, on skin, or on clothing.
P264 - Wash hands thoroughly after handling.
P280 - Wear protective gloves/protective clothing/eye protection/face protection.
P301 + P310 - IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P362 - Take off contaminated clothing and wash before reuse.
EUH066 - Repeated exposure may cause skin dryness or cracking
Hazards not otherwise classified (HNOC) or not covered by GHS
May form explosive peroxides.

SUMMARY OF ACUTE HAZARDS

Overexposure may cause coughing, shortness of breath, dizziness, central nervous system depression, intoxication and collapse. It may cause irritation to the respiratory tract and to other mucous membranes.

ROUTE OF EXPOSURE, SIGNS AND SYMPTOMS

INHALATION

Overexposure may cause coughing, shortness of breath, dizziness, central nervous system depression, intoxication and collapse. It may cause irritation to the respiratorytract and to other mucous membranes.

EYE CONTACT

Severely irritating. If not removed promptly, will injure eye tissue, which can result in permanent damage.

SKIN CONTACT

Frequent or prolonged contact may irritate and cause dermatitis. Low order of toxicity.

INGESTION

Low order of toxicity. Small amounts of the liquid aspirated into the respiratory system during ingestion, or from vomiting, may cause bronchiopneumonia or pulmonary edema.

SUMMARY OF CHRONIC HAZARDS

Repeated or prolonged exposure may cause signs of central nervous system depression and respiratory irritation. This material has been shown to induce tumors in laboratory animals.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE

Individuals with pre-existing or chronic diseases of the eyes, skin, respiratory system, cardiovascular system, gastrointestinal system, liver, or kidneys may have increased susceptibility to excessive exposure.

==========

Section 3 -- COMPOSITION/INFORMATION ON INGREDIENTS

INGREDIENT: Methyl Ethyl Ketone
PERCENTAGE BY WEIGHT: 20-40
CAS NUMBER: 78-93-3
EC# : 606-002-00-3

INGREDIENT: Tetrahydrofuran
PERCENTAGE BY WEIGHT: 20-40
CAS NUMBER: 109-99-9
EC# : 603-025-00-0

INGREDIENT: Cyclohexanone
PERCENTAGE BY WEIGHT: 1-20
CAS NUMBER: 108-94-1

EC# : 606-010-00-7

INGREDIENT: Acetone
PERCENTAGE BY WEIGHT: 5-20
CAS NUMBER: 67-64-1
EC# : 200-662-2

Section 4 -- FIRST AID MEASURES

If INHALED:	If overcome by exposure, remove victim to fresh air immediately. Give oxygen or artificial respiration as needed. Obtain emergency medical attention. Prompt action is essential.
If on SKIN:	Immediately flush with large amounts of water; use soap if available. Remove contaminated clothing.
If in EYES:	Immediately flush with large amounts of water for at least 15 minutes. Get prompt medical attention.
If SWALLOWED:	If swallowed, DO NOT induce vomiting. Keep at rest. Get prompt medical attention.

Section 5 -- FIRE FIGHTING MEASURES

CONDITIONS OF FLAMMABILITY

Flammable in the presence of a source of ignition when the temperature is above the flash point. Keep away from heat/sparks/open flame/hot surface. No smoking.

SUITABLE EXTINGUISHING MEDIA

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE-FIGHTERS

Wear self contained breathing apparatus for fire fighting if necessary.

HAZARDOUS COMBUSTION PRODUCTS

Hazardous decomposition products formed under fire conditions. - Carbon oxides

FURTHER INFORMATION

Use water spray to cool unopened containers.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Extremely flammable - very low flash point. Vapors are heavier than air and may travel along ground or to low spots at considerable distance to a source of ignition resulting in potential flashback. Burning liquid may float on water. Heat may build up pressure and rupture closed containers.

Section 6 -- ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS

Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Ventilate area with natural or explosion-proof, forced air ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapors accumulating to form explosive concentrations. Vapors can accumulate in low areas.

ENVIRONMENTAL PRECAUTIONS

Prevent further leakage or spillage if safe to do so. Avoid flushing into sewers, drains, waterways, and soil.

METHODS AND MATERIALS FOR CONTAINMENT AND CLEANING UP

Use absorbent materials to prevent footing hazard and to contain, then collect and place in container for disposal according to local regulations (see section 13).

Section 7 -- HANDLING AND STORAGE

PRECAUTIONS FOR SAFE HANDLING

Avoid contact with skin and eyes. Avoid inhalation of vapor or mist. Avoid prolonged or repeated contact with skin or clothing. If transferring this material to other containers, ground all containers to avoid static electricity buildup and discharge which may ignite flammable vapors.

CONDITIONS FOR SAFE STORAGE
  Do not store near heat, sparks, or open flames.
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Empty containers may contain residues and vapors; treat as if full and observe all products precautions. Do not reuse empty containers.
KEEP OUT OF REACH OF CHILDREN.

Section 8 -- EXPOSURE CONTROLS/PERSONAL PROTECTION

INGREDIENT		UNITS	
Methyl Ethyl Ketone			
	ACGIH TLV	200	ppm
	OSHA PEL	200	ppm
	STEL	300	ppm
Tetrahydrofuran			
	ACGIH TLV	50	ppm
	OSHA PEL	200	ppm
	STEL	250	ppm
Cyclohexanone			
	ACGIH TLV	20	ppm (skin)
	OSHA PEL	50	ppm
Acetone			
	ACGIH TLV	500	ppm
	OSHA PEL	1000	ppm
	STEL	750	ppm

RESPIRATORY PROTECTION (SPECIFY TYPE): In confined poorly ventilated areas, use NIOSH/MSHA approved air purifying or supplied air purifying or supplied air respirators.
VENTILATION - LOCAL EXHAUST: Acceptable
SPECIAL: Explosion-proof equipment.
MECHANICAL (GENERAL): Preferable
OTHER: N/A
PROTECTIVE GLOVES: Wear rubber gloves.
EYE PROTECTION: Chemical splash goggles (ANSI Z-87.1 or equivalent)
OTHER PROTECTIVE CLOTHING OR EQUIPMENT: Coveralls recommended.
WORK/HYGIENIC PRACTICES: Where use can result in skin contact, wash exposed areas thoroughly before eating, drinking, smoking, or leaving work area. Launder contaminated clothing before reuse.

Section 9 -- PHYSICAL AND CHEMICAL PROPERTIES

BOILING POINT:	151 F (66 C) @ 760mm Hg
SPECIFIC GRAVITY (H20 = 1):	0.91
VAPOR PRESSURE (mm Hg):	129 @ 68 F (20 C)
MELTING POINT:	N/A
VAPOR DENSITY (AIR = 1):	2.5
EVAPORATION RATE (ETHYL ACETATE = 1):	8-14.5
APPEARANCE/ODOR:	Liquid/Pungent Odor
SOLUBILITY IN WATER:	Soluble

VOC LEVEL: 510 g/L per SCAQMD Test Method 316A

FLASH POINT	4.1 F (-17 C) SETA CC
LOWER EXPLOSION LIMIT	1.8%
UPPER EXPLOSION LIMIT	11.8%

Section 10 -- STABILITY AND REACTIVITY

CHEMICAL STABILITY: Stable under recommended storage conditions.
POSSIBILITY OF HAZARDOUS REACTIONS: Can form potentially explosive peroxides upon long standing in air. Vapors may form explosive mixture with air.

CONDITIONS TO AVOID: Heat, sparks, open flames, and strong oxidizing, acidic and basic conditions.
MATERIALS TO AVOID: Oxidizers, acids and bases.
HAZARDOUS DECOMPOSITION PRODUCTS: CO, CO2, HCl and fragmented hydrocarbons.
HAZARDOUS POLYMERIZATION: Will not occur.

Section 11 -- TOXICOLOGY INFORMATION

CHRONIC HEALTH HAZARDS

No ingredient in this product is an IARC, NTP or OSHA listed carcinogen. Tetrahydrofuran - The National Toxicology Program has reported that exposures of mice and rats to THF vapor levels up to 1800 ppm 6hr/day, 5 days/week for their lifetime caused an incidence of kidney tumors in male rats and liver tumors in female mice. The significance of these findings for human health are unclear at this time, and may be related to "species specific" effects. Elevated incidences of tumors in humans have not been reported for THF.

TOXICOLOGY DATA

Ingredient Name

Methyl Ethyl Ketone
Oral-Rat LD50:2737 mg/kg
Inhalation-Rat LC50:23,500 mg/m3/8H

Tetrahydrofuran
Oral-Rat LD50:1650 mg/kg
Inhalation-Rat LC50:21,000 ppm/3H

Cyclohexanone
Oral-Rat LD50:1535 mg/kg
Inhalation-Rat LC50:8000 ppm/4H

Acetone
Oral-Rat LD50: 5800 mg/kg
Inhalation-Rat LC50: 50,100mg/m3

Section 12 -- Ecological Information

ECOLOGICAL DATA

Ingredient Name

Methyl Ethyl Ketone
Food Chain Concentration Potential: None
WATERFOWL TOXICITY: N/A
BOD: 214%
AQUATIC TOXICITY: 5640 mg/l/48 hr/bluegill/TLm/fresh water

Tetrahydrofuran
Food Chain Concentration Potential: None
WATERFOWL TOXICITY: N/A
BOD: N/A
AQUATIC TOXICITY: N/A

Cyclohexanone
Food Chain Concentration Potential: None
WATERFOWL TOXICITY: N/A
BOD: N/A
AQUATIC TOXICITY: N/A

Acetone
Food Chain Concentration Potential: None
WATERFOWL TOXICITY: N/A
BOD: N/A
AQUATIC TOXICITY: LC50/96-hour for fish > 100 mg/l

Section 13 -- DISPOSAL CONSIDERATIONS

Waste Classification: RCRA classified hazardous waste. Dispose of absorbed materials and liquid waste in approved, controlled incineration facility in accordance with all local, state and federal regulations.
Disposal Method: Incineration

Section 14 -- TRANSPORTATION INFORMATION

DOT: UN1133, Adhesives, Class 3,PG II, ERG#127.
Quarts and less: Consumer Commodity, ORM-D
OCEAN (IMDG): UN1133, Adhesives, Class 3, PG II, EMS-No: F-E, S-D
Quarts and less: Adhesives, Class 3, UN 1133, PG II, Limited Quantities or Ltd Qty
AIR (IATA): UN1133, Adhesives, Class 3, PG II, ERG#127
WHMIS (CANADA): Class B-2

Section 15 -- REGULATORY INFORMATION

REGULATORY DATA
Ingredient Name

Methyl Ethyl Ketone

SARA 313	Yes
TSCA Inventory	Yes
CERCLA RQ	5,000 lb.
RCRA Code	U159

Tetrahydrofuran

SARA 313	No
TSCA Inventory	Yes
CERCLA RQ	1,000 lb.
RCRA Code	U213

Cyclohexanone

SARA 313	No
TSCA Inventory	Yes
CERCLA RQ	5,000 lb.
RCRA Code	U057

Acetone

SARA 313	No
TSCA Inventory	Yes
CERCLA RQ	5,000 lb.
RCRA Code	U002

Section 16 -- OTHER INFORMATION

This document is prepared pursuant to the OSHA Hazard Communication Standard (29 CFR 1910.1200). The information herein is given in good faith, but no warranty, expressed or implied is made. Consult RectorSeal for further information: (713) 263-8001

PVC PRIMER - Hard PVC pipes primer
24-68

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product identifier: PVC PRIMER - Hard PVC pipes primer
24-68
2-butanone

CAS: 78-93-3
EC: 201-159-0
Index: 606-002-00-3
REACH: 01-2119457290-43-XXXX

1.2 Relevant identified uses of the substance or mixture and uses advised against:

Relevant uses: Primer for rigid PVC

Uses advised against: All uses not specified in this section or in section 7.3

1.3 Details of the supplier of the safety data sheet:

EVOCHEM S.A.
Tzaverdella Place
133 41 PHILI , ATTICA - GREECE
Phone.: 0030 210 5590460 , 0030 210 5590155 -
Fax: 0030 210 6254737 , 0030 210 5590244
info@evochem.gr; vmergoupis@evochem.gr;
sales@evochem.gr
www.evochem.gr

1.4 Emergency telephone number: National Poisoning Center 2107793777

SECTION 2: HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture:

CLP Regulation (EC) nº 1272/2008:

Classification of this product has been carried out in accordance with CLP Regulation (EC) nº 1272/2008.

Eye Irrit. 2: Eye irritation, Category 2, H319
Flam. Liq. 2: Flammable liquids, Category 2, H225
STOT SE 3: Specific toxicity causing drowsiness and dizziness, single exposure, Category 3, H336

2.2 Label elements:

CLP Regulation (EC) nº 1272/2008:

Danger



Hazard statements:

Eye Irrit. 2: H319 - Causes serious eye irritation
Flam. Liq. 2: H225 - Highly flammable liquid and vapour
STOT SE 3: H336 - May cause drowsiness or dizziness

Precautionary statements:

P101: If medical advice is needed, have product container or label at hand
P102: Keep out of reach of children
P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking
P264: Wash thoroughly after use
P280: Wear protective gloves/protective clothing/eye protection/face protection
P303+P361+P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P501: Dispose of contents and / or their container according to the separated collection system used in your municipality

Supplementary information:

EUH066: Repeated exposure may cause skin dryness or cracking

2.3 Other hazards:

Non-applicable

- CONTINUED ON NEXT PAGE -

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substance:

Chemical description: Mixture composed of resins in solvents

Components:

In accordance with Annex II of Regulation (EC) nº1907/2006 (point 3), the product contains:

Identification	Chemical name/Classification		Concentration
CAS: 78-93-3 EC: 201-159-0 Index: 606-002-00-3 REACH: 01-2119457290-43-XXXX	**2-butanone**	ATP CLP00	**100 %**
	Regulation 1272/2008	Eye Irrit. 2: H319; Flam. Liq. 2: H225; STOT SE 3: H336 - Danger 	

To obtain more information on the risk of the substances consult sections 8, 11, 12 and 16.

3.2 Mixture:

Non-applicable

SECTION 4: FIRST AID MEASURES

4.1 Description of first aid measures:

The symptoms resulting from intoxication can appear after exposure, therefore, in case of doubt, seek medical attention for direct exposure to the chemical product or persistent discomfort, showing the SDS of this product.

By inhalation:

This product does not contain substances classified as dangerous for inhalation, however, in case of symptoms of intoxication remove the person affected from the exposure area and provide with fresh air. Seek medical attention if the symptoms get worse or persist.

By skin contact:

Remove contaminated clothing and footwear, rinse skin or shower the person affected if appropriate with plenty of cold water and neutral soap. In serious cases see a doctor. If the product causes burns or freezing, clothing should not be removed as this could worsen the injury caused if it is stuck to the skin. If blisters form on the skin, these should never be burst as this will increase the risk of infection.

By eye contact:

Rinse eyes thoroughly with lukewarm water for at least 15 minutes. Do not allow the person affected to rub or close their eyes. If the injured person uses contact lenses, these should be removed unless they are stuck to the eyes, as this could cause further damage. In all cases, after cleaning, a doctor should be consulted as quickly as possible with the SDS of the product.

By ingestion/aspiration:

In case of consumption, seek immediate medical assistance showing the SDS of this product.

4.2 Most important symptoms and effects, both acute and delayed:

Acute and delayed effects are indicated in sections 2 and 11.

4.3 Indication of any immediate medical attention and special treatment needed:

Non-applicable

SECTION 5: FIREFIGHTING MEASURES

5.1 Extinguishing media:

Product is non-flammable under normal conditions of storage, manipulation and use. In the case of inflammation as a result of improper manipulation, storage or use preferably use polyvalent powder extinguishers (ABC powder), in accordance with the Regulation on fire protection systems. IT IS NOT RECOMMENDED to use tap water as an extinguishing agent.

5.2 Special hazards arising from the substance or mixture:

As a result of combustion or thermal decomposition reactive sub-products are created that can become highly toxic and, consequently, can present a serious health risk.

5.3 Advice for firefighters:

Depending on the magnitude of the fire it may be necessary to use full protective clothing and individual respiratory equipment. Minimum emergency facilities and equipment should be available (fire blankets, portable first aid kit,...) in accordance with Directive 89/654/EC.

Additional provisions:

- CONTINUED ON NEXT PAGE -

SECTION 5: FIREFIGHTING MEASURES (continue)

Act in accordance with the Internal Emergency Plan and the Information Sheets on actions to take after an accident or other emergencies. Destroy any source of ignition. In case of fire, refrigerate the storage containers and tanks for products susceptible to inflammation, explosion or BLEVE as a result of high temperatures. Avoid spillage of the products used to extinguish the fire into an aqueous medium.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures:

Isolate leaks provided that there is no additional risk for the people performing this task. Personal protection equipment must be used against potential contact with the spilt product (See section 8). Evacuate the area and keep out those who do not have protection.

6.2 Environmental precautions:

This product is not classified as dangerous to the environment. Keep product away from drains, surface and underground water.

6.3 Methods and material for containment and cleaning up:

It is recommended:

Absorb the spillage using sand or inert absorbent and move it to a safe place. Do not absorb in sawdust or other combustible absorbents. For any concern related to disposal consult section 13.

6.4 Reference to other sections:

See sections 8 and 13.

SECTION 7: HANDLING AND STORAGE

7.1 Precautions for safe handling:

A.- Precautions for safe manipulation

Comply with the current legislation concerning the prevention of industrial risks. Keep containers hermetically sealed. Control spills and residues, destroying them with safe methods (section 6). Avoid leakages from the container. Maintain order and cleanliness where dangerous products are used.

B.- Technical recommendations for the prevention of fires and explosions

Product is non-flammable under normal conditions of storage, manipulation and use. It is recommended to transfer at slow speeds to avoid the generation of electrostatic charges that can affect flammable products. Consult section 10 for information on conditions and materials that should be avoided.

C.- Technical recommendations to prevent ergonomic and toxicological risks

Do not eat or drink during the process, washing hands afterwards with suitable cleaning products.

D.- Technical recommendations to prevent environmental risks

It is recommended to have absorbent material available at close proximity to the product (See subsection 6.3)

7.2 Conditions for safe storage, including any incompatibilities:

A.- Technical measures for storage

Minimum Temp.:	5 ºC
Maximun Temp.:	35 ºC
Maximum time:	12 Months

B.- General conditions for storage

Avoid sources of heat, radiation, static electricity and contact with food. For additional information see subsection 10.5

7.3 Specific end use(s):

Except for the instructions already specified it is not necessary to provide any special recommendation regarding the uses of this product.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters:

Substances whose occupational exposure limits have to be monitored in the work environment

- CONTINUED ON NEXT PAGE -

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION (continue)

Identification	Environmental limits		
2-butanone	IOELV (8h)	200 ppm	600 mg/m³
CAS: 78-93-3	IOELV (STEL)	300 ppm	900 mg/m³
EC: 201-159-0	Year	2014	

DNEL (Workers):

Identification		Short exposure		Long exposure	
		Systemic	Local	Systemic	Local
2-butanone	Oral	Non-applicable	Non-applicable	Non-applicable	Non-applicable
CAS: 78-93-3	Dermal	Non-applicable	Non-applicable	1161 mg/kg	Non-applicable
EC: 201-159-0	Inhalation	Non-applicable	Non-applicable	600 mg/m³	Non-applicable

DNEL (General population):

Identification		Short exposure		Long exposure	
		Systemic	Local	Systemic	Local
2-butanone	Oral	Non-applicable	Non-applicable	31 mg/kg	Non-applicable
CAS: 78-93-3	Dermal	Non-applicable	Non-applicable	412 mg/kg	Non-applicable
EC: 201-159-0	Inhalation	Non-applicable	Non-applicable	106 mg/m³	Non-applicable

PNEC:

Identification				
2-butanone	STP	709 mg/L	Fresh water	55,8 mg/L
CAS: 78-93-3	Soil	22,5 mg/kg	Marine water	55,8 mg/L
EC: 201-159-0	Intermittent	55,8 mg/L	Sediment (Fresh water)	284,74 mg/kg
	Oral	1000 g/kg	Sediment (Marine water)	284,7 mg/kg

8.2 Exposure controls:

A.- General security and hygiene measures in the work place

As a preventative measure it is recommended to use basic Personal Protection Equipment, with the corresponding <<CE marking>> in accordance with Directive 89/686/EC. For more information on Personal Protection Equipment (storage, use, cleaning, maintenance, class of protection,…) consult the information leaflet provided by the manufacturer. For more information see subsection 7.1.
All information contained herein is a recommendation which needs some specification from the labour risk prevention services as it is not known whether the company has additional measures at its disposal.

B.- Respiratory protection

Pictogram	PPE	Labelling	CEN Standard	Remarks
 Mandatory respiratory tract protection	Filter mask for gases and vapours	CE CAT III	EN 405:2001+A1:2009	Replace when there is a taste or smell of the contaminant inside the face mask. If the contaminant comes with warnings it is recommended to use isolation equipment.

C.- Specific protection for the hands

Pictogram	PPE	Labelling	CEN Standard	Remarks
 Mandatory hand protection	NON-disposable chemical protective gloves	CE CAT III	EN 374-1:2003 EN 374-3:2003/AC:2006 EN 420:2003+A1:2009	The Breakthrough Time indicated by the manufacturer must exceed the period during which the product is being used. Do not use protective creams after the product has come into contact with skin.

D.- Ocular and facial protection

Pictogram	PPE	Labelling	CEN Standard	Remarks
 Mandatory face protection	Face mask	CE CAT II	EN 166:2001 EN 167:2001 EN 168:2001 EN 172:1994/A1:2000 EN 172:1994/A2:2001 EN ISO 4007:2012	Clean daily and disinfect periodically according to the manufacturer´s instructions. Use if there is a risk of splashing.

E.- Bodily protection

- CONTINUED ON NEXT PAGE -

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION (continue)

Pictogram	PPE	Labelling	CEN Standard	Remarks
 Mandatory complete body protection	Disposable clothing for protection against chemical risks, with antistatic and fireproof properties	CE CAT III	EN 1149-1,2,3 EN 13034:2005+A1:2009 EN ISO 13982-1:2004/A1:2010 EN ISO 6529:2001 EN ISO 6530:2005 EN ISO 13688:2013 EN 464:1994	For professional use only. Clean periodically according to the manufacturer´s instructions.
 Mandatory foot protection	Safety footwear for protection against chemical risk, with antistatic and heat resistant properties	CE CAT III	EN 13287:2008 EN ISO 20345:2011 EN 13832-1:2006 EN ISO 20344:2011	Replace boots at any sign of deterioration.

F.- Additional emergency measures

Emergency measure	Standards	Emergency measure	Standards
 Emergency shower	ANSI Z358-1 ISO 3864-1:2002	 Eyewash stations	DIN 12 899 ISO 3864-1:2002

Environmental exposure controls:

In accordance with the community legislation for the protection of the environment it is recommended to avoid environmental spillage of both the product and its container. For additional information see subsection 7.1.D

Volatile organic compounds:

With regard to Directive 2010/75/EU, this product has the following characteristics:

V.O.C. (Supply): 100 % weight

V.O.C. density at 20 ºC: 804,6 kg/m³ (804,6 g/L)

Average carbon number: 4

Average molecular weight: 72,1 g/mol

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties:

For complete information see the product datasheet.

Appearance:

Physical state at 20 ºC:	Liquid
Appearance:	Transparent
Color:	☐ Colourless
Odor:	Characteristic

Volatility:

Boiling point at atmospheric pressure:	80 ºC
Vapour pressure at 20 ºC:	9641 Pa
Vapour pressure at 50 ºC:	35559 Pa (36 kPa)
Evaporation rate at 20 ºC:	Non-applicable *

Product description:

Density at 20 ºC:	805 kg/m³
Relative density at 20 ºC:	0,805
Dynamic viscosity at 20 ºC:	0,41 cP
Kinematic viscosity at 20 ºC:	0,51 cSt
Kinematic viscosity at 40 ºC:	Non-applicable *
Concentration:	800 g/L (active ingredient)

*Not relevant due to the nature of the product, not providing information property of its hazards.

- CONTINUED ON NEXT PAGE -

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES (continue)

pH:	Non-applicable *
Vapour density at 20 ºC:	Non-applicable *
Partition coefficient n-octanol/water 20 ºC:	Non-applicable *
Solubility in water at 20 ºC:	Non-applicable *
Solubility properties:	Non-applicable *
Decomposition temperature:	Non-applicable *
Melting point/freezing point:	-85 ºC
Flammability:	
Flash Point:	-6 ºC
Autoignition temperature:	516 ºC
Lower flammability limit:	1,8 % Volume
Upper flammability limit:	10 % Volume
9.2 Other information:	
Surface tension at 20 ºC:	Non-applicable *
Refraction index:	Non-applicable *

*Not relevant due to the nature of the product, not providing information property of its hazards.

SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity:

No hazardous reactions are expected if the following technical instructions storage of chemicals. See section 7.

10.2 Chemical stability:

Chemically stable under the conditions of storage, handling and use.

10.3 Possibility of hazardous reactions:

Under the specified conditions, hazardous reactions that lead to excessive temperatures or pressure are not expected.

10.4 Conditions to avoid:

Applicable for handling and storage at room temperature:

Shock and friction	Contact with air	Increase in temperature	Sunlight	Humidity
Not applicable	Not applicable	Not applicable	Avoid direct impact	Not applicable

10.5 Incompatible materials:

Acids	Water	Combustive materials	Combustible materials	Others
Not applicable	Not applicable	Avoid direct impact	Not applicable	Not applicable

10.6 Hazardous decomposition products:

See subsection 10.3, 10.4 and 10.5 to find out the specific decomposition products. Depending on the decomposition conditions, complex mixtures of chemical substances can be released: carbon dioxide (CO2), carbon monoxide and other organic compounds.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects:

The experimental information related to the toxicological properties of the product itself is not available

Dangerous health implications:

In case of exposure that is repetitive, prolonged or at concentrations higher than recommended by the occupational exposure limits, it may result in adverse effects on health depending on the means of exposure:

A.- Ingestion:

- Acute toxicity: Based on available data, the classification criteria are not met, as it does not contain substances classified as dangerous for consumption. For more information see section 3.
- Corrosivity/Irritability: Based on available data, the classification criteria are not met, as it does not contain substances classified as dangerous for this effect. For more information see section 3.

- CONTINUED ON NEXT PAGE -

SECTION 11: TOXICOLOGICAL INFORMATION (continue)

B- Inhalation:

- Acute toxicity: Based on available data, the classification criteria are not met, as it does not contain substances classified as dangerous for inhalation. For more information see section 3.
- Corrosivity/Irritability: Based on available data, the classification criteria are not met, as it does not contain substances classified as dangerous for this effect. For more information see section 3.

C- Contact with the skin and the eyes:

- Contact with the skin: Based on available data, the classification criteria are not met, as it does not contain substances classified as dangerous for skin contact. For more information see section 3.
- Contact with the eyes: Produces eye damage after contact.

D- CMR effects (carcinogenicity, mutagenicity and toxicity to reproduction):

- Carcinogenicity: Based on available data, the classification criteria are not met, as it does not contain substances classified as dangerous for the effects mentioned. For more information see section 3.
- Mutagenicity: Based on available data, the classification criteria are not met, as it does not contain substances classified as dangerous for this effect. For more information see section 3.
- Reproductive toxicity: Based on available data, the classification criteria are not met, as it does not contain substances classified as dangerous for this effect. For more information see section 3.

E- Sensitizing effects:

- Respiratory: Based on available data, the classification criteria are not met, as it does not contain substances classified as dangerous with sensibilizising effects. For more information see section 3.
- Cutaneous: Based on available data, the classification criteria are not met, as it does not contain substances classified as dangerous for this effect. For more information see section 3.

F- Specific target organ toxicity (STOT)-time exposure:

Exposure in high concentrations can cause a breakdown in the central nervous system causing headache, dizziness, vertigo, nausea, vomiting, confusion, and in serious cases, loss of concentration.

G- Specific target organ toxicity (STOT)-repeated exposure:

- Specific target organ toxicity (STOT)-repeated exposure: Based on available data, the classification criteria are not met, as it does not contain substances classified as dangerous for this effect. For more information see section 3.
- Skin: Repeated exposure may cause skin dryness or cracking

H- Aspiration hazard:

Based on available data, the classification criteria are not met, as it does not contain substances classified as dangerous for this effect. For more information see section 3.

Other information:

Non-applicable

Specific toxicology information on the substances:

Identification	Acute toxicity		Genus
2-butanone	LD50 oral	4000 mg/kg	Rat
CAS: 78-93-3	LD50 dermal	6400 mg/kg	Rabbit
EC: 201-159-0	LC50 inhalation	23,5 mg/L (4 h)	Rat

SECTION 12: ECOLOGICAL INFORMATION

The experimental information related to the eco-toxicological properties of the product itself is not available

12.1 Toxicity:

Identification	Acute toxicity		Specie	Genus
2-butanone	LC50	3220 mg/L (96 h)	Pimephales promelas	Fish
CAS: 78-93-3	EC50	5091 mg/L (48 h)	Daphnia magna	Crustacean
EC: 201-159-0	EC50	4300 mg/L (168 h)	Scenedesmus quadricauda	Algae

12.2 Persistence and degradability:

Identification	Degradability		Biodegradability	
2-butanone	BOD5	2.03 g O2/g	Concentration	Non-applicable
CAS: 78-93-3	COD	2.31 g O2/g	Period	20 days
EC: 201-159-0	BOD5/COD	0.88	% Biodegradable	89 %

12.3 Bioaccumulative potential:

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SECTION 12: ECOLOGICAL INFORMATION (continue)

Identification	Bioaccumulation potential	
2-butanone	BCF	3
CAS: 78-93-3	Pow Log	0,29
EC: 201-159-0	Potential	Low

12.4 Mobility in soil:

Identification	Absorption/desorption		Volatility	
2-butanone	Koc	30	Henry	5,765E+0 Pa·m³/mol
CAS: 78-93-3	Conclusion	Very High	Dry soil	Yes
EC: 201-159-0	Surface tension	23960 N/m (25 ºC)	Moist soil	Yes

12.5 Results of PBT and vPvB assessment:

Non-applicable

12.6 Other adverse effects:

Not described

SECTION 13: DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods:

Code	Description	Waste class (Regulation (EU) No 1357/2014)
08 04 09*	Waste adhesives and sealants containing organic solvents or other dangerous substances	Dangerous

Type of waste (Regulation (EU) No 1357/2014):

HP3 Flammable, HP4 Irritant — skin irritation and eye damage, HP5 Specific Target Organ Toxicity (STOT)/Aspiration Toxicity

Waste management (disposal and evaluation):

Consult the authorized waste service manager on the assessment and disposal operations in accordance with Annex 1 and Annex 2 (Directive 2008/98/EC). As under 15 01 (2014/955/EC) of the code and in case the container has been in direct contact with the product, it will be processed the same way as the actual product. Otherwise, it will be processed as non-dangerous residue. We do not recommended disposal down the drain. See paragraph 6.2.

Regulations related to waste management:

In accordance with Annex II of Regulation (EC) nº1907/2006 (REACH) the community or state provisions related to waste management are stated

Community legislation: Directive 2008/98/EC, 2014/955/EU, Regulation (EU) No 1357/2014

SECTION 14: TRANSPORT INFORMATION

Transport of dangerous goods by land:

With regard to ADR 2015 and RID 2015:



14.1	**UN number:**	UN1193
14.2	**UN proper shipping name:**	ETHYL METHYL KETONE (METHYL ETHYL KETONE)
14.3	**Transport hazard class(es):**	3
	Labels:	3
14.4	**Packing group:**	II
14.5	**Dangerous for the environment:**	No
14.6	**Special precautions for user**	
	Special regulations:	Non-applicable
	Tunnel restriction code:	D/E
	Physico-Chemical properties:	see section 9
	Limited quantities:	1 L
14.7	**Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code:**	Non-applicable

Transport of dangerous goods by sea:

- CONTINUED ON NEXT PAGE -

SECTION 14: TRANSPORT INFORMATION (continue)

With regard to IMDG 37-14:



14.1	**UN number:**	UN1193
14.2	**UN proper shipping name:**	ETHYL METHYL KETONE (METHYL ETHYL KETONE)
14.3	**Transport hazard class(es):**	3
	Labels:	3
14.4	**Packing group:**	II
14.5	**Dangerous for the environment:**	No
14.6	**Special precautions for user**	
	Special regulations:	Non-applicable
	EmS Codes:	F-E, S-D
	Physico-Chemical properties:	see section 9
	Limited quantities:	1 L
14.7	**Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code:**	Non-applicable

Transport of dangerous goods by air:

With regard to IATA/ICAO 2015:



14.1	**UN number:**	UN1193
14.2	**UN proper shipping name:**	ETHYL METHYL KETONE (METHYL ETHYL KETONE)
14.3	**Transport hazard class(es):**	3
	Labels:	3
14.4	**Packing group:**	II
14.5	**Dangerous for the environment:**	No
14.6	**Special precautions for user**	
	Physico-Chemical properties:	see section 9
14.7	**Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code:**	Non-applicable

SECTION 15: REGULATORY INFORMATION

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture:

Candidate substances for authorisation under the Regulation (EC) 1907/2006 (REACH): Non-applicable

Substances included in Annex XIV of REACH ("Authorisation List") and sunset date: Non-applicable

Regulation (EC) 1005/2009, about substances that deplete the ozone layer: Non-applicable

Active substances for which a decision of non-inclusion onto Annex I (Regulation (EU) No 528/2012): Non-applicable

REGULATION (EU) No 649/2012, in relation to the import and export of hazardous chemical products: Non-applicable

Limitations to commercialisation and the use of certain dangerous substances and mixtures (Annex XVII, REACH):

Shall not be used, as substance or as mixtures in aerosol dispensers where these aerosol dispensers are intended for supply to the general public for entertainment and decorative purposes such as the following:
— metallic glitter intended mainly for decoration,
— artificial snow and frost,
— "whoopee" cushions,
— silly string aerosols,
— imitation excrement,
— horns for parties,
— decorative flakes and foams,
— artificial cobwebs,
— stink bombs.

Specific provisions in terms of protecting people or the environment:

It is recommended to use the information included in this safety data sheet as data used in a risk evaluation of the local circumstances in order to establish the necessary risk prevention measures for the manipulation, use, storage and disposal of this product.

- CONTINUED ON NEXT PAGE -

SECTION 15: REGULATORY INFORMATION (continue)

Other legislation:

The product could be affected by sectorial legislation

15.2 Chemical safety assessment:

The supplier has not carried out evaluation of chemical safety.

SECTION 16: OTHER INFORMATION

Legislation related to safety data sheets:

This safety data sheet has been designed in accordance with ANNEX II-Guide to the compilation of safety data sheets of Regulation (EC) Nº 1907/2006 (Regulation (EC) Nº 453/2010)

Modifications related to the previous security card which concerns the ways of managing risks. :

CLP Regulation (EC) nº 1272/2008:

· Precautionary statements

Texts of the legislative phrases mentioned in section 2.:

H225: Highly flammable liquid and vapour
H336: May cause drowsiness or dizziness
H319: Causes serious eye irritation

Texts of the legislative phrases mentioned in section 3.:

The phrases indicated do not refer to the product itself; they are present merely for informative purposes and refer to the individual components which appear in section 3

CLP Regulation (EC) nº 1272/2008:

Eye Irrit. 2: H319 - Causes serious eye irritation
Flam. Liq. 2: H225 - Highly flammable liquid and vapour
STOT SE 3: H336 - May cause drowsiness or dizziness

Advice related to training:

Minimal training is recommended to prevent industrial risks for staff using this product, in order to facilitate their comprehension and interpretation of this safety data sheet, as well as the label on the product.

Principal bibliographical sources:

http://esis.jrc.ec.europa.eu
http://echa.europa.eu
http://eur-lex.europa.eu

Abbreviations and acronyms:

- ADR: European agreement concerning the international carriage of dangerous goods by road
-IMDG: International maritime dangerous goods code
-IATA: International Air Transport Association
-ICAO: International Civil Aviation Organisation
-COD: Chemical Oxygen Demand
-BOD5: 5-day biochemical oxygen demand
-BCF: Bioconcentration factor
-LD50: Lethal Dose 50
-CL50: Lethal Concentration 50
-EC50: Effective concentration 50
-Log-POW: Octanol–water partition coefficient
-Koc: Partition coefficient of organic carbon

The information contained in this security data sheet is based on sources, technical knowledge and current legislation at European and state level, without being able to guarantee its accuracy. This information cannot be considered a guarantee of the properties of the product, it is simply a description of the security requirements. The occupational methodology and conditions for users of this product are not within our awareness or control, and it is ultimately the responsibility of the user to take the necessary measures to obtain the legal requirements concerning the manipulation, storage, use and disposal of chemical products. The information on this security data sheet only refers to this product, which should not be used for needs other than those specified.

- END OF SAFETY DATA SHEET -

SAFETY DATA SHEET

Sikaflex®-1A

Version	Revision Date:	SDS Number:
1.5	12/21/2016	000000604224

SECTION 1. IDENTIFICATION

Product name : Sikaflex®-1A

Manufacturer or supplier's details

Company name : Sika Canada Inc.
601, avenue Delmar
Pointe-Claire, QC H9R 4A9
Canada
www.sika.ca

Telephone : (514) 697-2610 / 1 (800) 933-7452

Telefax : (514) 694-2792

Health and Safety Services's e-mail address : ehs@ca.sika.com

Emergency telephone : CANUTEC (collect) (613) 996-6666 (24 hours)

Recommended use of the chemical and restrictions on use

For further information, refer to product data sheet.

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification

Skin sensitization : Category 1

Carcinogenicity (Inhalation) : Category 1A

Specific target organ systemic toxicity - repeated exposure (Inhalation) : Category 2 (hearing organs)

GHS label elements

Hazard pictograms :



Signal Word : Danger

Hazard Statements : H317 May cause an allergic skin reaction.
H350i May cause cancer by inhalation.
H373 May cause damage to organs (hearing organs) through prolonged or repeated exposure if inhaled.

Precautionary Statements : **Prevention:**
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P260 Do not breathe dust/ fume/ gas/ mist/ vapors/ spray.
P272 Contaminated work clothing must not be allowed out of the workplace.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
Response:
P302 + P352 IF ON SKIN: Wash with plenty of water.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.
P333 + P313 If skin irritation or rash occurs: Get medical advice/ attention.
P362 + P364 Take off contaminated clothing and wash it before reuse.
Storage:
P405 Store locked up.
Disposal:
P501 Dispose of contents/ container to an approved waste disposal plant.

Warning : Reports have associated repeated and prolonged exposure to some of the chemicals in this product with permanent brain,liver, kidney and nervous system damage. Intentional misuse by deliberate concentration and inhalation of vapors may be harmful or fatal.

Other hazards

None known.

Supplemental information

If product is in liquid or paste form, physical or health hazards listed related to dust are not considered significant. However, product may contain substances that could be potential hazards if caused to become airborne due to grinding, sanding or other abrasive processes.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Hazardous ingredients

Chemical name	CAS-No.	Concentration (% w/w)
xylene	1330-20-7	>= 2 - < 5
ethylbenzene	100-41-4	>= 0 - < 1
Quartz (SiO2) <5µm	14808-60-7	>= 0 - < 1
aromatic polyisocyanate	53317-61-6	>= 0 - < 1

SECTION 4. FIRST AID MEASURES

General advice : Move out of dangerous area.
Consult a physician.
Show this material safety data sheet to the doctor in attend-

ance.

If inhaled	:	Move to fresh air. Consult a physician after significant exposure.
In case of skin contact	:	Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. If symptoms persist, call a physician.
In case of eye contact	:	Remove contact lenses. Keep eye wide open while rinsing. If eye irritation persists, consult a specialist.
If swallowed	:	Clean mouth with water and drink afterwards plenty of water. Do not induce vomiting without medical advice. Do not give milk or alcoholic beverages. Never give anything by mouth to an unconscious person. Obtain medical attention.
Most important symptoms and effects, both acute and delayed	:	sensitizing effects carcinogenic effects Allergic reactions See Section 11 for more detailed information on health effects and symptoms. May cause an allergic skin reaction. May cause cancer by inhalation. May cause damage to organs through prolonged or repeated exposure if inhaled.
Notes to physician	:	Treat symptomatically.

SECTION 5. FIRE-FIGHTING MEASURES

Suitable extinguishing media	:	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
Further information	:	Collect contaminated fire extinguishing water separately. This must not be discharged into drains. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.
Special protective equipment for fire-fighters	:	In the event of fire, wear self-contained breathing apparatus.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	:	Use personal protective equipment. Deny access to unprotected persons.
Environmental precautions	:	Do not flush into surface water or sanitary sewer system. If the product contaminates rivers and lakes or drains inform

respective authorities.
Local authorities should be advised if significant spillages cannot be contained.

Methods and materials for containment and cleaning up : Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust).
Keep in suitable, closed containers for disposal.

SECTION 7. HANDLING AND STORAGE

Advice on protection against fire and explosion : Normal measures for preventive fire protection.

Advice on safe handling : Avoid exceeding the given occupational exposure limits (see section 8).
Do not get in eyes, on skin, or on clothing.
For personal protection see section 8.
Persons with a history of skin sensitization problems or asthma, allergies, chronic or recurrent respiratory disease should not be employed in any process in which this mixture is being used.
Smoking, eating and drinking should be prohibited in the application area.
Follow standard hygiene measures when handling chemical products.

Conditions for safe storage : Prevent unauthorized access.
Store in original container.
Keep container tightly closed in a dry and well-ventilated place.
Observe label precautions.
Store in accordance with local regulations.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Ingredients with workplace control parameters

Ingredients	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
xylene	1330-20-7	TWA	100 ppm 434 mg/m3	CA AB OEL
		STEL	150 ppm 651 mg/m3	CA AB OEL
		TWAEV	100 ppm 434 mg/m3	CA QC OEL
		STEV	150 ppm 651 mg/m3	CA QC OEL
		TWA	100 ppm	CA BC OEL
		STEL	150 ppm	CA BC OEL
		TWA	100 ppm	ACGIH
		STEL	150 ppm	ACGIH

ethylbenzene	100-41-4	TWA	100 ppm 434 mg/m3	CA AB OEL
		STEL	125 ppm 543 mg/m3	CA AB OEL
		TWA	20 ppm	CA BC OEL
		TWAEV	100 ppm 434 mg/m3	CA QC OEL
		STEV	125 ppm 543 mg/m3	CA QC OEL
		TWA	20 ppm	ACGIH
		STEL	125 ppm	ACGIH
Quartz (SiO2) <5µm	14808-60-7	TWA (Respirable fraction)	0.1 mg/m3	CA ON OEL
		TWA (Respirable particulates)	0.025 mg/m3	CA AB OEL
		TWAEV (respirable dust)	0.1 mg/m3	CA QC OEL
		TWA (Respirable)	0.025 mg/m3 (Silica)	CA BC OEL
		TWA (Respirable fraction)	0.025 mg/m3 (Silica)	ACGIH

Biological occupational exposure limits

Ingredients	CAS-No.	Control parameters	Biological specimen	Sampling time	Permissible concentration	Basis
xylene	1330-20-7	Methylhippuric acids	Urine	End of shift (As soon as possible after exposure ceases)	1.5 g/g creatinine	ACGIH BEI
ethylbenzene	100-41-4	Sum of mandelic acid and phenyl glyoxylic acid	Urine	End of shift (As soon as possible after exposure ceases)	0.15 g/g creatinine	ACGIH BEI

Engineering measures : Use of adequate ventilation should be sufficient to control worker exposure to airborne contaminants. If the use of this product generates dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure below any recommended or statutory limits.

Personal protective equipment

Respiratory protection : Use a properly fitted NIOSH approved air-purifying or air-fed

respirator complying with an approved standard if a risk assessment indicates this is necessary.

The filter class for the respirator must be suitable for the maximum expected contaminant concentration (gas/vapor/aerosol/particulates) that may arise when handling the product. If this concentration is exceeded, self-contained breathing apparatus must be used.

Hand protection

Remarks	:	Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.
Eye protection	:	Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary.
Skin and body protection	:	Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place.
Hygiene measures	:	Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product. Remove contaminated clothing and protective equipment before entering eating areas. Wash thoroughly after handling.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	paste
Color	:	various
Odor	:	aromatic
Odor Threshold	:	No data available
pH	:	No data available
Melting point/range / Freezing point	:	No data available
Boiling point/boiling range	:	No data available
Flash point	:	Not applicable
Evaporation rate	:	No data available
Flammability (solid, gas)	:	No data available
Upper explosion limit	:	No data available

Lower explosion limit	:	No data available
Vapor pressure	:	() 0.01 hpa (0.01 mmHg)
Relative vapor density	:	No data available
Density	:	ca. 1.4 g/cm3 (20 °C (68 °F) ())
Solubility(ies)		
Water solubility	:	No data available
Solubility in other solvents	:	No data available
Partition coefficient: n-octanol/water	:	No data available
Autoignition temperature	:	No data available
Decomposition temperature	:	No data available
Viscosity		
Viscosity, dynamic	:	No data available
Viscosity, kinematic	:	ca. > 20.5 mm2/s (40 °C)
Explosive properties	:	No data available
Molecular weight	:	No data available

SECTION 10. STABILITY AND REACTIVITY

Reactivity	:	No dangerous reaction known under conditions of normal use.
Chemical stability	:	The product is chemically stable.
Possibility of hazardous reactions	:	Stable under recommended storage conditions.
Conditions to avoid	:	No data available
Incompatible materials	:	No data available

No decomposition if stored and applied as directed.

SECTION 11. TOXICOLOGICAL INFORMATION

Acute toxicity

Not classified based on available information.

Product:

Acute inhalation toxicity : Acute toxicity estimate: > 40 mg/l
Exposure time: 4 h
Test atmosphere: vapor
Method: Calculation method

Acute dermal toxicity : Acute toxicity estimate: > 5,000 mg/kg
Method: Calculation method

Ingredients:

aromatic polyisocyanate:
Acute oral toxicity : LD50 Oral (Rat): > 5,000 mg/kg

Skin corrosion/irritation

Not classified based on available information.

Serious eye damage/eye irritation

Not classified based on available information.

Respiratory or skin sensitization

Skin sensitization: May cause an allergic skin reaction.
Respiratory sensitization: Not classified based on available information.

Germ cell mutagenicity

Not classified based on available information.

Carcinogenicity

May cause cancer by inhalation.

IARC	Group 2B: Possibly carcinogenic to humans	
	titanium dioxide	13463-67-7
	ethylbenzene	100-41-4
	Carbon black	1333-86-4
	Group 1: Carcinogenic to humans	
	Quartz (SiO2) <5µm	14808-60-7
NTP	Known to be human carcinogen	
	Quartz (SiO2) <5µm	14808-60-7

Reproductive toxicity

Not classified based on available information.

STOT-single exposure

Not classified based on available information.

STOT-repeated exposure

May cause damage to organs (hearing organs) through prolonged or repeated exposure if inhaled.

Aspiration toxicity
Not classified based on available information.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity
No data available

Persistence and degradability
No data available

Bioaccumulative potential
No data available

Mobility in soil
No data available

Other adverse effects

Product:

Additional ecological information	:	Do not empty into drains; dispose of this material and its container in a safe way. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues	:	Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements.
Contaminated packaging	:	Empty containers should be taken to an approved waste handling site for recycling or disposal.

SECTION 14. TRANSPORT INFORMATION

Domestic regulation

TDG (road/train)
Not dangerous goods

International Regulations

IATA-DGR
Not dangerous goods
IMDG-Code
Not dangerous goods

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
Not applicable for product as supplied.

SECTION 15. REGULATORY INFORMATION

Canadian lists

No substances are subject to a Significant New Activity Notification.

SECTION 16. OTHER INFORMATION

Revision Date : 12/21/2016

Prepared by : R & D of Sika Canada Inc.

Notice to Reader:

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Full text of other abbreviations

ADR	Accord européen relatif au transport international des marchandises Dangereuses par Route
CAS	Chemical Abstracts Service
DNEL	Derived no-effect level
EC50	Half maximal effective concentration
GHS	Globally Harmonized System
IATA	International Air Transport Association
IMDG	International Maritime Code for Dangerous Goods
LD50	Median lethal dosis (the amount of a material, given all at once, which causes the death of 50% (one half) of a group of test animals)
LC50	Median lethal concentration (concentrations of the chemical in air that kills 50% of the test animals during the observation period)
MARPOL	International Convention for the Prevention of Pollution from Ships, 1973 as modified by the Protocol of 1978
OEL	Occupational Exposure Limit
PBT	Persistent, bioaccumulative and toxic
PNEC	Predicted no effect concentration
REACH	Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a

	European Chemicals Agency
SVHC	Substances of Very High Concern
vPvB	Very persistent and very bioaccumulative

CA / Z8

SAFETY DATA SHEET

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1. Product identifier

Product name: WD-40® Multi-Use Product - Aerosol

Container size: 100 ml, 125 ml, 150ml, 200 ml, 240 ml, 250 ml, 300 ml, 400 ml, 420 ml

1.2. Relevant identified uses of the substance or mixture and uses advised against

Application: Universal lubricant.

1.3. Details of the supplier of the safety data sheet

Manufacturer:
WD-40
Brick Close | Kiln Farm
MK11 3LJ Milton Keynes
United Kingdom

Supplier/Distributor:
Hashahal, Inc.
HaRav Shalom Jarufi St 4
Rishon LeTsiyon
Tel:03-7612700

1.4. Emergency telephone number

Emergency telephone: Israel Poison Information Center: 04-7771900 (24/7)

SECTION 2: HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture

The product is classified:

SI 2302 (1): Flam. Aerosol 1 - STOT SE 3;H336 - Asp. Tox. 1

2.2. Label elements



Danger

Contains: Hydrocarbons, C9-C11, n-alkanes, isoalkanes, cyclics, < 2% aromatics

H222 Extremely flammable aerosol.

H229 Pressurised container: May burst if heated.

H336 May cause drowsiness or dizziness.

P102 Keep out of reach of children.

P271 Use only outdoors or in a well-ventilated area.

P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P251 Do not pierce or burn, even after use.

P410 + P412 Protect from sunlight. Do not expose to temperatures exceeding 50°C.

P211 Do not spray on an open flame or other ignition source.

P301 + P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.

P331 Do NOT induce vomiting.

Repeated exposure may cause skin dryness or cracking.

2.3. Other hazards

PBT/vPvB: This product does not contain any PBT or vPvB substances.

Other: Aerosol containers can burst violently when heated, due to excess pressure build-up. The product contains volatile, organic compounds which have a photochemical ozone creation potential. The product contains organic solvents. Organic solvents may be absorbed into the body by inhalation and cause permanent damage to the nervous system, including the brain.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.2. Mixtures

The product contains: organic solvents, propellants and mineral oil.

SI 2302 (1):

%:	CAS-No.:	EC No.:	Chemical name:	Hazard classification:	Notes:
60-80	-	919-857-5	Hydrocarbons, C9-C11, n-alkanes, isoalkanes, cyclics, < 2% aromatics	Flam. Liq. 3;H226 STOT SE 3;H336 Asp. Tox. 1;H304	

Reference: The full text for all hazard statements is displayed in section 16.

SECTION 4: FIRST AID MEASURES

4.1. Description of first aid measures

Burns: Flush with water immediately. While flushing, remove clothes which do not adhere to affected area. Call an ambulance. Continue flushing during transport to hospital.

Inhalation: Move injured person into fresh air and keep person calm under observation. If uncomfortable: Seek hospital and bring along these instructions.

Skin contact: Remove contaminated clothes and rinse skin thoroughly with water. In case of eczema or other skin disorders: Seek medical attention and bring these instructions.

Eye contact: Immediately flush with plenty of water for at least 15 minutes. Remove any contact lenses and open eyelids widely. If irritation persists: Seek medical attention and bring along these instructions.

Ingestion: Aspiration hazard. Immediately rinse mouth and drink plenty of water or milk. Keep person under observation. Do not induce vomiting. If vomiting occurs, keep head low. Immediate transport to hospital. Bring along these instructions.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/effects: Be aware that symptoms of lung oedema (shortness of breath) may develop up to 24 hours after exposure.

4.3. Indication of any immediate medical attention and special treatment needed

Medical attention/treatments: Treat symptomatically. If there is any suspicion of aspiration into the lungs either directly or as a result of vomiting, obtain medical advice.

SECTION 5: FIREFIGHTING MEASURES

5.1. Extinguishing media

Extinguishing media: Extinguish with carbon dioxide or dry powder. Cool containers exposed to heat with water spray and remove container, if no risk is involved.
Do not use water jet as an extinguisher, as this will spread the fire.

5.2. Special hazards arising from the substance or mixture

Specific hazards: Aerosol containers can explode when heated, due to excessive pressure build-up. During fire, gases hazardous to health may be formed.

5.3. Advice for firefighters

Protective equipment for fire-fighters: Selection of respiratory protection for fire fighting: follow the general fire precautions indicated in the workplace.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures

Personal precautions: Follow precautions for safe handling described in this safety data sheet. Avoid inhalation of vapours and contact with skin and eyes. Do not smoke or use open fire, or other sources of ignition.

6.2. Environmental precautions

Environmental precautions: Avoid discharge into drains, water courses or onto the ground.

6.3. Methods and material for containment and cleaning up

Methods for cleaning up: Absorb spillage with non-combustible, absorbing material. Clean contaminated area with oil-removing material.

6.4. Reference to other sections

Reference: For personal protection, see section 8. For waste disposal, see section 13.

SECTION 7: HANDLING AND STORAGE

7.1. Precautions for safe handling

Safe handling advice: Observe good chemical hygiene practices.
Work practice should minimise contact. Avoid inhalation of vapours and spray mists. Avoid contact with skin and eyes.

Technical measures: Do not smoke or use open fire or other sources of ignition.

Technical precautions: Provide adequate ventilation. Provide easy access to water supply or an emergency shower.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures for safe storage: Follow the rules for storage of flammable products.

Storage conditions: Store in a cool and well-ventilated place. Do not store near heat sources or expose to high temperatures.

Specific use(s): No information available.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control parameters

Occupational exposure limits:

CAS-No.:	Chemical name:	As:	Exposure limits:	Type:	Notes:	References:
124-38-9	Carbon dioxide	-	5000 ppm	TWA	-	ACGIH
		-	30000 ppm	STEL	15min	

8.2. Exposure controls

Engineering measures:	Provide adequate ventilation. Observe Occupational Exposure Limits and minimise the risk of inhalation of vapours.
Personal protection:	Personal protection equipment should be chosen according to the ANSI standards and in discussion with the supplier of the personal protective equipment.
Respiratory equipment:	In case of inadequate ventilation and work of brief duration, use suitable respiratory equipment.
Hand protection:	Risk of contact: Wear protective gloves. It is recommended to use gloves of Viton or nitrile rubber. Be aware that the liquid may penetrate the gloves. Frequent change is advisable. Other types of gloves can be recommended by the glove supplier.
Eye protection:	Risk of splashes: Wear goggles/face shield.
Hygiene measures:	Wash hands after handling. Do not eat, drink or smoke when using the product. Change contaminated clothing. Wash contaminated clothing before reuse.
Environmental Exposure Controls:	Not available.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on basic physical and chemical properties

Appearance:	Aerosol.
Colour:	Light brown.
Odour:	Characteristic.
pH:	Not available.
Melting point / freezing point:	< - 66°C (ASTM D 97)
Boiling point:	176°C (liquid phase)
Flash point:	47°C (liquid phase)
Explosion limits:	0.6-8.2% vol. (Main components)
Vapour pressure:	7.2 bar (20°C) 9.4 bar (50°C)
Vapour density:	Not available.
Relative density:	0.817 g/ml
Solubility:	Insoluble in water.
Partition coefficient (n-octanol/water):	Not available.
Decomposition temperature (°C):	Not available.
Viscosity:	Kinematic viscosity: 2-3 mm²/s (40 °C)

9.2. Other information

Other data:	Not available.

SECTION 10: STABILITY AND REACTIVITY

10.1. Reactivity

Reactivity:	Not reactive.

10.2. Chemical stability

Stability:	Stable under normal temperature conditions.

10.3. Possibility of hazardous reactions

Hazardous reactions:	None known.

10.4. Conditions to avoid

Conditions to avoid:	Avoid heat, flames and other sources of ignition. Avoid exposure to high temperatures or direct sunlight.

10.5. Incompatible materials

Incompatible materials:	Strong oxides.

10.6. Hazardous decomposition products

Hazardous decomposition products:	None in particular.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1. Information on toxicological effects

Low order of acute toxicity, but aspiration following ingestion and vomiting may cause severe and potentially fatal chemical pneumonitis.

Acute Toxicity (Oral):	Based on available data, the classification criteria are not met.
Acute Toxicity (Dermal):	Based on available data, the classification criteria are not met.
Acute Toxicity (Inhalation):	Based on available data, the classification criteria are not met.
Skin Corrosion/Irritation:	Based on available data, the classification criteria are not met.
Serious eye damage/irritation:	Based on available data, the classification criteria are not met.
Respiratory or skin sensitisation:	Based on available data, the classification criteria are not met.
Germ cell mutagenicity:	Based on available data, the classification criteria are not met.
Carcinogenicity:	Based on available data, the classification criteria are not met.
Reproductive Toxicity:	Based on available data, the classification criteria are not met.
STOT - Single exposure:	May cause drowsiness or dizziness.
STOT - Repeated exposure:	Based on available data, the classification criteria are not met.
Aspiration hazard:	May be fatal if swallowed and enters airways.
Inhalation:	In high concentrations, vapours and spray mists are narcotic and may cause headache, fatigue, dizziness and nausea.
Skin contact:	Prolonged contact may cause redness, irritation and dry skin.
Eye contact:	May irritate and cause redness and pain.
Ingestion:	Low order of acute toxicity, but aspiration following ingestion and vomiting may cause severe and potentially fatal chemical pneumonitis.

SECTION 12: ECOLOGICAL INFORMATION

12.1. Toxicity

Ecotoxicity:	Not classified as dangerous to the environment. Oil spills are generally hazardous to the environment.

12.2. Persistence and degradability

Degradability:	The degradability of the product has not been stated.

12.3. Bioaccumulative potential

Bioaccumulative potential:	No data available on bioaccumulation.

12.4. Mobility in soil

Mobility:	No data available.

12.5. Results of PBT and vPvB assessment

PBT/vPvB:	This product does not contain any PBT or vPvB substances.

12.6. Other adverse effects

Other adverse effects:	An oil film may cause physical damage to organisms and disturb the transportation of oxygen in the intermediate zone between air/water or water/air.

SECTION 13: DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

Dispose of waste and residues in accordance with local authority requirements. Do not puncture or incinerate even when empty.

Contaminated packaging: Empty aerosol containers before disposal.

SECTION 14: TRANSPORT INFORMATION

The product is covered by international regulation on the transport of dangerous goods (IMDG, IATA, ADR/RID).

14.1. UN number

UN-No: 1950

14.2. UN proper shipping name

Proper Shipping Name: AEROSOLS, flammable

14.3. Transport hazard class(es)

Class: 2

14.4. Packing group

PG: -

14.5. Environmental hazards

Marine pollutant: No.

Environmentally Hazardous Substance: No.

14.6. Special precautions for user

Special precautions: None known.

14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Transport in bulk: This product is not intended for transport in bulk.

SECTION 15: REGULATORY INFORMATION

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

National regulation: SI 2302 part 1 - Dangerous substances and mixtures: Classification, labelling, marking and packaging, with amendments.
Work Safety Regulations (Safety Data Sheets, Classification, Packing, Labeling and Marking of Packages), 5758-1998, with amendments.
Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006 with amendments.
Threshold Limit Values (2018), ACGIH, by the American Conference on Governmental Industrial Hygienists.

SECTION 16: OTHER INFORMATION

The user must be instructed in the proper work procedure and be familiar with the contents of these instructions.

Abbreviations and acronyms used in the safety data sheet:	Flam. Liq. = Flammable liquid. Asp. Tox. = Aspiration toxicity. PBT = Persistent, Bioaccumulative and Toxic. STOT SE = Specific target organ toxicity, single exposure. vPvB = very Persistent and very Bioaccumulative.
Additional information:	Classification according to Regulation (EC) No. 1272/2008: Health Hazards: Calculation method. Physical Hazards: Expert judgement.
Wording of H-statements:	
H222	Extremely flammable aerosol.
H226	Flammable liquid and vapour.
H229	Pressurised container: May burst if heated.
H304	May be fatal if swallowed and enters airways.
H336	May cause drowsiness or dizziness.

The information on this data sheet represents our current data and is reliable provided that the product is used under the prescribed conditions and in accordance with the application specified on the packaging and/or in the technical guidance literature. Any other use of the product which involves using the product in combination with any other product or any other process is the responsibility of the user.

Made by DHI - Environment and Toxicology, Agern Allé 5, DK-2970 Hørsholm, Denmark.
www.dhigroup.com.

Safety Data Sheet

RUST-OLEUM CORPORATION
* Trusted Quality Since 1921 *
www.rustoleum.com

1. Identification

Product Name: PRO LSPR 6PK MARK FLUORESCENT ORANGE

Revision Date: 5/12/2017

Product Identifier: 2554838

Supercedes Date: 6/5/2015

Product Use/Class: Marking Paint/Aerosols

Supplier: Rust-Oleum Corporation
11 Hawthorn Parkway
Vernon Hills, IL 60061
USA

Manufacturer: Rust-Oleum Corporation
11 Hawthorn Parkway
Vernon Hills, IL 60061
USA

Preparer: Regulatory Department

Emergency Telephone: 24 Hour Hotline: 847-367-7700

2. Hazard Identification

Classification

Symbol(s) of Product



Signal Word
Danger

Possible Hazards
27% of the mixture consists of ingredient(s) of unknown acute toxicity.

GHS HAZARD STATEMENTS

Carcinogenicity, category 2	H351	Suspected of causing cancer.
Compressed Gas	H280	Contains gas under pressure; may explode if heated.
Flammable Aerosol, category 1	H222	Extremely flammable aerosol.
STOT, repeated exposure, category 2	H373	May cause damage to organs through prolonged or repeated exposure.

GHS LABEL PRECAUTIONARY STATEMENTS

P201	Obtain special instructions before use.
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P211	Do not spray on an open flame or other ignition source.
P251	Do not pierce or burn, even after use.
P260	Do not breathe dust/fume/gas/mist/vapors/spray.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P308+P313	IF exposed or concerned: Get medical advice/attention.
P314	Get medical advice/attention if you feel unwell.
P405	Store locked up.
P410+P403	Protect from sunlight. Store in a well-ventilated place.
P410+P412	Protect from sunlight. Do no expose to temperatures exceeding 50°C/ 122°F.

P501 Dispose of contents/container in accordance with local, regional and national regulations.

3. Composition/Information On Ingredients

HAZARDOUS SUBSTANCES

Chemical Name	CAS-No.	Wt.% Range	GHS Symbols	GHS Statements
Propane	74-98-6	10-25	GHS04	H280
Naphtha, Petroleum, Hydrotreated Light	64742-49-0	2.5-10	GHS08	H304
n-Butane	106-97-8	2.5-10	GHS04	H280
Hydrotreated Light Distillate	64742-47-8	2.5-10	GHS08	H304
Xylenes (o-, m-, p- isomers)	1330-20-7	2.5-10	GHS02-GHS07	H226-315-319-332
Barium Sulfate	7727-43-7	2.5-10	Not Available	Not Available
Ethylbenzene	100-41-4	1.0-2.5	GHS02-GHS07-GHS08	H225-304-332-351-373
Stoddard Solvent	8052-41-3	0.1-1.0	GHS08	H304-372
Pigment Orange 13	3520-72-7	0.1-1.0	Not Available	Not Available
Crystalline Silica / Quartz	14808-60-7	0.1-1.0	Not Available	Not Available

4. First-aid Measures

FIRST AID - EYE CONTACT: Immediately flush eyes with plenty of water for at least 15 minutes holding eyelids open. Get medical attention. Do NOT allow rubbing of eyes or keeping eyes closed.

FIRST AID - SKIN CONTACT: Wash skin with soap and water. Remove contaminated clothing. Get medical attention if irritation develops or persists.

FIRST AID - INHALATION: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get immediate medical attention. Do NOT use mouth-to-mouth resuscitation. If you experience difficulty in breathing, leave the area to obtain fresh air. If continued difficulty is experienced, get medical assistance immediately.

FIRST AID - INGESTION: Aspiration hazard: Do not induce vomiting or give anything by mouth because this material can enter the lungs and cause severe lung damage. Get immediate medical attention. If swallowed, get medical attention.

5. Fire-fighting Measures

EXTINGUISHING MEDIA: Alcohol Film Forming Foam, Carbon Dioxide, Dry Chemical, Dry Sand, Water Fog

UNUSUAL FIRE AND EXPLOSION HAZARDS: FLASH POINT IS LESS THAN 20°F. EXTREMELY FLAMMABLE LIQUID AND VAPOR!Water spray may be ineffective. Closed containers may explode when exposed to extreme heat due to buildup of steam. Closed containers may explode when exposed to extreme heat. Vapors may form explosive mixtures with air. Vapors can travel to a source of ignition and flash back. Keep containers tightly closed. Isolate from heat, electrical equipment, sparks and open flame. Perforation of the pressurized container may cause bursting of the can. No unusual fire or explosion hazards noted.

SPECIAL FIREFIGHTING PROCEDURES: Water may be used to cool closed containers to prevent pressure buildup and possible autoignition or explosion. Full protective equipment including self-contained breathing apparatus should be used. Evacuate area and fight fire from a safe distance. Use water spray to keep fire-exposed containers cool. Containers may explode when heated.

6. Accidental Release Measures

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED: Contain spilled liquid with sand or earth. DO NOT use combustible materials such as sawdust. Isolate the hazard area and deny entry to unnecessary and unprotected personnel. Remove all sources of ignition, ventilate area and remove with inert absorbent and non-sparking tools. Dispose of according to local, state (provincial) and federal regulations. Do not incinerate closed containers. Ventilate area, isolate spilled material, and remove with inert absorbent. Dispose of contaminated absorbent, container, and unused contents in accordance with local, state, and federal regulations.

7. Handling and Storage

HANDLING: Wash thoroughly after handling. Wash hands before eating. Remove contaminated clothing and launder before reuse. Use only in a well-ventilated area. Use only with adequate ventilation. Follow all MSDS/label precautions even after container is emptied because it may retain product residues. Avoid breathing fumes, vapors, or mist. Avoid contact with eyes, skin and clothing.

STORAGE: Store in a dry, well ventilated place. Keep container tightly closed when not in use. Keep containers tightly closed. Isolate from heat, electrical equipment, sparks and open flame. Contents under pressure. Do not store above 120 ° F. Store large quantities in buildings designed and protected for storage of flammable aerosols. Keep away from heat, sparks, flame and sources of ignition. Contents under pressure. Do not expose to heat or store above 120 ° F. Avoid excess heat. Product should be stored in tightly sealed containers and protected from heat, moisture, and foreign materials.

8. Exposure Controls/Personal Protection

Chemical Name	CAS-No.	Weight % Less Than	ACGIH TLV-TWA	ACGIH TLV-STEL	OSHA PEL-TWA	OSHA PEL-CEILING
Propane	74-98-6	20.0	N.E.	N.E.	1000 ppm	N.E.
Naphtha, Petroleum, Hydrotreated Light	64742-49-0	10.0	N.E.	N.E.	N.E.	N.E.
n-Butane	106-97-8	10.0	N.E.	1000 ppm	N.E.	N.E.
Hydrotreated Light Distillate	64742-47-8	10.0	N.E.	N.E.	N.E.	N.E.
Xylenes (o-, m-, p- isomers)	1330-20-7	5.0	100 ppm	150 ppm	100 ppm	N.E.
Barium Sulfate	7727-43-7	5.0	5 mg/m3	N.E.	15 mg/m3	N.E.
Ethylbenzene	100-41-4	5.0	20 ppm	N.E.	100 ppm	N.E.
Stoddard Solvent	8052-41-3	1.0	100 ppm	N.E.	500 ppm	N.E.
Pigment Orange 13	3520-72-7	1.0	N.E.	N.E.	N.E.	N.E.
Crystalline Silica / Quartz	14808-60-7	1.0	0.025 mg/m3	N.E.	50 µg/m3	N.E.

PERSONAL PROTECTION

ENGINEERING CONTROLS: Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits. Use explosion-proof ventilation equipment. Provide general dilution of local exhaust ventilation in volume and pattern to keep TLV of hazardous ingredients below acceptable limits. Prevent build-up of vapors by opening all doors and windows to achieve cross-ventilation.

RESPIRATORY PROTECTION: A respiratory protection program that meets OSHA 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant a respirator's use. A NIOSH/MSHA approved air purifying respirator with organic vapor cartridge or canister may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits.

SKIN PROTECTION: Use gloves to prevent prolonged skin contact. Use impervious gloves to prevent skin contact and absorption of this material through the skin. Nitrile or Neoprene gloves may afford adequate skin protection.

EYE PROTECTION: Use safety eyewear designed to protect against splash of liquids.

OTHER PROTECTIVE EQUIPMENT: Refer to safety supervisor or industrial hygienist for further guidance regarding types of personal protective equipment and their applications. Refer to safety supervisor or industrial hygienist for further information regarding personal protective equipment and its application.

HYGIENIC PRACTICES: Wash thoroughly with soap and water before eating, drinking or smoking. Remove contaminated clothing immediately and launder before reuse.

9. Physical and Chemical Properties

Appearance:	Aerosolized Mist	**Physical State:**	Liquid
Odor:	Solvent Like	**Odor Threshold:**	N.E.
Relative Density:	0.857	**pH:**	N.A.
Freeze Point, °C:	N.D.	**Viscosity:**	N.D.
Solubility in Water:	Slight	**Partition Coefficient, n-octanol/water:**	N.D.
Decompostion Temp., °C:	N.D.		
Boiling Range, °C:	-37 - 537	**Explosive Limits, vol%:**	0.9 - 12.6
Flammability:	Supports Combustion	**Flash Point, °C:**	-96
Evaporation Rate:	Faster than Ether	**Auto-ignition Temp., °C:**	N.D.
Vapor Density:	Heavier than Air	**Vapor Pressure:**	N.D.

(See "Other information" Section for abbreviation legend)

10. Stability and Reactivity

CONDITIONS TO AVOID: Avoid temperatures above 120°F (49°C). Avoid contact with strong acid and strong bases. Avoid all possible sources of ignition.

INCOMPATIBILITY: Incompatible with strong oxidizing agents, strong acids and strong alkalies.

HAZARDOUS DECOMPOSITION: By open flame, carbon monoxide and carbon dioxide. When heated to decomposition, it emits acrid smoke and irritating fumes. Contains solvents which may form carbon monoxide, carbon dioxide, and formaldehyde.

HAZARDOUS POLYMERIZATION: Will not occur under normal conditions.

STABILITY: This product is stable under normal storage conditions.

11. Toxicological information

EFFECTS OF OVEREXPOSURE - EYE CONTACT: Causes Serious Eye Irritation

EFFECTS OF OVEREXPOSURE - SKIN CONTACT: Substance may cause slight skin irritation. May cause skin irritation. Allergic reactions are possible. Prolonged or repeated contact may cause skin irritation.

EFFECTS OF OVEREXPOSURE - INHALATION: Harmful if inhaled. High gas, vapor, mist or dust concentrations may be harmful if inhaled. Avoid breathing fumes, spray, vapors, or mist. High vapor concentrations are irritating to the eyes, nose, throat and lungs. Prolonged or excessive inhalation may cause respiratory tract irritation.

EFFECTS OF OVEREXPOSURE - INGESTION: Harmful if swallowed. Aspiration hazard if swallowed; can enter lungs and cause damage.

EFFECTS OF OVEREXPOSURE - CHRONIC HAZARDS: May cause central nervous system disorder (e.g., narcosis involving a loss of coordination, weakness, fatigue, mental confusion, and blurred vision) and/or damage. High concentrations may lead to central nervous system effects (drowsiness, dizziness, nausea, headaches, paralysis, and blurred vision) and/or damage. Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage. Overexposure to xylene in laboratory animals has been associated with liver abnormalities, kidney, lung, spleen, eye and blood damage as well as reproductive disorders. Effects in humans, due to chronic overexposure, have included liver, cardiac abnormalities and nervous system damage. IARC lists Ethylbenzene as a possible human carcinogen (group 2B).

PRIMARY ROUTE(S) OF ENTRY: Eye Contact, Ingestion, Inhalation, Skin Absorption, Skin Contact

ACUTE TOXICITY VALUES

The acute effects of this product have not been tested. Data on individual components are tabulated below:

CAS-No.	Chemical Name	Oral LD50	Dermal LD50	Vapor LC50
74-98-6	Propane	N.I.	N.I.	658 mg/L Rat
64742-49-0	Naphtha, Petroleum, Hydrotreated Light	>5000 mg/kg Rat	>3160 mg/kg Rabbit	>4951 mg/L Rat
106-97-8	n-Butane	N.I.	N.I.	658 mg/L Rat
64742-47-8	Hydrotreated Light Distillate	>5000 mg/kg Rat	>2000 mg/kg Rabbit	>5000 mg/L Rat
1330-20-7	Xylenes (o-, m-, p- isomers)	3500 mg/kg Rat	>4350 mg/kg Rabbit	29.08 mg/L Rat
100-41-4	Ethylbenzene	3500 mg/kg Rat	15400 mg/kg Rabbit	17.4 mg/L Rat
3520-72-7	Pigment Orange 13	>5000 mg/kg Rat	N.I.	N.I.
14808-60-7	Crystalline Silica / Quartz	5500 mg/kg Rat	5500	100 mg/L

N.I. - No Information

12. Ecological Information

ECOLOGICAL INFORMATION: Product is a mixture of listed components. Product is a mixture of listed components.

13. Disposal Information

DISPOSAL INFORMATION: Dispose of material in accordance to local, state, and federal regulations and ordinances. Do not allow to enter waterways, wastewater, soil, storm drains or sewer systems.

14. Transport Information

	Domestic (USDOT)	International (IMDG)	Air (IATA)	TDG (Canada)
UN Number:	N.A.	1950	1950	N.A.
Proper Shipping Name:	Paint Products in Limited Quantities	Aerosols	Aerosols	Paint Products in Limited Quantities
Hazard Class:	N.A.	2.1	2.1	N.A.
Packing Group:	N.A.	N.A.	N.A.	N.A.
Limited Quantity:	Yes	Yes	Yes	Yes

15. Regulatory Information

U.S. Federal Regulations:

CERCLA - SARA Hazard Category

This product has been reviewed according to the EPA 'Hazard Categories' promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

Fire Hazard, Pressure Hazard, Acute Health Hazard, Chronic Health Hazard

Sara Section 313:

This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendment and Reauthorization Act of 1986 and 40 CFR part 372:

Chemical Name	CAS-No.
Xylenes (o-, m-, p- isomers)	1330-20-7
Ethylbenzene	100-41-4

Toxic Substances Control Act:

This product contains the following chemical substances subject to the reporting requirements of TSCA 12(b) if exported from the United States:

Chemical Name	CAS-No.
Castor oil, sulfated, sodium salt	68187-76-8

16. Other Information

HMIS RATINGS

Health:	2*	**Flammability:**	4	**Physical Hazard:**	0	**Personal Protection:**	X

NFPA RATINGS

Health:	2	**Flammability:**	4	**Instability**	0

VOLATILE ORGANIC COMPOUNDS, g/L: 551

SDS REVISION DATE: 5/12/2017

REASON FOR REVISION:
Product Composition Changed
Substance and/or Product Properties Changed in Section(s):
02 - Hazard Identification
05 - Fire-fighting Measures
16 - Other Information
Statement(s) Changed

Legend: N.A. - Not Applicable, N.E. - Not Established, N.D. - Not Determined

Rust-Oleum Corporation believes, to the best of its knowledge, information and belief, the information contained herein to be accurate and reliable as of the date of this safety data sheet. However, because the conditions of handling, use, and storage of these materials are beyond our control, we assume no responsibility or liability for personal injury or property damage incurred by the use of these materials. Rust-Oleum Corporation makes no warranty, expressed or implied, regarding the accuracy or reliability of the data or results obtained from their use. All materials may present unknown hazards and should be used with caution. The information and recommendations in this material safety data sheet are offered for the users' consideration and examination. It is the responsibility of the user to determine the final suitability of this information and to comply with all applicable international, federal, state, and local laws and regulations.

Safety Data Sheet

RUST-OLEUM CORPORATION
* Trusted Quality Since 1921 *
www.rustoleum.com

1. Identification

Product Name: PRO LSPR 6PK WB MARK WHITE

Revision Date: 5/18/2017

Product Identifier: 2592838

Supercedes Date: 4/28/2016

Product Use/Class: Marking Paint/Aerosols

Supplier: Rust-Oleum Corporation
11 Hawthorn Parkway
Vernon Hills, IL 60061
USA

Manufacturer: Rust-Oleum Corporation
11 Hawthorn Parkway
Vernon Hills, IL 60061
USA

Preparer: Regulatory Department

Emergency Telephone: 24 Hour Hotline: 847-367-7700

2. Hazard Identification

Classification

Symbol(s) of Product



Signal Word
Danger

Possible Hazards
27% of the mixture consists of ingredient(s) of unknown acute toxicity.

GHS HAZARD STATEMENTS

Flammable Liquid, category 1	H224	Extremely flammable liquid and vapour.
Carcinogenicity, category 2	H351	Suspected of causing cancer.
STOT, repeated exposure, category 2	H373	May cause damage to organs through prolonged or repeated exposure.

GHS LABEL PRECAUTIONARY STATEMENTS

P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P233	Keep container tightly closed.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P303+P361+P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P370+P378	In case of fire: Use alcohol film forming foam, carbon dioxide, dry chemical, dry sand to extinguish.
P403+P235	Store in a well-ventilated place. Keep cool.
P501	Dispose of contents/container in accordance with local, regional and national regulations.
P201	Obtain special instructions before use.
P308+P313	IF exposed or concerned: Get medical advice/attention.
P405	Store locked up.
P260	Do not breathe dust/fume/gas/mist/vapors/spray.
P314	Get medical advice/attention if you feel unwell.

GHS SDS PRECAUTIONARY STATEMENTS

P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical/ventilating/lighting/equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.

3. Composition/Information On Ingredients

HAZARDOUS SUBSTANCES

Chemical Name	CAS-No.	Wt.% Range	GHS Symbols	GHS Statements
Propane	74-98-6	10-25	GHS04	H280
Titanium Dioxide	13463-67-7	2.5-10	Not Available	Not Available
n-Butane	106-97-8	2.5-10	GHS04	H280
Naphtha, Petroleum, Hydrotreated Light	64742-49-0	2.5-10	GHS08	H304
Xylenes (o-, m-, p- isomers)	1330-20-7	2.5-10	GHS02-GHS07	H226-315-319-332
Talc (Hydrous Magnesium Silicate)	14807-96-6	1.0-2.5	Not Available	Not Available
n-Butyl Acetate	123-86-4	1.0-2.5	GHS02-GHS07	H226-336
Ethylbenzene	100-41-4	1.0-2.5	GHS02-GHS07-GHS08	H225-304-332-351-373

4. First-aid Measures

FIRST AID - EYE CONTACT: Immediately flush eyes with plenty of water for at least 15 minutes holding eyelids open. Get medical attention. Do NOT allow rubbing of eyes or keeping eyes closed.

FIRST AID - SKIN CONTACT: Wash skin with soap and water. Remove contaminated clothing. Get medical attention if irritation develops or persists.

FIRST AID - INHALATION: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get immediate medical attention. Do NOT use mouth-to-mouth resuscitation. If you experience difficulty in breathing, leave the area to obtain fresh air. If continued difficulty is experienced, get medical assistance immediately.

FIRST AID - INGESTION: Aspiration hazard: Do not induce vomiting or give anything by mouth because this material can enter the lungs and cause severe lung damage. Get immediate medical attention. If swallowed, get medical attention.

5. Fire-fighting Measures

EXTINGUISHING MEDIA: Alcohol Film Forming Foam, Carbon Dioxide, Dry Chemical, Dry Sand, Water Fog

UNUSUAL FIRE AND EXPLOSION HAZARDS: FLASH POINT IS LESS THAN 20°F. EXTREMELY FLAMMABLE LIQUID AND VAPOR!Water spray may be ineffective. Closed containers may explode when exposed to extreme heat due to buildup of steam. Closed containers may explode when exposed to extreme heat. Vapors may form explosive mixtures with air. Vapors can travel to a source of ignition and flash back. Isolate from heat, electrical equipment, sparks and open flame. Perforation of the pressurized container may cause bursting of the can. No unusual fire or explosion hazards noted. Keep containers tightly closed.

SPECIAL FIREFIGHTING PROCEDURES: Full protective equipment including self-contained breathing apparatus should be used. Evacuate area and fight fire from a safe distance. Water may be used to cool closed containers to prevent pressure buildup and possible autoignition or explosion. Use water spray to keep fire-exposed containers cool. Containers may explode when heated.

6. Accidental Release Measures

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED: Contain spilled liquid with sand or earth. DO NOT use combustible materials such as sawdust. Isolate the hazard area and deny entry to unnecessary and unprotected personnel. Remove all sources of ignition, ventilate area and remove with inert absorbent and non-sparking tools. Dispose of according to local, state (provincial) and federal regulations. Do not incinerate closed containers. Ventilate area, isolate spilled material, and remove with inert absorbent. Dispose of contaminated absorbent, container, and unused contents in accordance with local, state, and federal regulations.

7. Handling and Storage

HANDLING: Wash thoroughly after handling. Wash hands before eating. Remove contaminated clothing and launder before reuse. Use only with adequate ventilation. Follow all MSDS/label precautions even after container is emptied because it may retain product residues. Avoid breathing fumes, vapors, or mist. Avoid contact with eyes, skin and clothing.

STORAGE: Keep containers tightly closed. Isolate from heat, electrical equipment, sparks and open flame. Contents under pressure. Do not store above 120 ° F. Store large quantities in buildings designed and protected for storage of flammable aerosols. Product should be stored in tightly sealed containers and protected from heat, moisture, and foreign materials. Store in a dry, well ventilated place. Keep container tightly closed when not in use. Keep away from heat, sparks, flame and sources of ignition. Avoid excess heat.

8. Exposure Controls/Personal Protection

Chemical Name	CAS-No.	Weight % Less Than	ACGIH TLV-TWA	ACGIH TLV-STEL	OSHA PEL-TWA	OSHA PEL-CEILING
Propane	74-98-6	20.0	N.E.	N.E.	1000 ppm	N.E.
Titanium Dioxide	13463-67-7	10.0	10 mg/m3	N.E.	15 mg/m3	N.E.
n-Butane	106-97-8	10.0	N.E.	1000 ppm	N.E.	N.E.
Naphtha, Petroleum, Hydrotreated Light	64742-49-0	10.0	N.E.	N.E.	N.E.	N.E.
Xylenes (o-, m-, p- isomers)	1330-20-7	10.0	100 ppm	150 ppm	100 ppm	N.E.
Talc (Hydrous Magnesium Silicate)	14807-96-6	5.0	2 mg/m3	N.E.	N.E.	N.E.
n-Butyl Acetate	123-86-4	5.0	50 ppm	150 ppm	150 ppm	N.E.
Ethylbenzene	100-41-4	5.0	20 ppm	N.E.	100 ppm	N.E.

PERSONAL PROTECTION

ENGINEERING CONTROLS: Use explosion-proof ventilation equipment. Provide general dilution of local exhaust ventilation in volume and pattern to keep TLV of hazardous ingredients below acceptable limits. Prevent build-up of vapors by opening all doors and windows to achieve cross-ventilation. Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits.

RESPIRATORY PROTECTION: A respiratory protection program that meets OSHA 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant a respirator's use. A NIOSH/MSHA approved air purifying respirator with organic vapor cartridge or canister may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits.

SKIN PROTECTION: Use gloves to prevent prolonged skin contact. Nitrile or Neoprene gloves may afford adequate skin protection.

EYE PROTECTION: Use safety eyewear designed to protect against splash of liquids.

OTHER PROTECTIVE EQUIPMENT: Refer to safety supervisor or industrial hygienist for further guidance regarding types of personal protective equipment and their applications.

HYGIENIC PRACTICES: Wash thoroughly with soap and water before eating, drinking or smoking. Remove contaminated clothing immediately and launder before reuse.

9. Physical and Chemical Properties

Appearance:	Liquid	**Physical State:**	Liquid
Odor:	Solvent Like	**Odor Threshold:**	N.E.
Relative Density:	0.882	**pH:**	NE
Freeze Point, °C:	ND	**Viscosity:**	N.D.
Solubility in Water:	No Information	**Partition Coefficient, n-octanol/ water:**	N.D.
Decompostion Temp., °C:	N.D.		
Boiling Range, °C:	-37 - 537	**Explosive Limits, vol%:**	0.9 - 12.6
Flammability:	Supports Combustion	**Flash Point, °C:**	-96
Evaporation Rate:	Faster than Ether	**Auto-ignition Temp., °C:**	N.D.
Vapor Density:	No Information	**Vapor Pressure:**	N.D.

(See "Other information" Section for abbreviation legend)

10. Stability and Reactivity

CONDITIONS TO AVOID: Avoid temperatures above 120°F (49°C). Avoid all possible sources of ignition. Avoid contact with strong acid and strong bases.

INCOMPATIBILITY: Incompatible with strong oxidizing agents, strong acids and strong alkalies.

HAZARDOUS DECOMPOSITION: By open flame, carbon monoxide and carbon dioxide. When heated to decomposition, it emits acrid smoke and irritating fumes. Contains solvents which may form carbon monoxide, carbon dioxide, and formaldehyde.

HAZARDOUS POLYMERIZATION: Will not occur under normal conditions.

STABILITY: This product is stable under normal storage conditions.

11. Toxicological information

EFFECTS OF OVEREXPOSURE - EYE CONTACT: Causes Serious Eye Irritation

EFFECTS OF OVEREXPOSURE - SKIN CONTACT: May cause skin irritation. Allergic reactions are possible.

EFFECTS OF OVEREXPOSURE - INHALATION: High gas, vapor, mist or dust concentrations may be harmful if inhaled. High vapor concentrations are irritating to the eyes, nose, throat and lungs. Harmful if inhaled. Avoid breathing fumes, spray, vapors, or mist. Prolonged or excessive inhalation may cause respiratory tract irritation.

EFFECTS OF OVEREXPOSURE - INGESTION: Harmful if swallowed.

EFFECTS OF OVEREXPOSURE - CHRONIC HAZARDS: Overexposure to xylene in laboratory animals has been associated with liver abnormalities, kidney, lung, spleen, eye and blood damage as well as reproductive disorders. Effects in humans, due to chronic overexposure, have included liver, cardiac abnormalities and nervous system damage. IARC lists Ethylbenzene as a possible human carcinogen (group 2B). Contains Titanium Dioxide. Titanium Dioxide is listed as a Group 2B-"Possibly carcinogenic to humans" by IARC. No significant exposure to Titanium Dioxide is thought to occur during the use of products in which Titanium Dioxide is bound to other materials, such as in paints during brush application or drying. Risk of overexposure depends on duration and level of exposure to dust from repeated sanding of surfaces or spray mist and the actual concentration of Titanium Dioxide in the formula. (Ref: IARC Monograph, Vol. 93, 2010)May cause central nervous system disorder (e.g., narcosis involving a loss of coordination, weakness, fatigue, mental confusion, and blurred vision) and/or damage. Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage. High concentrations may lead to central nervous system effects (drowsiness, dizziness, nausea, headaches, paralysis, and blurred vision) and/or damage.

PRIMARY ROUTE(S) OF ENTRY: Eye Contact, Ingestion, Inhalation, Skin Absorption, Skin Contact

ACUTE TOXICITY VALUES

The acute effects of this product have not been tested. Data on individual components are tabulated below:

CAS-No.	Chemical Name	Oral LD50	Dermal LD50	Vapor LC50
74-98-6	Propane	N.I.	N.I.	658 mg/L Rat
13463-67-7	Titanium Dioxide	>10000 mg/kg Rat	2500 mg/kg	N.I.
106-97-8	n-Butane	N.I.	N.I.	658 mg/L Rat
64742-49-0	Naphtha, Petroleum, Hydrotreated Light	>5000 mg/kg Rat	>3160 mg/kg Rabbit	>4951 mg/L Rat
1330-20-7	Xylenes (o-, m-, p- isomers)	3500 mg/kg Rat	>4350 mg/kg Rabbit	29.08 mg/L Rat
14807-96-6	Talc (Hydrous Magnesium Silicate)	6000	N.I.	30
123-86-4	n-Butyl Acetate	10768 mg/kg Rat	>17600 mg/kg Rabbit	> 21 mg/L Rat
100-41-4	Ethylbenzene	3500 mg/kg Rat	15400 mg/kg Rabbit	17.4 mg/L Rat

N.I. - No Information

12. Ecological Information

ECOLOGICAL INFORMATION: Product is a mixture of listed components.

13. Disposal Information

DISPOSAL INFORMATION: Dispose of material in accordance to local, state, and federal regulations and ordinances. Do not allow to enter waterways, wastewater, soil, storm drains or sewer systems.

14. Transport Information

	Domestic (USDOT)	International (IMDG)	Air (IATA)	TDG (Canada)
UN Number:	N.A.	1950	1950	N.A.
Proper Shipping Name:	Paint Products in Limited Quantities	Aerosols	Aerosols	Paint Products in Limited Quantities
Hazard Class:	N.A.	2.1	2.1	N.A.
Packing Group:	N.A.	N.A.	N.A.	N.A.
Limited Quantity:	Yes	Yes	Yes	Yes

15. Regulatory Information

U.S. Federal Regulations:

CERCLA - SARA Hazard Category

This product has been reviewed according to the EPA 'Hazard Categories' promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

Fire Hazard, Pressure Hazard, Acute Health Hazard, Chronic Health Hazard

Sara Section 313:

This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendment and Reauthorization Act of 1986 and 40 CFR part 372:

Chemical Name	CAS-No.
Xylenes (o-, m-, p- isomers)	1330-20-7
Ethylbenzene	100-41-4

Toxic Substances Control Act:

This product contains the following chemical substances subject to the reporting requirements of TSCA 12(b) if exported from the United States:

Chemical Name	CAS-No.
Castor oil, sulfated, sodium salt	68187-76-8

16. Other Information

HMIS RATINGS

Health:	No Information	**Flammability:**	4	**Physical Hazard:**	No Information	**Personal Protection:**	No Information

NFPA RATINGS

Health:	N.E.	**Flammability:**	4	**Instability**	0

VOLATILE ORGANIC COMPOUNDS, g/L: 531

SDS REVISION DATE: 5/18/2017

REASON FOR REVISION:

Regulatory Formula Source Changed
Product Composition Changed
Substance and/or Product Properties Changed in Section(s):
02 - Hazard Identification
05 - Fire-fighting Measures
09 - Physical & Chemical Properties
16 - Other Information
Statement(s) Changed

Legend: N.A. - Not Applicable, N.E. - Not Established, N.D. - Not Determined

Rust-Oleum Corporation believes, to the best of its knowledge, information and belief, the information contained herein to be accurate and reliable as of the date of this safety data sheet. However, because the conditions of handling, use, and storage of these materials are beyond our control, we assume no responsibility or liability for personal injury or property damage incurred by the use of these materials. Rust-Oleum Corporation makes no warranty, expressed or implied, regarding the accuracy or reliability of the data or results obtained from their use. All materials may present unknown hazards and should be used with caution. The information and recommendations in this material safety data sheet are offered for the users' consideration and examination. It is the responsibility of the user to determine the final suitability of this information and to comply with all applicable international, federal, state, and local laws and regulations.

Attachment D
H&S Standards

Implementation Date 26 March 2007	Arcadis HS Standard Name Cadmium	ARCADIS
Revision Date 04 August 2016	Arcadis HS Standard No. ARC HSIH006	Revision Number 05

EXECUTIVE SUMMARY

It is the policy of Arcadis to prevent or minimize all occupational exposure to cadmium and cadmium compounds, in all forms, through the use of engineering and administrative controls, and personal protective equipment (PPE).

Cadmium can be encountered at Arcadis project sites as a contaminant in environmental media. It can be encountered in the air at sites where dusts containing cadmium are present. It can also be encountered at mining and smelting operations, manufacturing facilities, chemical production facilities and other types of industrial sites.

The following personal exposure limits are established for cadmium by inhalation:

- OSHA ACTION LEVEL
    - Time Weighted Average (TWA) - 2.5 micrograms per cubic meter of air (µg/m^3) cadmium in air averaged over an 8 hour period
- OSHA PERMISSIBLE EXPOSURE LEVELS (PELs)
    - TWA - 5 µg/m^3 cadmium in air averaged over an 8 hour period.
- ACGIH THRESHOLD LIMIT VALUES (TLVs)
    - TWA – 10 µg/m^3 cadmium in air averaged over an 8 hour period
    - TWA – 2 µg/m^3 cadmium-in-air averaged over an 8 hour period for the respirable fraction which are those particles that enter deep into the lung where gas exchange takes place. Consult the ACGIH TLV Guide Book for additional information.

Representative personal exposure monitoring is required for each type of operation involving the handling of or potential exposure to cadmium. Initial cadmium awareness training is required for all employees assigned to a work area suspected or known to contain cadmium. Annual cadmium awareness training is required for all employees actually or potentially exposed to cadmium above the OSHA Action Level.

Initial and Annual Medical Surveillance is required if:

- If employee personal exposures are reasonably expected to exceed the Action Level on at least 30 calendar days per year.
- If work is to be conducted where cadmium concentrations are reasonably expected to exceed the PEL.
- All air monitoring and personal exposure monitoring records records shall be kept for 30 years.

1. POLICY

Arcadis understands the hazards of personal exposure to cadmium, and will implement the appropriate controls to minimize or eliminate the hazards of cadmium. These controls will focus first on engineering controls to mitigate cadmium hazards where appropriate and practical. Administrative controls may also be implemented as appropriate and practical. Where it is not appropriate or practical to implement engineering and administrative controls, personal protective equipment (PPE) will be implemented to control cadmium hazards below known occupational exposure limits.

2. PURPOSE AND SCOPE

2.1 Purpose

2.1.1 Exposure to Cadmium

This policy and associated standards provides information to protect Arcadis employees, subcontractors, and other affected personnel from exposures to cadmium while conducting work on Arcadis projects.

2.1.2 OSHA Requirements

This policy meets the requirements of the U.S. Occupational Safety and Health Administration (OSHA) regulations including Title 29 Code of Federal Regulations (CFR) Part 1910.1027 and Part 1926.1127.

2.2 Scope

This policy and the associated standards apply to all projects where cadmium is known or thought to be present, and where Arcadis employees, subcontractors and other affected personnel are or could be exposed to cadmium above the Action Level.

3. DEFINITIONS

Definitions related to this Cadmium Standard can be found in Exhibit 1.

4. RESPONSIBILITIES

4.1 Project Managers

Project Managers are responsible, as part of the project hazard assessment, for determining if cadmium is or is potentially present on a project site. In addition, the Project Manager is responsible for determining client requirements with respect to the control of cadmium hazards. Project Managers notify health and safety staff when working on sites containing cadmium. Project Managers are also responsible for ensuring that project staff has the appropriate and applicable training for cadmium prior to those staff beginning work. Project Managers are responsible for maintaining exposure monitoring records for a minimum of 30 years and submitting to Corporate Health and Safety, as required by the Industrial Hygiene H&S Standard (ARC HSIH009).

4.2 Corporate Health and Safety

Corporate Health and Safety is responsible for keeping this policy and standard up-to-date with current regulatory requirements and best practices. In addition, Corporate Health and Safety oversees the medical surveillance program for cadmium, as applicable and provides a cadmium training program for presentation to appropriate staff.

4.3 Project Health and Safety Staff

Project Health and Safety Staff including designated Writers and Reviewers of Project Health and Safety Plans (HASPs) are responsible for developing control processes and techniques on specific projects based on the levels of cadmium expected to be encountered on project facilities.

4.4 Project Personnel

Project personnel are responsible for reading and following all hazard control processes and airborne monitoring as required by the project HASP. If there is a reasonable potential that cadmium is present that was not previously identified or is at levels that are higher than expected, they should stop work and notify project health and safety staff and the project manager immediately and not proceed with the associated task until authorized.

4.5 Authorized Person

Any person authorized by Arcadis and required by work duties to be present in cadmium regulated areas. Authorized Personnel are responsible for completing cadmium awareness training prior to entering a regulated area, and for following all hazard control processes designated by the Project Manager, Project Health and Safety Staff, Competent Person and the project HASP. Authorized Personnel are also required to participate in the Medical Surveillance program when personal exposures are reasonably expected to exceed the Action Level on at least 30 calendar days per year.

4.6 Competent Person

Any person authorized by Arcadis who is capable of identifying existing and potential cadmium hazards in the workplace and the proper methods to control the hazard in order to protect workers. The Competent Person has the authority to take prompt corrective measures to eliminate or control such hazards. The duties of the Competent Person include at a mimumim:

- Determining prior to the performance of work whether cadmium is present in the workplace;
- Establishing, where necessary, regulated areas and assuring that access to and from those areas is limited to authorized employees;
- Assuring the adequacy of any employee exposure monitoring required by this standard;

- Assuring that all employees exposed to air cadmium levels above the PEL wear appropriate personal protective equipment and are trained in the use of appropriate methods of exposure control;

- Assuring that proper hygiene facilities are provided and that workers are trained to use those facilities; and

- Assuring that the engineering controls required by this standard are implemented, maintained in proper operating condition, and functioning properly.

The Competent Person is also required to participate in the Medical Surveillance program when personal exposures are reasonably expected to exceed the Action Level on at least 30 calendar days per year.

5. PROCEDURE

5.1 Cadmium Hazards

Cadmium can be encountered at Arcadis project sites as a contaminant in environmental media. It can be encountered in the air at sites where dusts containing cadmium are present. It can also be encountered at mining and smelting operations, manufacturing facilities, chemical production facilities and other types of industrial sites.

The health effects of cadmium are based on the type of exposure encountered by workers.

- Acute - Indicates that metal fume fever may result from acute exposure with flu-like symptoms of weakness, fever, headache, chills, sweating and muscular pain. Acute pulmonary edema usually develops within 24 hours and reaches a maximum by three days. If death from asphyxia does not occur, symptoms may resolve within a week.

- Chronic - Identifies the most serious consequence of chronic cadmium poisoning is cancer (lung and prostate). The first observed chronic effect is generally kidney damage, manifested by excretion of excessive (low molecular weight) protein in the urine. Cadmium also is believed to cause pulmonary emphysema and bone disease (osteomalcia and osteoporosis). The latter has been observed in Japan ("itai-itai" disease) where residents were exposed to cadmium in rice crops irrigated with cadmium-contaminated water. Cadmium may also cause anemia, teeth discoloration (Cd forms CdS) and loss of smell (anosmia).

5.2 Exposure Limits

The following personal exposure limits are established for cadmium by inhalation:

- OSHA ACTION LEVEL
    - Time Weighted Average (TWA) - 2.5 micrograms per cubic meter of air ($\mu g/m^3$) cadmium in air averaged over an 8 hour period.

- OSHA PERMISSIBLE EXPOSURE LEVELS (PELs)
    - TWA - 5 µg/m3 cadmium in air averaged over an 8 hour period.
- ACGIH THRESHOLD LIMIT VALUES (TLVs)
    - TWA – 10 µg/m3 cadmium in air averaged over an 8 hour period.
    - TWA – 2 µg/m3 cadmium-in-air averaged over an 8 hour period for the respirable fraction which, are those particles that enter deep into the lung where gas exchange takes place.

Personal exposures shall be measured over the exposure period in the breathing zone of the employee. Personal exposures should not be determined by area sampling.

5.3 Exposure Air Monitoring

Representative personal exposure monitoring is required for each type of operation involving the handling of or potential exposure to cadmium. Additionally exposure monitoring is required whenever there has been a change in the raw materials, equipment, personnel, work practices, or finished products that may result in additional employees being exposed to cadmium at or above the action level or in employees already exposed to cadmium at or above the action being exposed above the PEL or whenever the competent person has any reason to suspect that any other change might result in such further exposure.

Personal exposure monitoring shall utilize standard industrial hygiene sampling techniques and recordkeeping as required in Arcadis Industrial Hygiene H&S Standard – ARC HSIH009. Personal TWA monitoring can be used for extended tasks, such as soil and sediment sampling, working on mine sites where cadmium is present, working in manufacturing facilities where cadmium is present, or where clients require monitoring. Area sampling can be used to determine regulated areas.

5.3.1 Initial Monitoring

- Initial monitoring is required when there is the potential for an employee to be exposed to cadmium at or above the action level or PEL. The initial motoring shall be conducted as soon as practicable and must be representative of the exposure for each employee in the workplace.
- Initial monitoring is required when an employee periodically performs tasks that may expose the employee to a higher concentration of airborne cadmium.
- Initial monitoring can be omitted if there is documented objective data or industrial hygiene calculations to demonstrate that exposures are below the action level. A written record of this determination must be made and shall include the monitoring date, the date of determination, and the name of each employee.

5.3.2 Periodic Monitoring

- Periodic Monitoring is required if initial or periodic monitoring demonstrates exposures exceed the Action Level or PEL.

- Periodic Monitoring shall be conducted at least semiannually or as needed to represent the levels of exposure of employees until at least two consecutive exposure determinations (no less than 7 days apart) indicate the employee exposure is below the OSHA Action Level.

5.3.3 Exposure Air Monitoring Notification

Employees who have been monitored for cadmium exposure shall be notified of the monitoring results within 15 working days (or 5 working days if work is being performed under Part 1926.1127) of receipt of these results. If the PEL is exceeded, the notification must indicate the follow-up plans or corrective actions to be taken to reduce exposures to below the PEL.

5.4 Actions for Employee Exposures Greater Than or Equal to the OSHA Action Level but Less Than the PEL

- Medical Surveillance – Initial and annual medical exams (Section 5.8) are required if employee personal exposures do or can be reasonably expected to exceed the Action Level on at least 30 calendar days during the coming year.

- Training – Annual cadmium awareness training is required (Section 6).

- Exposure Air Monitoring (Section 5.3)

5.5 Actions for Employee Exposures Greater Than OSHA PEL

- Areas that have air monitoring results exceeding the OSHA PEL must have a delineated regulated area as defined in Section 5.6.

- Medical Surveillance – Initial and annual medical exams (Section 5.8) are required if employee personal exposures do or can be reasonably expected to exceed the PEL.

- Training – Annual cadmium awareness training is required (Section 6).

- Written Program – (Section 5.7.1)

- At a minimum, a half-face air-purifying respirator equipped with HEPA filters shall be used in all regulated areas. Respirators shall be worn, maintained and managed in accordance with the OSHA Respiratory Protection Standard (29 CFR 1910.134) and Arcadis HSS ARC HSGE017 – Respiratory Protection. In addition, client requirements will be followed.

- Exposure Air Monitoring (Section 5.3)

5.6 Requirements for Regulated Areas

Regulated areas will be established by the Competent Person wherever an employee's exposure to airborne concentrations of cadmium is or can reasonably be expected to be in excess of the PEL. Access to the regulated area shall be limited to authorized persons only. Respirators shall be worn by all personnel when in a regulated area, regardless of the time period or over-all personal exposure measurement.

Eating, drinking, smoking, chewing any item, or applying cosmetics is strictly prohibited in a regulated area. Additionally the carrying of the products associated with these activates or storing of such products in into regulated areas is strictly prohibited.

Access to regulated areas shall be restricted by barricades, barricade tape, painted demarcations, or other devices. A sign shall be posted at the access to the regulated area with the warning:

DANGER

CADMIUM

MAY CAUSE CANCER

CAUSES DAMAGE TO LUNGS AND KIDNEYS

WEAR RESPIRATORY PROTECTION IN THIS AREA

AUTHORIZED PERSONNEL ONLY

(Minimum lettering height: "DANGER CADMIUM" must be 4-inches; other text must be 3-inches.")

5.6.1 Labeling

In addition to appropriate Hazard Communication labeling, containers or equipment containing cadmium or cadmium compounds must also be labeled as such:

DANGER

CONTAINS CADMIUM

MAY CAUSE CANCER

CAUSES DAMAGE TO LUNGS AND KIDNEYS

AVOID CREATING DUST

5.7 Exposure Reduction

5.7.1 Written Program

A written program is required when exposure to airborne concentrations of cadmium is or can reasonably be expected to be in excess of the PEL or a substantial release of airborne cadmium is possible. The written plan will detail procedures on how to reduce exposure below the PEL. The written plan will be included in the site-specific HASP, which will be reviewed at least annually in accordance with Arcadis HSS ARC HSFS010 – Health and Safety Plan H&S Standard. The written program must include:

- The locations and operations of potential cadmium exposure
  - Identify regulated areas/tasks and the operations where cadmium may be encountered
- Means to achieve compliance
  - List the corrective actions that will be taken to reduce employee exposure to concentrations less than the OSHA Action Level
  - Engineering controls
  - Revised work practices (employee rotation to reduce exposure is strictly prohibited)
  - Written respiratory protection program
  - Protective clothing
- Available air monitoring data or industrial hygiene exposure assessment (i.e. exposure assessment calculations or air monitoring data) of airborne concentrations
- Schedule for implementing control procedures
- Exposure control processes

- Medical surveillance requirements
- Training requirements
- Emergency Situation
    - An emergency is any occurrence which may result in an unexpected release of cadmium or cadmium-containing compounds that may result in worker exposure to concentrations equal to or greater than the OSHA Action Level.
    - During the emergency the competent person will designate the restricted area and remove all non-essential employees to the cleanup efforts. Additional PPE including respiratory protection and protective clothing will be listed in the written plan.
    - After an emergency, exposure monitoring must be conducted to assure the ambient cadmium levels are back to normal; and conduct initial monitoring for affected employee(s).

5.7.2 Ventilation Systems

Where appropriate, ventilation systems will be utilized to control the level of airborne cadmium. Measurements (Duct & Capture Velocity, Static Pressure) will be routinely collected to demonstrate the effectiveness of the ventilation system. These ventilation systems will be equipped with HEPA filtration and be maintained to ensure effective collection of the cadmium particulates. Personnel who maintain these systems and change the filters will be appropriately protected per this HSS to minimize exposure.

5.7.3 Personal Hygiene & House Keeping

Where cadmium is present at any concentration, project personnel handling such media contaminated with cadmium will wear gloves to minimize exposure of cadmium to the skin that can then be transferred to the mouth. In all areas where cadmium is present, personnel will routinely and thoroughly wash their hands and face before leaving the area to eat, drink, smoke, chew or apply cosmetics. In situations as indicated in the project HASP, PPE will be worn to protect the skin from exposure. However, even where PPE is worn, hand and face washing is required.

To further reduce the contact with cadmium the following steps should be taken:

- All surfaces shall be maintained as free as practicable of accumulations of cadmium.
- All spills and sudden releases of material containing cadmium shall be cleaned up as soon as possible.
- Surfaces impacted with cadmium shall, wherever possible, be cleaned by vacuuming or other methods that minimize the likelihood of cadmium becoming airborne.

- HEPA-filtered vacuuming equipment or equally effective filtration methods shall be used for vacuuming. The equipment shall be used and emptied in a manner that minimizes the reentry of cadmium into the workplace.
- Shoveling, dry or wet sweeping, and brushing may be used only where vacuuming or other methods that minimize the likelihood of cadmium becoming airborne have been tried and found not to be effective.
- Compressed air shall not be used to remove cadmium from any surface unless the compressed air is used in conjunction with a ventilation system designed to capture the dust cloud created by the compressed air.
- Waste, scrap, debris, bags, containers, personal protective equipment, and clothing contaminated with cadmium and consigned for disposal shall be collected and disposed of in sealed impermeable bags or other closed, impermeable containers. These bags and containers shall be labeled in accordance with Section 5.6.1.

Where cadmium is present above the OSHA PEL, clean changing rooms, handwashing facilities, showers and lunchroom facilities will be required in accordance with 1910.1027(j) and 1926.1127(j).

5.7.4 Personal Protective Equipment below the OSHA Action Level

Additional protective clothing will be worn when employees are exposed to cadmium when concentrations of cadmium are below the OSHA Action Level and will include at a minimum:

- Coveralls or similar full-body work clothing
- Gloves
- Head covering
- Boots and boot covers
- Face shield (depending on operation)
- Goggles

5.7.5 Personal Protective Equipment equal to or greater than the OSHA Action Level

In addition to the PPE listed in Section 5.7.4, a minimum half-face air-purifying respirator equipped with HEPA filters shall be worn in all regulated areas. A written Respiratory Protection Plan (Level C Supplement) is required in accordance with the Arcadis Health & Safety Plan H&S Standard (ARC HSFS010). In addition, respirators shall be worn, maintained and managed in accordance with the Arcadis HSS ARC HSGE017 – Respiratory Protection. Client requirements on project sites will also be followed.

The Competent Person will verify that all Authorized Employees are wearing the appropriate PPE in regulated areas.

5.8 Medical Surveillance Program

Initial medical surveillance is required:

- If employee personal exposures are reasonably expected to exceed the OSHA Action Level on at least 30 calendar days per year; or
- If employee personal exposures are reasonably expected to exceed the OSHA PEL on a least 10 calendar days per year.

Periodic exams are required on an annual basis for employees who continue to meet the criteria listed above. Annual exams may be discontinued after the exam conducted the year after personal exposures fall below the limits stated above in this section.

Specific medical exam requirements are explained in Arcadis HSS ARC HSGE010 - Medical Surveillance.

- Any occupational exposure or biological monitoring required to be conducted by a project team that is not included the established exam protocols (e.g. project specific testing of employees for cadmium) needs to be discussed with the Corporate H&S Medical Surveillance Program Administrator and/or a third party administrator (TPA) occupational health physician (currently WorkCare), prior to scheduling an exam appointment.
- Any project specific occupational exposure monitoring program deemed to be necessary will be charged back to the client. Project teams are to provide WorkCare with the appropriate charge number at the time of implementing the monitoring.

The occupational health physician must be supplied a copy of the applicable OSHA cadmium regulation (29 CFR 1910.1027 or 29 CFR 1926.1127) and a description of the employee's cadmium exposure.

For employees potentially exposed or exposed to cadmium, the employee or another Arcadis person will immediately call the TPA's Incident Intervention Program Hotline (WorkCare - **1-888-449-7787**) and follow all instructions for treatment and exposure testing.

6. TRAINING

Initial cadmium awareness training is required for all employees assigned to a work area suspected or known to contain cadmium. This training can be accomplished at the project orientation prior to the initiation of site work.

Annual cadmium training is required at a minimum for all employees actually or potentially exposed to greater than the Action Level.

Initial and annual training shall consist of:

- The operations that involve cadmium exposure.
- The methods/observations that can be used to detect the presence or release of cadmium
- The physical and health hazards of cadmium.
- Methods used to protect against the hazards of cadmium including PPE and respiratory protection.
- The proper use of personal protective equipment in emergency situations.
- The meaning of a regulated area and how such are demarcated.
- A review of the applicable standard and where copies can be found.
- An explanation of the medical surveillance program and an employee's right to access medical and exposure records.

7. REFERENCES (regulation citation, technical links, publications, etc.)

OSHA 29 CFR 1910.1027 – Cadmium

OSHA 29 CFR 1926.1127 – Cadmium

Arcadis Medical Surveillance H&S Standard – ARC HSGE010

Arcadis Respiratory Protection H&S Standard – ARC HSGE017

Arcadis Industrial Hygiene H&S Standard – ARC HSIH009

Arcadis Health and Safety Plan H&S Standard - ARC HSFS010

8. RECORDS - DATA RECORDING AND MANAGEMENT

All exposure, medical, and training records shall be kept for 30 years. These records are maintained by WorkCare on behalf of Arcadis.

Training records are maintained by the Arcadis HR Solutions Center.

All exposure and medical records shall be made available to appropriate regulatory agencies upon written request.

Employees who have been monitored for cadmium exposure shall be notified of the monitoring results within 15 working days (or 5 working days if work is being performed under Part 1926.1127) of receipt of these results; a written request is not required. Refer to the Arcadis

Industrial Hygiene HSS (ARC HSIH009) for information on communicating results of personal exposure monitoring.

9. APPROVALS AND HISTORY OF CHANGE

Julie Santaniello, CSP - Corporate H&S, Manager of Technical Programs



History of Change

Revision Date	Revision Number	Standard Developed/Reviewed By or Revised By	Reason for change
26 March 2007	01	Mike Thomas/Tony Tremblay-	Original document
6 September 2007	02	Camille Carollo/Tony Tremblay	Changing over to new template format
26 February 2008	03	Camille Carollo/Tony Tremblay	Template Change
19 December 2013	04	Grant Sprick/Tony Tremblay	Executive Summary Added; Clarified respirator selection and specified training and other actions are triggered from OSHA Action Level and PEL
28 July 2016	05	Alec MacAdam / Andrew McDonald / Julie Santaniello	Update template and reordered sections. Update referenced H&S Standards. Add ARC HSIH009 – Industrial Hygiene HSS guidance and reference. Add Authorized Person and Competent Person to Section 4.0 and Exhibit 1. Update sign and label text in Section 5.6. Expand Personal Hygiene and Housekeeping requirements in Section 5.7.3. Update Section 5.8 to include project specific screening requirements and billings.

Exhibit 1 – DEFINITIONS

Action Level is the airborne concentration established by OSHA that triggers certain regulatory requirements (2.5 micrograms per cubic meter of air ($\mu g/m^3$) cadmium in air 8-hour time weighted average).

Authorized person means any person authorized by Arcadis and required by work duties to be present in cadmium regulated areas.

Cadmium is a natural element in the earth's crust. It is usually found as a mineral combined with other elements such as oxygen (cadmium oxide), chlorine (cadmium chloride), or sulfur (cadmium sulfate, cadmium sulfide).

All soils and rocks, including coal and mineral fertilizers, contain some cadmium. Most cadmium used in the United States is extracted during the production of other metals like zinc, lead, and copper. Cadmium does not corrode easily and has many uses, including batteries, pigments, metal coatings, and plastics.

Cadmium is encountered on Arcadis projects as a contaminant in soils, ground and surface water, sediments, and other environmental media. It can also be encountered through the air where dusts containing cadmium are present. Personnel may also encounter cadmium in other forms at certain client facilities at which Arcadis works. It can be encountered at mining and smelting operations, battery manufacturing facilities, chemical production facilities where metal coatings or plastics are manufactured and other types of industrial sites.

Competent person - one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has the authorization to take prompt corrective measures to eliminate them.

High-Efficiency Particulate Air [HEPA] filter means a filter capable of trapping and retaining at least 99.97 percent of mono-dispersed particles of 0.3 micrometers in diameter.

Objective Data is information demonstrating that a particular product or material containing cadmium or a specific process, operation, or activity involving cadmium cannot release dust or fumes in concentrations at or above the action level even under the worst-case release conditions. Objective data can be obtained from an industry-wide study or from laboratory product test results from manufacturers of cadmium-containing products or materials. The data the used from an industry-wide survey must be obtained under workplace conditions closely resembling the processes, types of material, control methods, work practices and environmental conditions in the employer's current operations.

Permissible Exposure Limit (PEL) is an average airborne concentration regulatory limit established by OSHA above which requires control to protect people from adverse health effects (5 $\mu g/m^3$ cadmium in air averaged over an 8 hour period).

Personal exposure is the concentration of cadmium to which a person would be exposed if that person were not wearing respiratory protection.

Regulated Area – An area where the cadmium exposure does or can be expected to exceed the PELs. Since it may be difficult to determine the exposure time for employees working in areas with concentrations that exceed PEL values, the facility/location may wish to regulate any area that exceeds the 8-hour TWA PEL. Only Authorized Persons are permitted to enter regulated areas.

Short Term Exposure Limit (STEL) is a PEL or TLV established as a limit of exposure measured over a designated period of time less than 8 hours.

Threshold Limit Value is a recommended average airborne concentration limit established by ACGIH. The TLVs are reviewed and updated as appropriate annually.

Time Weighted Average (TWA) is a measurement of airborne exposure to a chemical compound measured and averaged over a designated period of time for comparison to an STEL or an 8-hour PEL or TLV.

EXECUTIVE SUMMARY

This Standard sets forth the accepted practice for and establishes the requirements for workplace safety near excavations and trenches and employee and subcontractor entry into such.

It is ARCADIS' policy that ARCADIS staff will not enter excavations and trenches unless it is absolutely necessary and that an OSHA-defined Excavation Competent Person is on-site for all excavation work under ARCADIS contractual control. The competent person will be provided by the entity on site responsible for performing the excavation work unless otherwise required by the client. Thus, if an ARCADIS subcontractor is conducting the excavation work, that subcontractor will provide the competent person. If ARCADIS is self-performing the excavation services, then ARCADIS will provide a competent person whether a specialized subcontractor or authorized employee.

An excavation Competent Person must be involved in the excavation/trenching hazard assessment process. This will assist in determining the need for an engineering opinion when excavating near or adjacent to structures and determining the need and timing of inspections.

Prior to excavation, all underground installations (water, electric, telephone, gas, etc.) must be located and documented in accordance with ARCADIS Utility Clearance Policy and Standard ARC HSFS019.

All excavations over four feet in depth (or less than 4 feet in depth if deemed necessary by the Competent Person) shall be provided with a stairway, ladder, ramp, or other safe means of egress so as to require no more than 25 feet of lateral travel.

Water must not be allowed to accumulate in open excavations where employees are working. When necessary, means such as diverting natural drainage around the excavation or actively pumping water must be used to prevent or control water accumulation.

Excavated materials (spoil) must be placed no closer than 2 feet from the edge of an open excavation, and otherwise retained to prevent loose material from falling into the excavation.

Each employee at the edge of an excavation 6 feet (1.8 m) or more in depth shall be protected from falling by guardrail systems, fences, or barricades *when the excavations are not readily seen because of plant growth or other visual barrier*.

Any excavation over 5 feet in depth into which employees will enter that is not entirely in stable rock as defined in this Standard requires use of a protective system.

All excavations over 20 feet in depth must be designed by a registered professional engineer regardless of whether personnel will enter it or not.

All excavations over 4 feet in depth must be tested for hazardous atmospheres whenever personnel are required to enter and a potential exists for the existence of hazardous contaminants or oxygen deficiency. Excavations less than 4 feet in depth must be evaluated by the competent person and at the competent person's discretion be tested for hazardous atmospheres whenever personnel are required to enter and a potential exists for the existence of hazardous contaminants or oxygen deficiency.

1. POLICY

It is ARCADIS US policy to be proactive in the identification, assessment and control of health and safety hazards and associated risks. To those means, any work involving trenching and excavation that is under the control or direction of ARCADIS or an ARCADIS subcontractor will be accomplished following, at a minimum, this Standard.

It is ARCADIS' policy that ARCADIS staff will not enter excavations and trenches unless it is absolutely necessary. If there are no suitable alternatives and it becomes necessary to enter excavations or trenches, this standard, at a minimum will be strictly followed.

It is also the policy of ARCADIS to ensure an OSHA-defined Excavation Competent Person is on-site for all excavation work under ARCADIS contractual control. The competent person will be provided by the entity on site responsible for performing the excavation work unless otherwise required by the client. Thus, if an ARCADIS subcontractor is conducting the excavation work, that subcontractor will provide the competent person. If ARCADIS is self-performing the excavation services, then ARCADIS will provide a competent person whether a specialized subcontractor or authorized employee.

2. PURPOSE AND SCOPE

2.1 Purpose

To effectively control or eliminate the hazards presented by working near or entry into excavations or trenches, this Standard sets forth the accepted practice for and establishes the requirements for workplace safety near excavations and trenches and employee and subcontractor entry into such.

2.2 Scope

This standard along with associated checklists and the Utility Location Standard (ARC HSFS019) apply to all employees of ARCADIS-US. Only trained and authorized personnel are permitted to work near or enter excavations and trenches, perform rescue services, or act as the excavation competent person.

3. DEFINITIONS

Exhibit 1 includes relevant definitions to this Standard including that for competent person qualifications.

4. RESPONSIBILITIES

4.1 Corporate H&S with Division and Practice Experts

- On a routine basis, review and update, as necessary, this standard.
- As requested by Operations Leadership, review cancelled checklists periodically to ensure conformance to this standard.
- Coordinate with the Training Group to ensure that the excavation competent person qualifications and training/retraining requirements are met.

- Conduct excavation competent person evaluations for nominated individuals as necessary, in order to approve and designate them as competent.
- Recommend qualified training provider for excavation awareness training for employees working in or around excavation/trenching operations.
- Provide technical assistance regarding excavation and trench protocol, atmospheric testing equipment, PPE, hazard assessment and research information on unusual hazards.
- Audit project-specific excavation sites for compliance with this standard.

4.2 Principal in Charge (PIC), Project Manager (PM), and/or Task Manager (TM)

- Verify that excavation and trench protocols are properly identified and addressed within the project work plan, project health & safety plan, and/or other project-related documents.
- Verify that their divisional or project team employees have received the proper training provided by Corporate Health & Safety or qualified training source prior to conducting excavation/trenching entry activities.
- Verify that any ARCADIS employee acting as the Excavation Competent person has been designated and authorized to do so per the requirements specified in section 4.4 of this standard.
- Verify that the proper entry equipment, including personal protective equipment (PPE), atmospheric testing equipment and safety equipment, is available for use by their divisional employees.
- Verify that copies of the completed checklists are available for Corporate Health and Safety review and retained with the project files.
- Request that Corporate Health and Safety review cancelled checklists as necessary and appropriate

4.3 Health and Safety Plan Writers and Reviewers

Use this standard as guidance to ensure the appropriate identification, assessment and control of excavation and trenching hazards for documentation in project HASPs and development of task specific Job Safety Analysis (JSA).

4.4 Competent Person

Competent Person responsibilities include:

- Anticipation, identification and control of excavation and trenching hazards, as well as the signs and symptoms of exposure to the hazard(s), and the Authority to implement all corrective actions including Stopping Work.

  Note: An excavation Competent Person must be involved in the excavation/trenching hazard assessment process. This will assist in

determining the need for an engineering opinion when excavating near or adjacent to structures and determining the need and timing of inspections.

- Review existing soil sampling data (if any) or other pertinent hazard characterization information recorded by the client.
- Investigate the client's excavation/trenching protocol, to verify that any identified hazards and previous experience with earthwork at the site is properly communicated.
- Coordinate entry operations with the client's employees when both client and ARCADIS employees will be working in or near an excavation/trench.
- Offer all entrants an opportunity to review the applicable control measures and testing results and an opportunity to request a reevaluation as necessary.
- Design of structural ramps that are used solely by employees as a means of access or egress from excavations.
- Monitoring of water removal equipment and operations, if water is controlled or prevented from accumulating by the use of water removal equipment,
- Inspection of excavations subject to runoff from heavy rains.
- Daily inspections of excavations, the adjacent areas, and protective systems when required.
- If evidence of a situation that could result in a possible cave-in, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions are present, the Competent Person is responsible for ensuring that exposed employees are removed from the hazardous area until the necessary precautions have been taken to ensure their safety.
- Examining material or equipment used for protective systems that is damaged to evaluate its suitability for continued use. If the competent person cannot assure the material or equipment is able to support the intended loads or is otherwise suitable for safe use, then such material or equipment shall be removed from service, and shall be evaluated and approved by a registered professional engineer before being returned to service.
- For excavations less than 5 feet (1.52 m) in depth, in which employees will be entering, a Competent Person must examine the ground to determine if there are indications of a potential cave-in hazard. If there are potential indicators of a cave-in

hazard, the Competent Person will require some form of cave-in protection be implemented before employees can enter.

- Classifying soil and rock deposits based on site and environmental conditions, and on the structure and composition of the earth deposits.

- Soil and rock deposits shall be classified by a Competent Person as Stable Rock, Type A, Type B, or Type C based on the results of at least one visual and at least one manual analysis.

- If, after classifying a deposit, the properties, factors, or conditions affecting its classification change in any way, the changes shall be evaluated by a Competent Person. The deposit shall be reclassified as necessary to reflect the changed circumstances.

- When surcharge loads from stored material or equipment, operating equipment, or traffic are present, a competent person shall determine the degree to which the actual slope must be reduced below the maximum allowable slope, and shall assure that such reduction is achieved.

- Order evacuation of the excavation/trench if an uncontrolled hazard develops, either within or outside the space, or upon observing a behavioral effect of hazard exposure among excavation/trench entrants.

- Verify that all tests and precautionary measures identified on the Daily/Periodic Inspection Checklist located in Exhibit 2 and the ARCADIS Utility Location Policy and Standard ARC HSFS019 has been performed prior to authorizing subsurface work or entry into an excavation or trench.

ARCADIS employees must meet the following requirements to be a designated and approved Competent Person:

- Attend an Excavation Competent Person training course approved by Corporate Health and Safety or have equivalent training; and

- Approval by Corporate Health and Safety through demonstration of practical field experience and/or knowledge of the subject matter.

    - Documentation of the evaluation and approval of each excavation competent person will be completed using the form provided in Exhibit 3.

    - This documentation and a listing of the approved ARCADIS excavation competent person will be maintained by the Training Group; and

- If on an Environmental project where HAZWOPER training is required by ARCADIS, the Competent Person must also have completed the 40 Hour HAZWOPER training, be current on their annual 8 Hour HAZWOPER refresher and it is recommended, but

not required, that the Competent Person completed the HAZWOPER Supervisor training course.

4.5 Site Safety Officer (SSO)

When ARCADIS and/or our subcontractor is in control of an excavation project, the SSO will be responsible for the following:

- Interface with the client representative and Competent Person to identify and understand hazards associated with the client's excavation and trenching and/or work permit programs.
- Implement the ARCADIS Utility Clearance Policy and Procedure and complete the Daily/Periodic Excavation Inspection Checklist, when the excavation project is under the control of ARCADIS.
- Verify adequate training and experience of those ARCADIS employees working in and around excavations.
- Verify that the safety procedures identified in this Standard, the site specific HASP, and applicable regulatory requirements are used when required to protect employees during excavation activities.
- Verify that the client takes the necessary precautions in notifying their employees that our employees will be installing an excavation or trench.
- Review the lockout/tagout and isolation measures implemented by ARCADIS, our subcontractor and/or the client as necessary based on proximity of utilities or other energy sources in the area of the excavation/trench.
- Immediately report any unusual or unplanned excavation or trenching hazards to both the Competent Person and the Project Manager or Task Manager.
- Keep unauthorized persons away from the excavation area.
- Confirm that the ARCADIS Utility Location Policy and Standard ARC HSFS019 has been performed prior to authorizing subsurface work or entry into an excavation or trench.
- Issue, authorize, and have the Utility Clearance and Daily/Periodic Inspection forms readily available for review
- Verify that copies of the completed clearance forms and checklists are properly disseminated to Corporate Health and Safety and retained with the project files, as specified in Section 8.0 – Records.

4.6 Employees

- Notify the PIC, PM, TM or SSO if they have not received appropriate training.
- Review the site specific HASP, task specific JSAs, and other written plans that are associated with their work.

- Use the TRACK process regularly and frequently to recognize the hazards which may be faced during work around or in excavation/trenches, as well as to understand the signs and symptoms of exposure to airborne hazard(s).

- Never enter an excavation/trench without verifying that the required Utility Location Procedure, Daily/Periodic Inspection Checklist and required air monitoring is conducted.

- Use Stop Work Authority if excavation/trenching hazard(s) have not been appropriately addressed. Immediately consult with SSO, Competent Person and ARCADIS Project/Task Manager.

- Use the PPE, air monitoring and testing equipment that has been provided or have access to the information documenting that results are within the defined Action Levels established within the HASP.

- Maintain an awareness of all required hazard controls and consult with the Competent Person as necessary.

- If unexpected conditions arise during entry, immediately notify other entrants, evacuate the space and inform the designated Competent Person

- Obey evacuation orders given by the Competent Person, SSO, automatic alarm activation, or when self-perceived.

- At least one person on site must maintain current certification in basic first aid and cardiopulmonary resuscitation (CPR).

5. PROCEDURE

5.1 General Safety Requirements for all Excavations

- If excavation work encounters unanticipated groundwater contamination, soil contamination or other unanticipated contaminants, ARCADIS staff will Stop Work and notify the Project Manager. An appropriate work plan to sample the suspected contaminants shall be developed, samples collected by HAZWOPER trained personnel, the HASP modified and a contaminant management plan developed, as necessary.

- All surface obstructions must be moved or supported so as to protect employees and equipment.

- Prior to excavation, all underground installations (water, electric, telephone, gas, etc.) must be located and documented in accordance with ARCADIS Utility Clearance Policy and Standard ARC HSFS019.

- When excavating in areas near underground installations, proper precautions must be taken to determine the exact location of the installations and to adequately protect and support them. While an excavation is open, underground installations shall be protected, supported or removed as necessary to protect employees.

- Structural ramps that are used solely by employees as a means of access or egress from excavations shall be designed by a competent person.

- Structural ramps used for access or egress of equipment shall be designed by a competent person qualified in structural design, and shall be constructed in accordance with the design.

- Ladders must extend at least 36” (3 feet) above the landing surface.

- All excavations over four feet in depth shall be provided with a stairway, ladder, ramp, or other safe means of egress so as to require no more than 25 feet of lateral travel. As deemed necessary by the competent person, excavations less than 4 feet in depth will be provided with a stairway, ladder, ramp, or other safe means of egress so as to require no more than 25 feet of lateral travel.

- If personnel are working in a location exposed to vehicular traffic they must be provided with and be required to wear reflective safety vests. Adequate, signs, barriers or other equivalent traffic controls must be used to protect employees.

- Personnel are not permitted to be beneath elevated loads handled by equipment or be in excavations when heavy equipment is digging in or near the excavation.

- Mobile equipment located near open excavations must be adequately protected from falling or rolling into excavations by the use of barricades or warning devices.

- Employees entering bell-bottom pier holes, or other similar deep and confined footing excavations, shall wear a harness with a lifeline securely attached to it. The lifeline shall be separate from any line used to handle materials, and shall be individually attended at all times while the employee wearing the lifeline is in the excavation.

- Water must not be allowed to accumulate in open excavations where employees are working. When necessary, means such as diverting natural drainage around the excavation or actively pumping water must be used to prevent or control water accumulation.

- Where the stability of adjoining buildings, walls, or other structures is endangered by excavation operations, support systems such as shoring, bracing, or underpinning shall be provided to ensure the stability of such structures for the protection of employees.

- All structures adjacent to an open excavation must be supported, or a registered professional engineer (PE) must determine that the structure will not be affected by the excavation activities.

- Excavated materials (spoil) must be placed no closer than 2 feet from the edge of an open excavation, and otherwise retained to prevent loose material from falling into the excavation.

- Each employee at the edge of an excavation 6 feet (1.8 m) or more in depth shall be protected from falling by guardrail systems, fences, or barricades when the excavations are not readily seen because of plant growth or other visual barrier.

- Employees at the edge of a well, pit, shaft, and similar excavation 6 feet (1.8m) or more in depth shall be protected from falling by guardrail systems, fences, barricades, or covers.

- Work tasks will be designed to limit the number of personnel required to enter any excavation. All tasks that can be completed remotely from outside the excavation (such as soil sampling) will be conducted in such a manner.

- Personnel will not be allowed to enter any excavation unless required protective systems and procedures are used to prevent accidents and injury.

Best Management Practice: *In some instances, an excavation will not have any protective systems in place when employees will not be entering into the excavation. Even if employees are not entering into this type of excavation, a competent person should be consulted to establish a safe zone distance away from the edge of any open excavation to minimize the hazard of falling into this type of excavation. Standing at the edge of an excavation places an employee at risk of falling into the excavation, thereby subjecting themselves to the hazard of excavation/trench collapse, which then triggers the requirement for protective system use as defined in this standard. General guidance would be for employees to remain 6 feet or more away from the edge of any excavation.*

- Dust control measures will be implemented during excavation and soil-moving activities as required by the Health and Safety Plan (HASP). As necessary, dust control measures will also be used to manage soil located in temporary storage areas or stockpile areas. Specific dust control measures will be detailed in the HASP. The Competent Person must be consulted prior to initiating “wet” dust control measures to discuss limits/impact to protective systems.

- Excavations cut through a firewall or containment berm/bund shall provide alternate means of containment while the job is progressing. A specific containment procedure or diversion procedure will be included as a supplement to the HASP or defined in the Remedial Work Plan.

- Excavating in archeological sites requires special consideration and compliance with local legal requirements and shall be avoided wherever possible. Archaeological investigations on federal and state lands have additional requirements. For example, permit provisions are established in federal (specifically the federal Archaeological Resources Protection Act) and some state statutes. If an artifact or archeological feature is unearthed during excavation, ARCADIS shall stop work and consult with client, regulatory agencies and professional archaeologist, as necessary.

5.2 Excavations Requiring Protective Systems

This section defines excavations that require protective systems.

- All excavations into which employees will enter, regardless of depth, where the potential for cave-in exists.
- Any excavation over 5 feet in depth into which employees will enter that is not entirely in stable rock as defined in this Standard.
- Any excavation near a structure, (e.g. foundations, piers, footers, walls, sidewalks, tanks, roadways, etc.), as required by the registered professional engineer reviewing the stability of the excavation and the structure.
- All excavations over 20 feet in depth must be designed by a registered professional engineer regardless of whether personnel will enter it or not.
- All excavations that could potentially impact adjacent structures shall be reviewed by a registered professional engineer to determine if the stability of the structure will be affected by the excavation.
- Support systems for an adjacent structure must be designed by a registered professional engineer.

5.3 Selection and Use of Protective Systems

5.3.1 Shoring or Shielding

If shoring or shielding is selected as the protective system for an excavation, soil classification in accordance with 1926 Subpart P Appendix A is required.

One of the following options must be used for excavations which will be shored or shielded.

- Timber shoring as specified in 1926 Subpart P Appendix C must be utilized
- Hydraulic shoring, trench jacks, air shores, or shields as required in 1926.652 (c)(2) must be utilized following the system manufacturer's data
- A system which follows other tabulated data (approved by a registered professional engineer) must be utilized
- The excavation must be designed by a registered professional engineer

5.3.2 Sloping

If sloping is selected as the protective system for an excavation, the excavation sides must be sloped at a maximum of 34 degrees (1.5 Horizontal: 1 Vertical), unless the procedure listed above is followed.

Soil classification is required for all excavations with sides which will be sloped greater than 34° (1.5 Horizontal: 1 Vertical). If it will be sloped greater than 34°, the one of the following options must be utilized:

- Option 1 - assume Type C and slope 1.5/1 - default sloping classification
- Option 2 - classify soil according to the standard and use Type A/B sloping requirements
- Option 3 – use other tabulated data with PE approval
- Option 4 – PE approval of sloping/benching design

5.4 Atmospheric Testing for Entry

All excavations over 4 feet in depth must be tested for hazardous atmospheres whenever personnel are required to enter and a potential exists for the existence of hazardous contaminants or oxygen deficiency. Excavations less than 4 feet in depth must be evaluated by the competent person and at the competent person's discretion be tested for hazardous atmospheres whenever personnel are required to enter and a potential exists for the existence of hazardous contaminants or oxygen deficiency.

Emergency rescue equipment, such as breathing apparatus, a safety harness and line, or a basket stretcher, shall be readily available where hazardous atmospheric conditions exist or may reasonably be expected to develop during work in an excavation. This equipment shall be attended when in use.

The site designated "Competent Person" and/or SSO will document initial and periodic air monitoring results for all activities requiring entry into the excavation. All atmospheric testing of excavations must be conducted in the following sequence and meet the following air quality criteria.

- Oxygen content must be between 19.5% to 23.5%
- Combustible gas or vapor less than (<) or equal to 5% of its lower explosive limit (LEL): Level D. Continue to monitor atmospheric conditions as detailed in project specific Health and Safety Plan.
- Combustible gas or vapor levels greater than (>) 5%, but < 10% of its LEL: Continuous atmospheric monitoring required; review use/implementation of engineering controls (ventilation, etc.) and PPE; evaluate potential source(s) of ignition and where feasible, remove from the area; fire extinguisher must be available; and use TRACK to assess condition/controls and proceed with caution.
- Combustible gas or vapor levels > or equal to 10% of its LEL: Stop Work; evacuate the excavation/trench; contact the Competent Person and SSO; and re-evaluate source/controls of combustible gas,
- Carbon monoxide levels must not exceed 25 ppm as an 8-hour Time Weighted Average (TWA).

- Hydrogen sulfide must not exceed 5 ppm as a Short-Term Exposure Limit (STEL) value or 1 ppm as an 8-hour TWA.

- Toxic air contaminant levels must not exceed 50% of the PEL or the TLV for the specific contaminant (whichever is lower).

5.5 Location of Underground/Overhead Utilities

- The competent person and the project manager shall both verify that local underground facilities location/protection agencies are notified within the required time frame prior to the initiation of excavation activities and meet all requirements in the ARCADIS Utility Location Policy and Standard ARC HSFS019.

- Prior to initiation of excavation or trenching operations the competent person shall verify that all utilities have been located.

5.6 Daily/Periodic Inspections

Daily inspections of excavations, the adjacent areas, and protective systems shall be made by a Competent Person for evidence of a situation that could result in possible cave-ins, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions. An inspection shall be conducted by the Competent Person:

- Prior to initiation of daily excavation or trenching operations the competent person shall complete a daily inspection of the excavation.

- During excavation or trenching operations the competent person shall complete a periodic inspection after any event (e.g., thunderstorm, vibration, excessive drying) that may affect excavation stability.

Note: In order to correctly ascertain the soil types, the competent person must identify the locations and the limits of each type of soil, and must conduct visual and all appropriate manual tests to classify the initial (opening) soil types observed.

Note: These inspections are only required when employee exposure can be reasonably anticipated. Not just in-trench exposure, but also ANY hazardous condition in the area that an employee could be exposed to.

The competent person shall complete the daily/periodic inspection checklist (A copy of the checklist is attached to this Policy as Exhibit A) – Subcontractors must complete the ARCADIS checklist or an equivalent inspection form for each inspection of excavation and trenching activities.

5.7 Soil Classification for Selection of Protective Systems

5.7.1 Soil Classification

This section describes a method of classifying soil and rock deposits based on site and environmental conditions, and on the structure and composition of the earth deposits. This

section contains definitions, sets forth requirements, and describes acceptable visual and manual tests for use in classifying soils.

This section applies when a sloping, benching or shoring system is utilized as a method of protection for employees from cave-ins.

5.7.2 Soil Classification Definitions

5.7.2.1 Types/Classes of Soil

5.7.2.1.1 Type Class A Soils

Type/Class A Soils are cohesive soils with an unconfined, compressive strength of 1.5 ton per square foot (tsf) (144kPa) or greater. Examples of cohesive soils are: Clay, silty clay, sandy clay, clay loam and in some cases, silty clay loam and sandy clay loam. Cemented soils such as caliche and hardpan are also considered Type A. However, no soil is Type A if the following apply.

- The soil is fissured;
- The soil is subject to vibration from heavy traffic, pile driving, or similar effects;
- The soil has been previously disturbed;
- The soil is part of a sloped, layered system where the layers dip into the excavation on a slope of four horizontal to one vertical (4 Horizontal:1 Vertical) or greater;
- The material is subject to other factors that would require it to be classified as a less stable material

5.7.2.1.2 Type Class B Soils

Type/Class B Soils are:

- Cohesive soils with an unconfined compressive strength greater than 0.5 tsf (48 kPa) but less than 1.5 tsf (144 kPa)
- Granular cohesion-less soils including angular gravel (similar to crushed rock), silt, silt loam, sandy loam and, in some cases, silty clay loam and sandy clay loam
- Previously disturbed soils except those which would otherwise be classed as Type C soil
- Soil that meets the unconfined compressive strength or cementation requirements for Type A, but is fissured or subject to vibration
- Dry rock that is not stable
- Material that is part of a sloped, layered system where the layers dip into the excavation on a slope less steep than four horizontal to one vertical (4 Horizontal:1 Vertical), but only if the material would otherwise be classified as Type B

5.7.2.1.3 Type/Class C Soils

Type/Class C Soils are:

- Cohesive soil with an unconfined compressive strength of 0.5 tsf (48 kPa) or less

- Granular soils including gravel, sand, and loamy sand
- Submerged soil or soil from which water is freely seeping
- Submerged rock that is not stable
- Material in a sloped, layered system where the layers dip into the excavation or a slope of four horizontal to one vertical (4 Horizontal:1 Vertical) or steeper

5.7.2.2 Methods for Classifying Soils

Each soil and rock deposit shall be classified by a competent person as Stable Rock, Type A, Type B, or Type C in accordance with the definitions set forth in this section. The classification of the deposits shall be made based on the results of at least one visual and at least one manual analysis conducted by a competent person using tests described below, or in other recognized methods of soil classification and testing such as those adopted by the American Society for Testing Materials, or the U.S. Department of Agriculture textural classification system.

The visual and manual analyses, such as those noted as being acceptable in this section, shall be designed and conducted to provide sufficient quantitative and qualitative information as may be necessary to identify properly the properties, factors, and conditions affecting the classification of the deposits. Visual analysis is conducted to determine qualitative information regarding the excavation site in general, the soil adjacent to the excavation, the soil forming the sides of the open excavation, and the soil taken as samples from excavated material.

Observe the following:

- Samples of soil that are excavated and soil in the sides of the excavation. Estimate the range of particle sizes and the relative amounts of the particle sizes. Soil that is primarily composed of fine grained material is cohesive material. Soil composed primarily of coarse grained sand or gravel is granular material.

- Soil as it is excavated. Soil that remains in clumps when excavated is cohesive. Soil that breaks up easily and does not stay in clumps is granular.

- The side of the open excavation and the surface area adjacent to the excavation. Crack like openings such as tension cracks could indicate fissured material. If chunks of soil spall off a vertical side, the soil could be fissured. Small spalls are evidence of moving ground and are indications of potentially hazardous situations.

- The area adjacent to the excavation and the excavation itself for evidence of existing utility and other underground structures, and to identify previously disturbed soil.

- The open side of the excavation to identify layered systems. Examine layered systems to identify if the layers slope toward the excavation. Estimate the degree of slope of the layers.

- The area adjacent to the excavation and the sides of the opened excavation for evidence of surface water, water seeping from the sides of the excavation, or the location of the level of the water table.

- The area adjacent to the excavation and the area within the excavation for sources of vibration that may affect the stability of the excavation face.

Manual analysis of soil samples is conducted to determine quantitative as well as qualitative properties of soil and to provide more information in order to classify soil properly.

5.7.2.3 Classifications

- *Plasticity*. Mold a moist or wet sample of soil into a ball and attempt to roll it into threads as thin as 1/8 inch in diameter. Cohesive material can be successfully rolled into threads without crumbling. For example, if at least a two inch (50 mm) length of 1/8 inch thread can be held on one end without tearing, the soil is cohesive.

- *Dry strength*. If the soil is dry and crumbles on its own or with moderate pressure into individual grains or fine powder, it is granular (any combination of gravel, sand, or silt). If the soil is dry and falls into clumps which break up into smaller clumps, but the smaller clumps can only be broken up with difficulty, it may be clay in any combination with gravel, sand or silt. If the dry soil breaks into clumps which do not break up into small clumps and which can only be broken with difficulty, and there is no visual indication the soil is fissured, the soil may be considered unfissured.

- *Thumb penetration*. The thumb penetration test can be used to estimate the unconfined compressive strength of cohesive soils. Type A soils with an unconfined compressive strength of 1.5 tsf can be readily indented by the thumb; however, they can be penetrated by the thumb only with very great effort. Type C soils with an unconfined compressive strength of 0.5 tsf can be easily penetrated several inches by the thumb, and can be molded by light finger pressure. This test should be conducted on an undisturbed soil sample, such as a large clump of spoil, as soon as practicable after excavation to keep to a minimum the effects of exposure to drying influences. If the excavation is later exposed to wetting influences (rain, flooding), the classification of the soil must be changed accordingly.

- *Other strength tests*. Estimates of unconfined compressive strength of soils can also be obtained by use of a pocket penetrometer or by using a hand operated shearvane.

- *Drying test*. The basic purpose of the drying test is to differentiate between cohesive material with fissures, unfissured cohesive material, and granular material. The procedure for the drying test involves drying a sample of soil that is approximately one inch thick (2.54 cm) and six inches (15.24 cm) in diameter until it is thoroughly dry:

    1. If the sample develops cracks as it dries, significant fissures are indicated.

    2. Samples that dry without cracking are to be broken by hand. If considerable force is necessary to break a sample, the soil has significant cohesive material content. The soil can be classified as an unfissured cohesive material and the unconfined compressive strength should be determined by using the thumb penetration or other test.

5.7.2.4 Cohesive with Fissures vs Granular

If a sample breaks easily by hand, it is either a fissured cohesive material or a granular material. To distinguish between the two, pulverize the dried clumps of the sample by hand or by stepping on them. If the clumps do not pulverize easily, the material is cohesive with fissures. If they pulverize easily into very small fragments, the material is granular.

5.7.2.5 Layered system

A layered system shall be classified in accordance with its weakest layer. Each layer may be classified individually where a more stable layer lies under a less stable layer.

5.7.2.6 Reclassifying Soils

A layered system shall be classified in accordance with its weakest layer. Each layer may be classified individually where a more stable layer lies under a less stable layer.

In most instances the ARCADIS designated Excavation/Trenching Competent person will assume Type C soil, unless they have conclusive data to validate Type A or B.

5.7.2.7 Excavation Construction Based on Soil Type

The maximum allowable slope means the steepest incline of an excavation face that is acceptable for the most favorable site conditions as protection against cave-ins, and is expressed as the ratio of horizontal distance to vertical rise (H:V). Short-term exposure means a period of time less than or equal to 24 hours that an excavation is open. Soil and rock deposits must be classified in accordance with Appendix A to Subpart P of Part 1926. The maximum allowable slope for a soil or rock deposit must be determined from the table provided below. The actual slope must not be steeper than the maximum allowable slope. The actual slope must be less steep than the maximum allowable slope, when there are signs of distress. If that situation occurs, the slope must be cut back to an actual slope which is at least horizontal to one vertical (1/2H:1V) less steep than the maximum allowable slope. When surcharge loads from stored material or equipment, operating equipment, or traffic are present, a competent person must determine the degree to which the actual slope must be reduced below the maximum allowable slope, and must assure that such reduction is achieved. Surcharge loads from adjacent structures must be evaluated in accordance with 1926.651(I). Configurations of sloping and benching systems must be in accordance with 29 CFR 1926 Subpart P, Appendix B.

EXCAVATION SLOPE INFORMATION FROM 29 CFR 1926 SUBPART P APPENDIX B MAXIMUM ALLOWABLE SLOPES	
Soil or Rock Type	**Maximum Allowable Slopes (H:V)[1] for Excavations Less Than 20 Feet Deep[2]**
Stable Rock	Vertical (90 degrees)
Type A[3]	¾:1 (53 degrees)
Type B	1:1 (45 degrees)
Type C	1½:1 (34 degrees)

1. Numbers shown in parentheses next to maximum allowable slopes are angles expressed in degrees from the horizontal (H). Angles have been rounded off.

2. Sloping or benching for excavations greater than 20 feet deep must be designed by a registered professional engineer.
3. A short-term maximum allowable slope of 1/2H:1V (63 degrees) is allowed in excavations in Type A soil that are 12 feet (3.67 m) or less in depth. Short-term maximum allowable slopes for excavations greater than 12 feet (3.67 m) in depth must be 3/4H:1V (53 degrees).

6. TRAINING

6.1 Project - Specific Orientation

All staff working on a site where trenching and excavation activities are being conducted by ARCADIS or its subcontractors will be provided with site orientation on excavation projects and participate in daily safety meetings that include a discussion of the following:

- Site excavation hazards and procedures;
- Requirements for conducting activities remotely whenever possible;
- Client requirements and procedures for excavation activities;
- Review of applicable federal, state and/or local excavation requirements; and
- This Excavation and Trenching Standard, as appropriate

6.2 Employee Training

Besides site orientation training, additional training will be provided as follows based on the employee's activities:

- All employees who work in the area of potential excavation/trenching sites will receive awareness level training as provided and/or approved by ARCADIS Corporate H&S in order to recognize and to understand the hazards associated with trenching/excavation work.
- On an as needed basis, employees will receive site specific instruction regarding the excavation/trenching operation from the Competent Person and/or the SSO.

6.3 Competent Person Training

Competent Persons will be provided training as follows:

In order for ARCADIS employees to be assigned duties as a competent person, with respect to excavation and trenching, in addition to the criteria noted in section 4.4, personnel must attend an Excavation Competent Person training course approved by Corporate Health and Safety or have equivalent training. The course shall include, but is not limited to the following:

- Introduction to and definition of trenches and excavations.
- General requirements of OSHA 29 CFR 1926 Subpart P.
- Responsibilities and requirements of a competent person.
- Hazards associated with trenches/excavations and Identification and Assessment of these hazards.
- Hazard controls

- Soil analysis and testing (visual and manual;
- Protective systems;
- Personal protective equipment;
- Utility location;
- Atmospheric testing;
- Water drainage and pumping;
- Site housekeeping and management;
- Communications;
- Access and egress

- Emergency Procedures.
- Inspections.

All training provided must be reviewed and approved by Corporate Health & Safety and will be managed through the Training Team.

Documentation of training certification received by attendance at any training course including externally provided training courses will be kept by the employee with copies provided to the Training Team.

7. REFERENCES

ARCADIS Health and Safety Standard ARC HSFS010– Health and Safety Planning

ARCADIS Health and Safety Standard ARC HSFS004 – Control of Hazardous Energy (Lockout/Tagout)

ARCADIS Utility Clearance Policy and Standard ARC HSF019

OSHA 29 CFR Part 1926 Subpart P - Excavations

8. RECORDS

8.1 Training records will be kept by the individual employee with copies of such certificates kept by the Training Team. Training dates and times will be kept by the Training Team.

8.2 Completed clearance forms and checklists will be kept in the project files with copies available for Corporate H&S review.

8.3 Copies of all HASPs that document excavation trenching procedures will be kept in the project files.

9. APPROVALS AND HISTORY OF CHANGE

Approved By: Anthony Tremblay, CSP, CIAQP – Corporate H&S, Director of Technical Programs



History of Change

Revision Date	Revision Number	Standard Developed/Reviewed By or Revised By	Reason for change
12 May 2008	01	Greg Ertel	Original document
13 June 2008	02		Modified Section 5.1 – 4th bullet related to structural ramps. Modified Section 5.2 to designate a 6x factor for structural integrity of structures near the excavation. Revised Exhibit 1 to modify the definition of a Competent person
9 January 2009	03		Cleaned up definitions, deleted training requirements from Section 5.0 and moved them to Section 6.0, modified purpose statement
31 March 2011	04		Updated Competent Person training and qualification requirements in section 4.6, section 6.2 and definition in Exhibit 1.
27 March 2012	05	Tremblay	Section 4 competent person, SSO and employee responsibilities revised; Confined Space references eliminated; Training requirements clarified; use of ladders detailed; Fall prevention requirements clarified in section 5.1; depth of protective system requirement corrected to 5 feet; spoils pile must be minimum 2 feet from edge of excavation; Atmospheric Monitoring Action Levels revised; Employee Awareness Training and Competent Person Training requirements clarified
4 June 2012	06	Tremblay	Section 4.4 typo corrected; 8-hour HAZWOPER Supervisor course for competent person was made a recommended practice instead of a requirement; Section 4.5 SSO responsibilities revised to eliminate those responsibilities that belong with the Competent Person; Section 5 Best Management Guidance to maintain safe distance from the edge of excavation; checklists hyperlinked

Revision Date	Revision Number	Standard Developed/Reviewed By or Revised By	Reason for change
18 September 2013	07	Tremblay	Tracking table format updated; Section 5.1 revised to include information about encountering unanticipated contaminants, implementing dust control measures, instituting containment measures when breeching a containment berm and avoiding excavating in archeological sites
26 September 2013	08	Tremblay	Section 5.7.2.7 Maximum Allowable Slope Table had a typo in Type C soil line H:V ratio (corrected the ratio to read 1 ½ : 1). The value of 34 degrees is correct; Header format update and pages renumbered
23 February 2015	09	Tremblay	Page numbering correction; Exhibit 2 checklist and Exhibit 3 Competent Person Checklist inserted to supplement the existing hyperlink to documents

Exhibit 1 – Definitions

Attendant is a trained qualified individual stationed outside the excavation whose duty is to monitor authorized entrants inside the excavation or trench and have a means of communication with the designated rescue services.

Benching/Benching system means a method of protecting employees from cave-ins by excavating the sides of an excavation to form one or a series of horizontal levels or steps, usually with vertical or near-vertical surfaces between levels.

Cave-in means the separation of a mass of soil or rock material from the side of an excavation, or the loss of soil from under a trench shield or support system, and its sudden movement into the excavation, either by falling or sliding, in sufficient quantity so that it could entrap, bury or otherwise injure and immobilize a person.

Cemented soil means a soil in which the particles are held together by a chemical agent, such as calcium carbonate, such that a hand size sample cannot be crushed into powder or individual soil particles by finger pressure.

Cohesive soil means clay (fine grained soil), or soil with a high clay content, which has cohesive strength. Cohesive soil does not crumble, can be excavated with vertical sides, and is plastic when moist. Cohesive soil is hard to break up when dry, and exhibits significant cohesion when submerged. Cohesive soils include clayey silt, sandy clay, silty clay, clay and organic clay.

Competent person means one who, through education, training, and/or experience, is capable of identifying existing and predictable hazards or working conditions which are unsanitary, hazardous, or dangerous to employees and who has authorization to take prompt corrective measures to eliminate them.

Dry soil means soil that does not exhibit visible signs of moisture content.

Excavation means any man-made cut, cavity, trench, or depression in an earth surface formed by earth removal into which a person can bodily enter.

Entry constitutes the act by which an employee proceeds into an excavation or trench. Consideration of hazards, especially cave-ins and fall protection must still be considered and accounted for when equipment or personnel are near an excavation or trench, even if personnel will not be entering.

Entrants are employee's who are trained and authorized to enter a trench or excavation. Entrants must have attended a Qualified Excavation Training course offered or approved by Corporate Health and Safety.

Failure means the breakage, displacement, or permanent deformation of a structural member or connection so as to reduce its structural integrity and its supportive capabilities.

Fissured means a soil material that has a tendency to break along definite planes of fracture with little resistance, or a material that exhibits open cracks, such as tension cracks, in an exposed surface.

Granular soil means gravel, sand, or silt (coarse grained soil) with little or no clay content. Granular soil has no cohesive strength. Some moist granular soils exhibit apparent cohesion. Granular soil cannot be molded when moist and crumbles easily when dry.

Hazardous Atmosphere is an atmosphere which exposes employees to a risk of death, incapacitation, injury, or acute illness from one or more of the following:

- An atmospheric concentration of any substance in excess of 50% of its established permissible exposure limit (PEL); or its assigned threshold limit value (TLV) or other value listed on the Material Safety Data Sheet (MSDS) for the chemical constituent, whichever is lower.
- A flammable gas, vapor, or mist in excess of 10% of its lower explosive limit (LEL).
- An airborne combustible dust at a concentration that obscures vision at a distance of 5 feet or less.
- An atmospheric oxygen concentration below 19.5% (oxygen-deficient atmosphere) or above 23.5% (oxygen-enriched atmosphere).
- An atmosphere which is immediately dangerous to life and health.

Immediately Danger to Life and Health (IDLH) means any condition which poses an immediate threat to loss of life; may result in irreversible or immediate-severe health effects; may result in eye damage, irritation, or other conditions which could impair escape from the space.

Layered system means two or more distinctly different soil or rock types arranged in layers. Micaceous seams or weakened planes in rock or shale are considered layered.

Moist soil means a condition in which a soil looks and feels damp. Moist cohesive soil can easily be shaped into a ball and rolled into small diameter threads before crumbling. Moist granular soil that contains some cohesive material will exhibit signs of cohesion between particles.

Plastic means a property of a soil which allows the soil to be deformed or molded without cracking, or appreciable volume change.

Protective system means a method of protecting employees from cave-ins, from material that could fall or roll from an excavation face or into an excavation, or from the collapse of adjacent structures. Protective systems include support systems, sloping and benching systems, shield systems and other systems that provide protection.

Ramp means an inclined walking or working surface that is used to gain access to one point from another, and is constructed from earth or from structural materials such as steel or wood.

Registered Professional Engineer means a person who is registered as a professional engineer in the state where the work is to be performed. However, a professional engineer, registered in any state is deemed to be a "registered professional engineer" within the meaning of this standard when approving designs for "manufactured protective systems" or "tabulated data" to be used in interstate commerce. To oversee an excavation/trench activity the PE must have experience with and expertise in excavation, soil and stability considerations.

Saturated soil means a soil in which the voids are filled with water. Saturation does not require flow. Saturation, or near saturation, is necessary for the proper use of instruments such as a pocket penetrometer or sheer vane.

Sheeting means the members of a shoring system that retain the earth in position and in turn are supported by other members of the shoring system.

Shield (Shield system) means a structure that is able to withstand the forces imposed on it by a cave-in and thereby protect employees within the structure. Shields can be permanent structures or can be designed to be portable and moved along as work progresses. Additionally, shield can be

either pre-manufactured or job-built in accordance with 1926.652 (c)(3) or (c)(4). Shields used in trenches are usually referred to as "trench boxes" or "trench shields".

Shoring (Shoring system) means a structure such as a metal hydraulic, mechanical or timber shoring system that supports the sides of an excavation and which is designed to prevent cave-ins.

Sloping (Sloping system) means a method of protecting employees from cave-ins by excavating to form sides of an excavation that are inclined away from the excavation so as to prevent cave-ins. The angle of incline required to prevent a cave-in varies with differences in such factors as the soil type, environmental conditions of exposure, and application of surcharge loads.

Soil classification system means, for the purpose of this procedure, a method of categorizing soil and rock deposits in a hierarchy of Stable Rock, Type A, Type B and Type C, in decreasing order of stability. The categories are determined based on an analysis of the properties and performance characteristics of the deposits and the characteristics of the deposits and the environmental conditions of exposure.

Stable rock means natural solid mineral material that can be excavated with vertical sides and will remain intact while exposed. Unstable rock is considered to be stable when the rock material on the side or sides of the excavation is secured against caving-in or movement by rock bolts or by another protective system that has been designed by a registered professional engineer.

Submerged soil means soil which is underwater or is free seeping.

Support system means a structure such as underpinning, bracing, or shoring, which provides support to an adjacent structure, underground installation, or the sides of an excavation.

Trench means a narrow excavation (in relation to its length) made below the surface of the ground to which a person can bodily enter. In general, the depth is greater than the width, but the width of a trench (measured at the bottom) is not greater than 15 feet (4.6 meters). If forms or other structures are installed or constructed in an excavation so as to reduce the dimension measured from the forms or structure to the side of the excavation to 15 feet (4.6 meters) or less (measured at the bottom of the excavation), the excavation is considered to be a trench.

Unconfined compressive strength means the load per unit area at which a soil will fail in compression. It can be determined by laboratory testing, or estimated in the field using a pocket penetrometer, by thumb penetration tests, and other methods.

Wet soil means soil that contains significantly more moisture than moist soil, but in such a range of values that cohesive material will slump or begin to flow when vibrated. Granular material that would exhibit cohesive properties when moist will lose those cohesive properties when wet.

Exhibit 2 – Daily / Periodic Excavation Inspection Checklist

Daily / Periodic Excavation Inspection Checklist

ARCADIS	Daily / Periodic Excavation Inspection Checklist
Project Name:	Date / Time:
Project Number:	Location:
Prepared By:	Project Manager:

This checklist must be completed for all excavations. It documents that daily and post-event / periodic inspections are conducted.

Soil Classified As:	☐ Stable Rock	☐ Type A	☐ Type B	☐ Type C
Soil Classified On:	By:			
Type of Protective System in Use	☐ Sloping	☐ Shoring	☐ Shielding	☐ Benching	☐ Other
Description:				

Inspection Item	YES	NO	N/A	Comments
Has the ARCADIS Utility Clearance Procedure been completed?	☐	☐	☐	
Are underground installations protected from damage?	☐	☐	☐	
Has a Competent Person been identified?	☐	☐	☐	
Are adequate means of entry / exit available in the excavation – at least every 25 feet?	☐	☐	☐	
If exposed to traffic, are personnel wearing reflective vests and adequate barriers/traffic controls installed?	☐	☐	☐	
Do barriers exist to prevent equipment from rolling into the excavation?	☐	☐	☐	
Was air monitoring conducted prior to and during excavation entry?	☐	☐	☐	
Was the stability of adjacent structures reviewed by a registered P.E.?	☐	☐	☐	
Are spoil piles at least 2 feet from the excavation edge?	☐	☐	☐	
Is the excavation(s) readily visible ? If no, employees must be protected from falling by guardrail systems, fences, or barricades?	☐	☐	☐	
If the well, pit, shaft, or similar excavation is 6 feet (1.8m) or more in depth, are employees protected from falling by guardrail systems, fences, barricades?	☐	☐	☐	
Are work tasks completed remotely if feasible?	☐	☐	☐	
Is a protective system in place and in good repair?	☐	☐	☐	
Is excavation isolated from the effects of vibration?	☐	☐	☐	
Are employees protected from falling / elevated material?	☐	☐	☐	
Is soil classification adequate for current environmental / weather conditions?	☐	☐	☐	
Do portable ladders extend at least 3 feet above the excavation?	☐	☐	☐	
Are portable ladders or ramps secured in place?	☐	☐	☐	
Have all personnel attended safety meeting on excavation hazards?	☐	☐	☐	
Are support systems for adjacent structures in place?	☐	☐	☐	
Is the excavation free from standing water?	☐	☐	☐	
Is water control and diversion of surface run-off adequate?	☐	☐	☐	
Are employees wearing required protective equipment?	☐	☐	☐	
Excavation Competent Person:				Date/Time:

Exhibit 3 – Competent Person Evaluation Form for Excavation / Trenching

Exhibit 3 – Competent Person Evaluation Form for Excavation / Trenching

Name of Employee:_____Job Title:_____

Department: _____Office Location: _____

Experience with Excavations/Trenching:

_____

_____

_____

_____

_____

_____

Relevant Training:

_____

_____

_____

_____

_____

_____

_____

Other Relevant Qualifications:

_____

_____

_____

_____

_____

_____

_____

*Include documentation from employee's Supervisor that acknowledges their capacity to work as a designated competent person.

Based on the information listed above and an evaluation of this employee's knowledge and experience, I consider them to be a Competent Person for Excavation and Trenching.

Evaluation By: _____ Job Title: _____

Signature: _____ Date: _____

Executive Summary

All work to be performed outside of any office setting is required to have a properly prepared written Health and Safety Plan (HASP) in the field for employee use. To ensure the HASP meets Arcadis and regulatory expectations, the HASP must meet the minimum requirements set forth in this H&S standard (HSS):

- HASPs must be planned, prepared, and approved in advance of field work.
- The employee writing the HASP (HASP Writer) must have at a minimum 2 years of field experience.
- The employee reviewing the HASP (HASP Reviewer) must be approved by Corporate Health & Safety to perform review activities prior to performing HASP reviews.
- HASP may be prepared using HASP Templates on the H&S Site of the Source North America (Source NA) intranet page or other template meeting the requirements of this standard.
- All aspects of HASP preparation are expected to be billable to the project.
- Contact your assigned Business Line Health & Safety (H&S) Director or H&S Specialist for any questions on HASP preparation or implementation.

The HASP Reviewer is responsible for ensuring that the HASP has been written in accordance with Arcadis H&S policies and this standard, and for forwarding the HASP to the PM upon completion of the review. The HASP reviewer has the responsibility to sign the final version of the HASP.

Project staff are responsible for reading, understanding and complying with the HASP, asking questions and using their Stop Work Authority if there are requirements that are not understood.

No special training, other than the requirements for writer/reviewer as provide in Section 5.2, is required to implement this HSS.

1. POLICY

It is the policy of Arcadis that before every project involving work to be performed outside of any office setting, the Project Manager or designee, identifies and assesses hazards that may be encountered. Using this health and safety standard (HSS) and based on the hazard assessment and other factors, the Project Manager determines the need for and type of Health and Safety Plan (HASP) and other information necessary to protect Arcadis staff, subcontractors, clients, and the public during the completion of activities. The project team develops, implements, and regularly reviews and modifies the HASP and associated documents and information to ensure that project hazards are appropriately controlled on the project.

2. PURPOSE AND SCOPE

2.1 Purpose

This HSS provides guidance on the minimal requirements associated with HASP development and implementation.

2.2 Scope

This HASP standard applies to all Arcadis generated HASPs, regardless of format and client requirements.

3. DEFINITIONS

See Definitions in Exhibit 1.

4. RESPONSIBILITIES

4.1 Client Services Director (CSD)

The CSD is responsible for ensuring the client team members understand the requirements of the client and for stewarding H&S on client projects under their control.

4.2 Project Manager (PM)

The PM is responsible for the overall development and implementation of HASPs. The PM has primary responsibility to ensure the appropriate HASP is in place where necessary for project work, that requirements in the HASP are fully implemented during the course of work, that project personnel, exclusion zone visitors and relevant subcontractors are made aware of any changes made to the plan and are asked to sign the addendum, when utilized, that reflects the change. The PM may designate responsibility to ensure that the Task Manager or Site Safety Officer will confirm that all required Arcadis employees have signed the HASP indicating they have reviewed and understand the contents of the HASP.

The PM will also ensure that the project HASP is reviewed and amended as necessary:

1) At least annually; ***and,***

2) Any time during work when a new task is introduced, when the scope of work changes and/or as site conditions warrant a change.

The PM shall ensure the HASP Writer selected has sufficient knowledge and understanding of project site conditions and the scope of work to be performed. The PM will confirm that the HASP writer is aware of and addresses client requirements related to H&S.

4.3 Task Manager (TM)

The Task Manager is responsible for some or all requirements expected by the PM, if the PM designated some or all responsibilities to the TM. TM responsibilities for HASP preparation and implementation will be clearly defined the PM.

4.4 HASP Writer

A HASP Writer can be anyone with at least 2 years of field experience, has attended the Arcadis H&S Orientation training, and has relevant knowledge of the hazards likely to be encountered on the project. The HASP Writer will write the HASP in accordance with Arcadis H&S policies, this standard and shall forward the HASP to an approved HASP Reviewer. The HASP Writer must have sufficient understanding and project site conditions and project scope of work to effectively develop a functional HASP. The HASP Writer has the responsibility to the sign the final version of the HASP.

4.5 HASP Reviewer

The HASP Reviewer is responsible for ensuring that the HASP has been written in accordance with Arcadis H&S policies and this standard, and for forwarding the HASP to the PM upon completion of the review. The HASP reviewer has the responsibility to sign the final version of the HASP.

4.6 Project Team Members

Project staff are responsible for reading, understanding and complying with the HASP, asking questions and using their Stop Work Authority if there are requirements that are not understood. Project staff are expected to adhere and conform to the H&S requirements of the HASP and to talk with a supervisor, manager or H&S Representative regarding any concerns or problems they have with the HASP.

4.7 Corporate H&S Staff

Corporate H&S staff are responsible for assuring the development and implementation of this standard, development of HASP templates for staff use, ensuring regulatory requirements associated with HASP content are current, and provide overall stewardship of the HASP process.

5. PROCEDURE

5.1 HASP Planning

The PM or designated TM should consider HASP scheduling and budgeting during the project setup phase as directed by the Arcadis Project Management Office (PMO). During planning, considerations should be given to the HASP template anticipated to be used for the project as the template used can have an impact on project schedule and budget. These templates include, but are not limited to:

- Arcadis Standard Excel HASP Template (Excel® HASP template) for projects with standard and limited scopes of work not requiring submittal to a regulatory agency [excludes Incident Response and Remediation (IRR) projects].
- Arcadis Word HASP Template (Word® HASP template) for projects with complex scopes of work and projects where the HASP is required to be submitted for regulatory agency review and/or approval. This HASP template should also be considered for all projects occurring in the state of California.
- *Client HASP Templates* as required and meeting the minimum requirements prescribed by this standard.

The planning process shall also identify a:

- HASP writer who is a member of the project team and meeting the HASP Writer requirements specified in this standard;
- HASP Reviewer who is approved for the HASP being prepared and is listed on the HASP Reviewer list;
- Engineering Judgment (EJ) employee for projects requiring a Traffic Safety Plan (TSP), addressing traffic controls in the public right-of way (ROW), when required by the Arcadis Traffic Safety Program and as needed a
- Current HazMat #1*, Complete DOT/IATA Hazardous Materials Shipping and Transportation* trained employee who is a member of the project team to perform any required Shipping Determinations.

Projects utilizing the Word HASP Template, PMs (or designated) TMs should utilize the Project H&S Planning Form to facilitate the planning process. The form does not need to be completed if equivalent information is included in Project Management Office (PMO) prescribed planning processes.

For projects utilizing Excel® HASP templates that include or are derived from the Arcadis Standard Excel HASP Template, the use of the Project Planning Form is not required, but first time HASP preparers or PMs or TMs new to the HASP preparation process should consider using the Project Planning Form to guide them in the HASP preparation process.

5.2 HASP Development

5.2.1 HASP Writer Qualifications

Any employee with 2 or more years field experience may prepare a HASP using any Arcadis approved template.

5.2.2 Required HASP Content

The HASP must contain the following elements, at a minimum:

- A Hazard analysis providing an identification of hazards anticipated for the project and potential severity of identified hazards;
- Controls to be used to mitigate the hazards identified including (in order of preference):
    - Engineering controls;
    - Administrative controls; and/or
    - Personal protective equipment.
- Emergency action planning and response including but not limited to:
    - Identification, location and description of routes to the nearest hospital;
    - On site medical assistance and first aid;
    - Emergency assembly areas (for on-site and weather emergencies); and
    - Emergency communications and phone numbers.

If applicable to the scope of work, the following must also be constructed in conjunction with HASP development:

- ROW and/or Non-ROW TSPs prescribed by the Arcadis Traffic Safety Program;
- International Travel Safety and Security Plan and affiliated supplemental plans required by the plan template are required by the Arcadis International Travel H&S Standard
- Lone or Remote Worker Plan when required by the Standard Excel HASP Template or the PM.
- Journey Management Plan when required by the Standard Excel HASP Template or the PM.
- Site Security Plan when required by the Standard Excel HASP Template or the PM.
- Injury and Illness Prevention Plan (specific to California but may be used for any project) when required by the Standard Excel HASP Template or the PM.

- Heat Related Illness Prevention Plan (specific to California and Washington state but may be used for any project) when required by the Standard Excel HASP Template or the PM.
- Shipping determination(s) as prescribed by the Arcadis Transportation Safety Program for HazMat Shipping and Transportation; and/or Identification of tasks or work activities subject to Task Improvement Process (TIPs) activities and frequency at which TIPs will be conducted in accordance with the Arcadis Behavior Based Safety Program.

HASPs used for projects having a Hazardous Waste Operations and Emergency Response component must also include:

- Site description;
- Site topography and surrounding land use;
- Scope of work;
- Staff roles and responsibilities;
- Staff training requirements;
- Hazard communication/Global Harmonization System (GHS) requirements;
- An evaluation of air monitoring requirements and presentation of an air monitoring plan, if air monitoring is required;
- Medical surveillance requirements;
- Site control requirements;
- Personal and/or equipment decontamination requirements;
- Levels of protection (Levels A through D), as applicable or required, but must address Level D in all cases;
- Requirements for safety briefings; and
- Safety equipment required to be on site.

5.2.3 HASP Review and HASP Reviewer Qualifications

Upon completion of the HASP, the HASP writer will forward the completed HASP including any JSAs, Shipping Determinations, and/or TSPs prepared in conjunction with the HASP to an approved HASP Reviewer for review and approval.

HASP Reviewers must be approved by Corporate Health and Safety. The approval process is initiated by staff submitting the standard HASP Reviewer Request Form. The request will be reviewed by either the appropriate Business Line H&S Director. If approved, the requestor's name will be added to the Approved HASP Reviewer List. Individuals seeking Reviewer status must have 10 years' experience in the technical field where they will be performing HASP reviews (Environment business line work, Water business line work, etc.). Additionally, to be approved as a HASP Reviewer, the employee must have demonstrable experience in preparation of HASPs and execution of HASP requirements (served as site safety officer on field projects) for the previous 8 years. A current list of HASP Reviewers is posted on the H&S page of The Source NA and are listed on the Cover worksheet in the Excel HASP Template.

TSPs associated with any HASP are required to be submitted to an Engineering Judgment (EJ) employee for approval if prompted to submit to an EJ reviewer in the TSP template or Arcadis Traffic Safety Handbook. EJ employee qualifications are described in ARC DOT-302 in the Arcadis Traffic Safety Program for Work in the Public Right of Way.

5.2.4 HASP Development Cost Allocation

All HASP planning, preparation, review and revision activities including, but not limited to, preparation of JSAs, mandated supplemental plans and documents listed in Section 5.2.2 , HASP addendums and/or permits are expected to be project billable activities.

6. TRAINING

No special training, other than the requirements for writer/reviewer as provide in Section 5.2, is required to implement this HSS.

7. REFERENCES

Project Health and Safety Planning Form (for use with the Word HASP Template)

Health and Safety Orientation Training

HASP Templates

ARC HSMS002-HARC Standard

ARC HSGE022-International Travel Health and Safety Standard

OSHA HAZWOPER Standard 29 CFR 1910.120

Arcadis Transportation Safety Program (shipping determinations and traffic safety information)

Arcadis Legal File Retention Policy

8. RECORDS

During on-site activities, a signed copy (hardcopy is preferable) of the HASP must be present at the site. HASPs and supplemental forms and/or permits will be maintained in the applicable project files per the Arcadis Legal File Retention Policy and/or the client contract, which may be more stringent. Also refer to individual Arcadis HSS for additional, potentially more stringent, recordkeeping requirements related to specific activities (e.g., refer to the Industrial Hygiene HSS for occupational exposure monitoring recordkeeping requirements, which must be maintained for 30 years).

9. APPROVALS AND HISTORY OF CHANGE

Approved by: Julie Santaniello, CSP, H&S Manager of Technical Standards



History of Change:

Revision Date	Revision Number	Original Author/Approver or Revised By	Reason for change
	01	M. Ramer/M. Thomas	Original document
3/12/04	02		Process regarding Subcontractor review
4/22/05	03		Revision of H&S Plan templates and PM Checklist
6/11/07	04		Updated format and LPS/JSA use
1/16/08	05		Updated to include reference to Field H&S Handbook
5/8/08	06		Updated for revised HASP preparation process and templates
5/7/2013	07	S. Moyers	Updated for revised HASP names and templates; Comprehensive revision of content throughout to reflect new practices and procedures; Executive summary updated, definitions moved to Exhibit 1; hyperlinks for reference documents added
12/26/2017		S Moyers/J. Santaniello	Updated for revised HASP names and templates; comprehensive revision of content throughout to reflect new practices and procedures. Incorporation of International Travel Safety and Security Plan information. Updated Section 8. Fixed hyperlinks.

Exhibit 1 - Definitions

Emergency Action Plan (EAP) is a document that contains emergency contact information, local emergency responders (e.g.; fire, police, ambulance, etc.), project specific emergency information and actions, etc.

Field Health & Safety Handbook (FHSHB) is an Arcadis guidance document containing topic-specific health and safety information applicable to Arcadis employees.

Hazard Assessment, Risk Assessment and Control (HARC) is a standardized process used during HASP preparation to facilitate hazard identification and control for work tasks. Requirements for HARC use are addressed in Arcadis H&S HARC Standard – ARC HSMS002.

Health and Safety Plan (HASP) as defined by this standard and/or by OSHA 29 CFR 1910.120 is a document addressing identified hazards and controls to be used to eliminate or mitigate identified hazards during work. The HASP also includes Emergency Action Plan (EAP) information and other Arcadis and other regulatory required information to effectively protect workers and the public.

Job Safety Analysis (JSA) is a focused 1 to 2-page document that is developed in accordance with the Arcadis behavior based safety (BBS) program addressing the job steps, hazards and controls to be used to eliminate or mitigate hazards for a specific job task.

Level C Supplement is a document addressing Hazardous Waste Operations and Emergency Response (HAZWOPER) Level C personal protective equipment (PPE) requirements. The Level C Supplement must be attached to or integrated into the Standard Template HASP for projects where Level C conditions will exist or are reasonably anticipated.

Shipping Determination is a written document describing the classification and identification of materials being shipped or transported for a project. The Shipping Determination is considered part of the HASP and the requirements for preparing Shipping Determinations are presented in the Arcadis Transportation Safety Program for Hazardous Materials Shipping and Transportation.

Traffic Safety Plan (TSP) is a document used to identify applicable vehicular and/or pedestrian traffic controls in the public right -of-way (ROW) or in other locations, such as parking lots) where vehicular and/or pedestrian traffic controls are required (Non-ROW) as prescribed by the Arcadis Traffic Safety Program.

Implementation Date 1 June 2009	Arcadis HS Standard Name Hazard Communication	ARCADIS Design & Consultancy for natural and built assets
Revision Date 27 May 2016	Arcadis HS Standard No. ARC HSGE007	Revision Number 05

EXECUTIVE SUMMARY

The purpose of this Health and Safety Standard (HSS) is to provide direction on the development and implementation of an office location or project specific Hazard Communication (HazCom) program. Each office or project site that is subject to the HazCom standard shall have a written program regarding chemical use and storage.

Arcadis is committed to preventing accidents and ensuring the safety and health of our employees. Arcadis will comply with applicable federal and state health and safety rules. Under this standard, employees will be informed of the contents of the OSHA Hazard Communications standard, the hazardous properties of chemicals in the work area, safe handling procedures and chemical protective measures.

This HazCom HSS applies to all office locations and project sites that store or use hazardous chemicals/products on site (office or field).

Every office within Arcadis shall develop and maintain a written HazCom program specific to their location and activities. With the exception of the sections regarding “Labeling” and “Safety Data Sheets,” use of hazardous chemicals at Arcadis laboratories is exempt from the requirements of this hazard communication standard.

For project sites, the project Health and Safety plan (HASP) shall serve as the documented written HazCom program for that site.

A Master Inventory List (MIL) is an inventory of all chemicals/products found on-site. At each location or project site, an inventory of the hazardous chemicals present shall be completed at least once per year, or as new chemicals are introduced to or removed from the location and more often as necessary. All primary and secondary containers of hazardous chemicals/products listed on the MIL must be labeled.

The SDS shall be obtained, reviewed and then maintained for each chemical subject to the HazCom standard. It shall be readily available to all employees who may use or may be exposed to the hazardous chemicals.

Employees who may be exposed to hazardous chemicals/products under normal operating conditions or in foreseeable emergency situations shall receive HazCom training. Arcadis shall provide employees with effective information and training on hazardous chemicals in their work area at the time of their initial assignment, and whenever a new chemical hazard the employees have not previously been trained about is introduced into their work area.

The SDSs shall be kept at the office location or in the project files.

HazCom training records will be kept in the corporate training database.

1. POLICY

It is Arcadis policy to inform all employees of the hazardous chemicals they may encounter during their work activities. This shall be accomplished through the development and implementation of a location and project specific hazard communication process that includes Safety Data Sheets (SDS), container labeling, and training. Hazard Communication (HazCom) requires a written program specific to each location or project site where hazardous chemicals/products are used or stored.

This HSS meets the requirements outlined in the final rule revising the OSHA Hazard Communication Standard (29 CFR 1910.1200) to be consistent with the United Nations Globally Harmonized system of Classification and Labeling of Chemicals.

2. PURPOSE AND SCOPE

2.1 Purpose

The purpose of this Health and Safety Standard (HSS) is to inform employees, contractors, and subcontractors about potential hazards associated with routinely used chemicals/products. A checklist that will assist in evaluating conformance with this standard is found in Exhibit 2.

Each office or job site that is subject to the HazCom standard shall have a written program regarding chemical use and storage. The program should describe how the requirements of this standard will be met. The program should address the following:

- Master Inventory List (MIL)
- SDS
- Container Labeling
- Chemicals in Pipes
- Contractor Requirements
- Training

The transmittal of information is to be accomplished by means of comprehensive hazard communication programs, which are to include container labeling and other forms of warning, safety data sheets and employee training.

2.2 Scope

This HazCom HSS applies to office locations and job sites that store or use hazardous chemicals/products on site (office or field) in such a manner that employees may be exposed under normal conditions of use or in a foreseeable emergency. Use of a hazardous chemical includes generation of that chemical as a byproduct.

3. DEFINITIONS

There are a number of definitions associated with this standard and its associated procedures. These definitions are presented in Exhibit 1 of this document.

4. RESPONSIBILITIES

4.1 Corporate Health & Safety

Corporate H&S staff are responsible for assisting the locations and project sites with the development and implementation of the required HazCom program. In addition, provide the tools and resources for employees to have access to information on hazardous chemicals. In addition, Corporate H&S shall review the program for effectiveness periodically and when program deficiencies are identified.

4.2 Location Leaders and Office H&S Coordinators

Location Leaders and H&S Coordinators are responsible for the development and implementation of a HazCom program in their location.

As applicable, local H&S Coordinators are responsible for ensuring that employees are provided with training and information about specific labeling systems in use at their office (e.g., HMIS III, NFPA, etc.).

4.3 Employees

Employees are responsible for reviewing SDS of the substances they are going to work with and make sure they understand all relevant information as well as take necessary precautions. They are responsible for ensuring that containers of hazardous chemicals they are using are appropriately labeled and if not, for obtaining the proper labeling.

4.4 Supervisors

Supervisors (or Group Leaders) are responsible for providing the necessary resources for the appropriate development and implementation of an appropriate HazCom program and to ensure the company is operating in accordance with this policy by performing periodic reviews, task observations and/or conformance assessments.

4.5 Project Managers and Principals in Charge

Project Managers (PM) and Principals in Charge (PICs) are responsible for ensuring that a HazCom program is developed and implemented on projects where hazardous chemicals are used or encountered. PMs and PICs are also responsible for understanding their clients' requirements for HazCom and that hazardous chemical information is shared with the client and other affected contractors/subcontractors on site. In addition, PICs and PMs are responsible for ensuring their project staff has had training in HazCom per this HSS.

As applicable, PMs and PICs are responsible for ensuring that employees are provided with training and information about specific labeling systems in use at project sites (e.g., HMIS III, NFPA, etc.).

4.6 Site Safety Officers

Site Safety Officers (SSOs) will act as the HazCom Program Coordinator for the project sites and shall maintain the MIL of hazardous chemicals kept on the job Site. The SSO is responsible for maintaining SDS on Site for those hazardous chemicals being used by Arcadis staff on site. The SSO is responsible to communicate the location of the SDS and the hazards associated with these chemicals to project Site Arcadis employees and potentially affected subcontractors during the initial tailgate safety meeting and/or safety orientation. The SSO shall ensure that all containers of chemicals (bag, barrel, bottle, box, can, cylinder, drum, reaction vessel, storage tank, or the like) are labeled appropriately and will provide additional details regarding any specific labeling system in use at the project location (e.g., HMIS III, NFPA, etc.).

> **Note:** In those instances where an Arcadis subcontractor is using a hazardous chemical on site, the SSO shall obtain a copy of the SDS and maintain in the on-site project file for reference by Arcadis employees, contractor employees or client/facility staff.

When working at a multi-employer work-site in which Arcadis and/or our subcontractor will produce, use, or store hazardous chemicals at a workplace in such a way that the employees of other employer(s), including but not limited to facility management and/or our client's employees, may be exposed, then the SSO shall ensure the following is addressed:

- A copy of the applicable SDS has been provided to those employers;
- Discuss any necessary precautionary measures that need to be taken to protect employees during the workplace's normal operating conditions and in foreseeable emergencies; and
- The labeling system that will be used in the workplace.

5. PROCEDURE

5.1 Written Program

Every office within Arcadis shall develop and maintain a written HazCom program specific to their location and activities. The program should be developed using the template provided in Exhibit 3 of this standard. The program shall be reviewed annually. The written program shall be maintained in a location that is accessible to each employee when they are in the office. Employees shall be notified of its presence and how to access it.

For project sites, the project H&S plan (HASP) shall serve as the documented written HazCom program for that site. The HASP shall provide information about the chemicals present on the site (inventory), the location of the SDS on site, and the labeling of containers. In addition, the required training shall be part of the site orientation and the daily or more frequent tailgate meetings at the project site.

5.2 Master Inventory List

A Master Inventory List (MIL) is an inventory of all chemicals/products found on-site. At each office location or project site, an inventory of the hazardous chemicals present shall be completed at least once per year, or as new chemicals are introduced to or removed from the location and more often as necessary. This inventory shall be developed into a MIL of hazardous chemicals. This inventory includes hazardous chemicals present in piping and those that may be generated as a byproduct of other activities.

Upon completion of the inventory, it shall be determined if any of the chemicals/products identified are exempt from the appropriate HazCom standard that is applicable to the location. If the chemicals/products at the location are exempt from HazCom, it shall be noted on the MIL. The MIL shall be made available to all employees and should be kept current and accurate. The MIL for a project will be found in the HASP. A sample MIL form for office use is found in Exhibit 4.

Common chemical exemptions include:

1. Foods, drugs, or cosmetics intended for personal consumption by employees;
2. Any consumer product or hazardous substance used in the workplace in the same manner as normal consumer use, and which use results in a duration and frequency of exposure which is not greater than exposures experienced by consumers; and
3. Office products to which office workers would have non-route exposure.

Exhibit 5 provides a listing of those chemicals which are commonly determined to be exempt in Arcadis offices. However, each office and project site must determine what is exempt by using the exemption descriptions above.

The MIL shall be reviewed periodically. Any new chemicals/products will be added and those no longer in use or kept at the office or job site shall be deleted.

5.3 GHS Labeling Requirements

All primary and secondary containers of hazardous chemicals/products listed on the MIL must be labeled. Labels or other forms of warning will be legible, in English, and prominently displayed on the container, or readily available in the work area. For employees who speak another language(s), information may be added in their language to the label or other form of warning. Exhibit 6 provides examples of GHS compliant labels.

5.3.1 Labels on Shipped Containers

The chemical manufacturer, importer, or distributor shall ensure that each container of hazardous chemicals leaving the workplace is labeled, tagged or marked. Hazards not otherwise classified do not have to be addressed on the container. Where the chemical manufacturer or importer is required to label, tag or mark the following information shall be provided on containers shipped to Arcadis:

- Product Identifier;

- A signal word, either “Danger” or “Warning”;
- Hazard statement(s);
- A standard pictogram(s);
- Precautionary statement(s); and
- The name, address and telephone number of the chemical manufacturer, importer or other responsible party.

5.3.2 Workplace Labeling

Arcadis shall ensure that each container of hazardous chemicals in the workplace is labeled, tagged or marked with either:

- A product identifier, a signal word (either “Danger” or “Warning”), hazard statement(s), standard pictogram(s), and precautionary statement(s); or
- Product identifier and words, pictures, symbols, or combination thereof, which provide at least general information regarding the hazards of the chemicals, and which, in conjunction with the other information immediately available to employees under the hazard communication program, will provide employees with the specific information regarding the physical and health hazards of the hazardous chemical.

  Note: Arcadis may use signs, placards, process sheets, batch tickets, operating procedures, or other such written materials in lieu of affixing labels to individual stationary process containers, as long as the alternative method identifies the containers to which it is applicable and conveys the information required by the hazardous chemicals in the workplace labeling requirement. Arcadis must also ensure the written materials are readily accessible to the employees in their work area throughout each work shift.

The supervisor of each work area must ensure that secondary chemical containers are properly labeled. Secondary chemical container labeling can be labeled with the same shipping container labels, or information that communicates the following:

- Identity of the chemical.
- Hazards of the chemical.

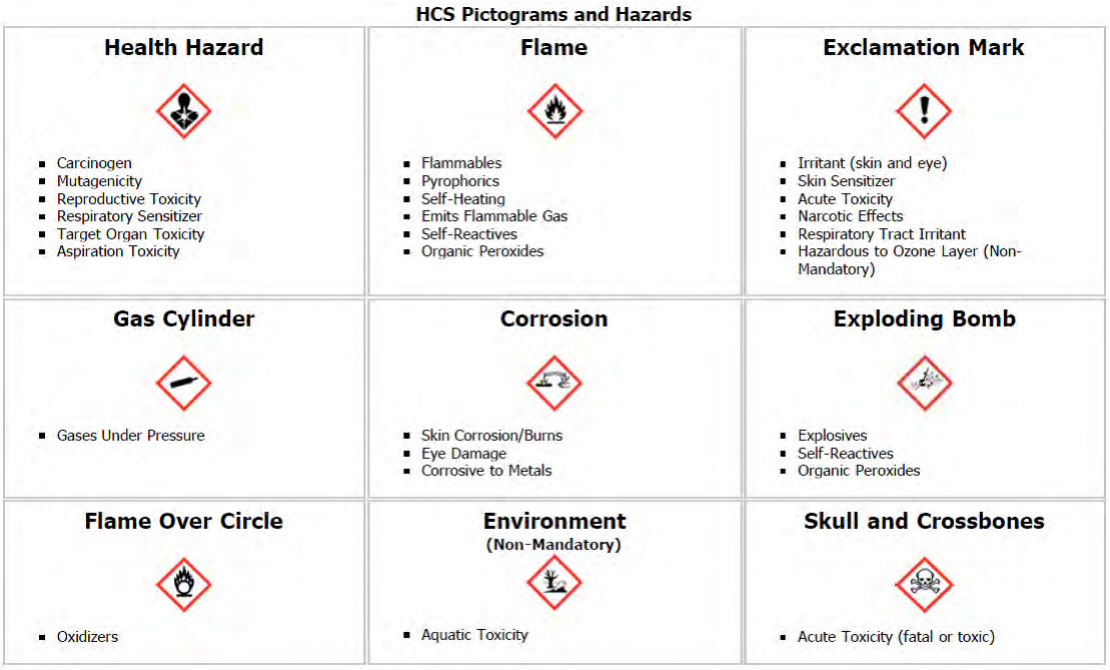
The label may use a combination of words, symbols or pictures to communicate this information. The company will use a standard labeling method for all secondary containers.

Note: Arcadis is not required to label portable containers into which hazardous chemicals are transferred from labeled containers, and which are intended only for the immediate use of the employee who performs the transfer, however, best management practice would be that all portable containers, even those intended only for the

immediate use by employees, should be labeled with chemical identity and hazard information, where feasible.

5.3.3 Hazard Communication Standard Pictograms

The Hazard Communication Standard pictograms and hazards are defined as follows:



5.3.4 Hazard Classifications

Hazard Class	Type of Hazard	Hazard Category	Comment
Hazard Not Otherwise Classified			Added for hazards like combustible dust
Flammable Liquids	Physical	1-4	
Flammable Solids	Physical	1-2	
Self-Reactive Substances	Physical	A-G (types)	
Pyrophoric Liquids	Physical	1	
Pyrophoric Solids	Physical	1	
Self-Heating Substances	Physical	1-2	
Substances – emit flammable gas with contact with water	Physical	1-3 and not classified	

Hazard Class	Type of Hazard	Hazard Category	Comment
Oxidizing Liquids	Physical	1-3	Based on results
Oxidizing Solids	Physical	1-3	Based on results
Organic Peroxide	Physical	A-G (type)	A = detonate as packaged
Substances Corrosive to Metal	Physical	1	Based on results
Acute Toxicity	Health	1-5	Further divided by oral, dermal, gases, vapors, dust/mist
Skin Corrosion	Health	1a – 1c; 2-3	
Skin Irritation	Health	1	
Eye Effects	Health	1; 2a – 2b	
Sensitization	Health	Respiratory 1-2 Skin 1	
Germ Cell Mutagenicity	Health	1a – 1b; 2	
Carcinogenicity	Health	1a – 1b; 2	
Reproductive Toxicity	Health	1a – 1b; 2 and lactation	
Target Organ System Toxicity	Health	Single Exposure: 1-3 Repeated Exposure: 1 - 2	
Aspiration Hazard	Health	1-2	
Hazardous to Aquatic Environment	Environmental	N/A	
Acute Aquatic Toxicity	Environmental	1-3	
Chronic Aquatic Toxicity	Environmental	1-4	
Explosive	Physical	1.1 – 1.6 (divisions)	1.1 most severe
Flammable Gasses	Physical	1-2	Based on results
Flammable Aerosols	Physical	1-2	Based on results
Oxidizing Gases	Physical	1	
Gasses Under Pressure (e.g., compressed gas)	Physical	1-4	1 = entirely gaseous

5.3.5 Missing Labels

Labels on received chemicals must not be removed or defaced. Missing, defaced or illegible labels shall be replaced immediately with clean, properly marked ones. Shipments that show damage/leak/or spill are to be refused.

5.4 Safety Data Sheets

A SDS shall be obtained and then maintained for each chemical subject to the Hazard Communication standard. It shall be readily available to all employees who may use or be exposed to the applicable chemicals. The SDS is the principal means of conveying chemical-specific information to the user. SDS's must be present for each hazardous chemical used in the field.

SDS for those hazardous substances purchased or obtained by Arcadis or are in their original container from the manufacturer or have been transferred from their original container to a secondary container, shall be those specific SDS developed and provided by the manufacturer for that specific substance. Manufacturer SDS often are found on the manufacturer's website. SDS for hazardous substances identified in the environmental media as contaminants can be obtained as generic SDS from an on-line or web-based source.

The SDS shall contain at least the following:

1. Identification
    - Product identifier used on the label;
    - Other means of identification;
    - Recommended use of the chemical and restrictions on use;
    - Name, address, and telephone number of the manufacturer, importer, or other responsible party; and
    - Emergency phone number
2. Hazard(s) identification
    - Classification of the chemical in accordance with paragraph (d) of §1910.1200;
    - Signal word, hazard statement(s), symbol(s) and precautionary statement(s) in accordance with paragraph (f) of §1910.1200. (Hazard symbols may be provided as graphical reproductions in black and white or the name of the symbol, e.g., flame, skull and crossbones);
    - Describe any hazards not otherwise classified that have been identified during the classification process;
    - Where an ingredient with unknown acute toxicity is used in a mixture at a concentration = 1% and the mixture is not classified based on testing of

the mixture as a whole, a statement that X% of the mixture consists of ingredient(s) of unknown acute toxicity is required.

3. Composition/information on ingredients

   For Substances

   - Chemical name;
   - Common name and synonyms;
   - CAS number and other unique identifiers; and
   - Impurities and stabilizing additives which are themselves classified and which contribute to the classification of the substance.

   For Mixtures

   In addition to the information required for substances:

   - The chemical name and concentration (exact percentage) or concentration ranges of all ingredients which are classified as health hazards in accordance with paragraph (d) of §1910.1200 and are present above their cut-off/concentration limits; or present a health risk below the cut-off/concentration limits.
   - The concentration (exact percentage) shall be specified unless a trade secret claim is made in accordance with §1910.1200(i), when there is batch-to-batch variability in the production of a mixture, or for a group of substantially similar mixtures with similar chemical composition. In these cases, concentration ranges may be used.

   For All Chemicals Where a Trade Secret is Claimed

   Where a trade secret is claimed in accordance with paragraph (i) of§1910.1200, a statement that the specific chemical identity and/or exact percentage of composition (concentration) has been withheld as a trade secret is required.

4. First-aid measures

   - Description of necessary measures, subdivided according to the different routes of exposure, i.e., inhalation, skin and eye contact, and ingestion.
   - Most important symptoms/effects, acute and delayed.
   - Indication of immediate medical attention and special treatment needed, if necessary.

5. Fire-fighting measures

   - Suitable (and unsuitable) extinguishing media.

- Specific hazards arising from the chemical (e.g., nature of any hazardous combustion products).

6. Accidental release measures

   - Personal precautions, protective equipment, and emergency procedures.
   - Methods and materials for containment and cleaning up.

7. Handling and storage

   - Precautions for safe handling

8. Exposure controls/personal protection

   - OSHA permissible exposure limit (PEL), American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV), and any other exposure limit used or recommended by the chemical manufacturer, importer, or employer preparing the safety data sheet, where available.
   - Appropriate engineering controls.

9. Physical and chemical properties

   - Appearance (physical state, color, etc.);
   - Odor;
   - Odor threshold;
   - pH;
   - Melting point/freezing point;
   - Initial boiling point and boiling range;
   - Flash point;
   - Evaporation rate;
   - Flammability (solid, gas);
   - Upper/lower flammability or explosive limits;
   - Vapor pressure;
   - Vapor density;
   - Relative density;
   - Solubility(ies);
   - Partition coefficient: n-octanol/water;
   - Auto-ignition temperature;
   - Decomposition temperature; and
   - Viscosity.

10. Stability and reactivity

    - Reactivity
    - Chemical stability;
    - Possibility of hazardous reactions;
    - Conditions to avoid (e.g., static discharge, shock, or vibration);

- Incompatible materials; and
- Hazardous decomposition products.

11. Toxicological information

Description of the various toxicological (health) effects and the available data used to identify those effects, including:

- Information on the likely routes of exposure (inhalation, ingestion, skin and eye contact);
- Symptoms related to the physical, chemical and toxicological characteristics;
- Delayed and immediate effects and also chronic effects from short- and long-term exposure;
- Numerical measures of toxicity (such as acute toxicity estimates);
- Whether the hazardous chemical is listed in the National Toxicology Program (NTP) Report on Carcinogens (latest edition) or has been found to be a potential carcinogen in the International Agency for Research on Cancer (IARC) Monographs (latest editions), or by OSHA.

12. Ecological information (Non-Mandatory)

To be GHS-compliant the requirements for this section are provided.

- Ecotoxicity (aquatic and terrestrial, where available);
- Persistence and degradability;
- Bioaccumulative potential;
- Mobility in soil.

13. Disposal considerations (Non-Mandatory)

To be GHS-compliant the requirements for this section are provided.

- Description of waste residues and information on their safe handling and methods of disposal, including the disposal of any contaminated packaging.

14. Transport information (Non-Mandatory)

To be GHS-compliant the requirements for this section are provided.

- UN number;
- UN proper shipping name;
- Transport hazard class(es);

- Packing group, if applicable;
- Environmental hazards (e.g., Marine pollutant (Yes/No));
- Transport in bulk (according to Annex II of MARPOL 73/78 and the IBC Code);
- Special precautions, which a user needs to be aware of, or needs to comply with, in connection with transport or conveyance either within or outside their premises.

15. Regulatory information (Non-Mandatory)

To be GHS-compliant the requirements for this section are provided.

- Safety, health and environmental regulations specific for the product in question.

16. Other information, including date of preparation or last revision.

A master file of SDSs will be maintained and SDSs shall be made readily available to employees at a central office location or a readily available location at the project site. The SDS master file shall be reviewed, at a minimum, annually or any time the MIL is updated. Any obsolete or outdated SDSs shall be removed from the master file and maintained in a secondary “obsolete” or “outdated” SDS file that shall be retained for at least 30 years.

5.4.1 Multi-Employer Work Sites

If appropriate, the written program will include information regarding how other employers at the workplace will be provided the following:

- Access to SDSs for chemicals/products introduced to the workplace by Arcadis;
- Information on precautions that should be taken regarding these chemicals/products; and
- Information regarding any site-specific labeling system.

This information will be communicated as part of a contractor site safety orientation. In addition, clients frequently ask for us to provide SDS for the chemicals Arcadis will bring onto their sites. If Arcadis or our contractor will produce, use, or store hazardous chemicals at a workplace in such a way that the employees of other employer(s) may be exposed, then the Arcadis SSO must provide the appropriate SDS to the client along with information on precautions that should be taken regarding these chemical products and information about our site specific labeling system.

As applicable, Arcadis field and office staff can also ask the client or other parties working in their vicinity for SDS of hazardous substances being used by client or other parties at a project or office location.

5.5 Chemicals in Pipes

Some work activities are performed by employees in areas where chemicals are transferred through pipes. Prior to starting work in these areas, employees should contact owner/operator for information regarding:

- The chemicals in the pipes, or the insulation material on the pipe;
- Potential hazards; and
- Safety and emergency evacuation precautions to be taken.

5.6 Laboratories

With the exception of the sections regarding “Labeling” and “Safety Data Sheets,” use of hazardous chemicals at Arcadis laboratories is exempt from the requirements of this hazard communication standard. Laboratories using hazardous chemicals must comply with the requirements of a Laboratory Chemical Hygiene Plan.

The following Hazard Communication requirements apply to Arcadis laboratories:

- Laboratory staff shall ensure that labels on incoming containers of hazardous chemicals are not removed or defaced;
- Laboratory staff shall maintain any safety data sheets that are received with incoming shipments of hazardous chemicals, and ensure that they are readily accessible during each work-shift to laboratory employees when they are in their work areas;
- Laboratory employees must be provided with information and training in accordance with Section 6 of this standard, excluding information about the location and availability of the written hazard communication program; and
- Arcadis Laboratories that ship hazardous chemicals are considered to be either a chemical manufacturer or a distributor, and thus must ensure that any containers of hazardous chemicals leaving the laboratory are labeled in accordance with Section 5.3 of this Standard, and that a safety data sheet is provided to distributors and other employers.

6. TRAINING

All employees who may be exposed to hazardous chemicals/products under normal operating conditions, or in foreseeable emergency situations, shall receive Hazard Communication training. Arcadis shall provide employees with effective information and training on hazardous chemicals in their work area at the time of their initial assignment, and whenever a new chemical hazard the employees have not previously been trained about is introduced into their work area. Information and training is designed to cover categories of hazards (e.g., flammability, carcinogenicity) or specific chemicals. Chemical-specific information is always available to employees through labels and safety data sheets.

Training will be followed per the requirements and instruction outlined by the Corporate Training group and Corporate H&S.

Arcadis employees will be informed of:

- The requirements contained in the Hazard Communication Standard 29 CFR 1910.1200;
- Any operations in their work area where hazardous chemicals are present;
- The location and availability of the written HazCom program; and
- The location of the MIL and SDS.

Initial HazCom training shall include the following elements:

- Methods and observations that may be used to detect the presence or release of a hazardous chemical in the work area (such as monitoring conducted by the employer, continuous monitoring devices, visual appearance or odor of hazardous chemicals when being released, etc.);
- The physical, health, simple asphyxiation, combustible dust and pyrophoric gas hazards, as well as hazards not otherwise classified, of the chemicals in the work area;
- The measures employees can take to protect themselves from these hazards, including specific procedures Arcadis has implemented to protect employees from exposure to hazardous chemicals, such as appropriate work practices, emergency procedures, and personal protective equipment to be used; and
- The details of the hazard communication program developed by Arcadis, including an explanation of the labels received on shipped containers and any office/project specific labeling system used by Arcadis, the safety data sheet, including the order of information and how employees can obtain and use the appropriate hazard information. The training will reinforce that here at Arcadis the primary and secondary containers of hazardous chemicals/products listed on the MIL must be labeled.

Whenever a new chemical hazard the employees have not previously been trained about on is introduced into their work area, each employee of that area will be given information as outlined above.

7. REFERENCES

29 CFR 1910.1200 “Hazard Communication Standard”

8. RECORDS - DATA RECORDING AND MANAGEMENT

The SDSs shall be kept at the office location or in the project files. The Hazard Communication Standard requires that Arcadis maintain copies of SDSs for each hazardous chemical used in the workplace. Arcadis may discard a SDS for a mixture, if the new data sheet includes the same hazardous chemicals as the original formulation. If the formulation is different, then Arcadis must maintain all versions of these SDS for at least 30 years. OSHA standard, 29 CFR 1910.1020, Access to Employee Exposure and Medical Records defines "employee exposure records" to

include SDSs. The Access to Employee Exposure and Medical Records standard requires all employee exposure records to be maintained for at least 30 years.

Once a SDS is deemed to be "obsolete", Arcadis will indicate the date of last use on the SDS and then maintain a copy of these SDS be placing them into an "obsolete" SDS folder (paper copy or electronic file copy is acceptable) which will be maintained for at least 30 years past the date of last use by an Arcadis employee.

Employee training records will be kept in the corporate training database.

9. APPROVALS AND HISTORY OF CHANGE

Approved By:

Julie Santaniello, CSP - Corporate H&S, Manager of Technical Programs



History of Change

Revision Date	Revision Number	Standard Developed/Reviewed By or Revised By	Reason for change
1 June 2009	01	Mike Thomas	Original document
18 April 2012	02		Executive Summary Added
3 December 2012	03	Amanda Tine/Tony Tremblay	Standard revised to be consistent with the provisions of the United Nations Globally Harmonized System of Classification and Labeling of Chemicals (GHS), Revision 3; Detailed that as applicable, Local H&S Coordinators and PM/PICs must ensure staff are trained/informed about office or project specific chemical labeling systems in use; Clarified SSO responsibilities as it pertains to multi-employer worksites; Definitions Added/Updated; HazCom Template in Exhibit 3 was revised; Exhibit 4 – Master Chemical Inventory List revised; Exhibit 6 labels updated

Implementation Date 1 June 2009	Arcadis HS Standard Name Hazard Communication	ARCADIS Design & Consultancy for natural and built assets
Revision Date 27 May 2016	Arcadis HS Standard No. ARC HSGE007	Revision Number 05

Revision Date	Revision Number	Standard Developed/Reviewed By or Revised By	Reason for change
18 January 2013	04	Tony Tremblay	SDS Recordkeeping requirements defined in section 8
27 May 2016	05	Julie Santaniello	Modified Policy, Purpose and Scope (Sections 1, 2.1 and 2.2, respectively); Section 4.5 changed Supervisor to PIC; removed transition language from Sections 5.3.1 and 5.3.2; removed side by side comparison link and exhibit list in reference section; removed Tony Tremblay and added Julie Santaniello as reviewer; removed outdated labels in Exhibit 6; updated template and exhibits to new brand; updated hyperlinks in document.

Exhibit 1 – Definitions

Chemical - Any substance, or mixture of substances

Chemical name - the scientific designation of a chemical in accordance with the nomenclature system developed by the International Union of Pure and Applied Chemistry (IUPAC) or the Chemical Abstracts Service (CAS) rules of nomenclature, or a name that will clearly identify the chemical for the purpose of conducting a hazard classification.

Classification -to identify the relevant data regarding the hazards of a chemical; review those data to ascertain the hazards associated with the chemical; and decide whether the chemical will be classified as hazardous according to the definition of hazardous chemical. In addition, classification for health and physical hazards includes the determination of the degree of hazard, where appropriate, by comparing the data with the criteria for health and physical hazards.

Container - any bag, barrel, bottle, box, can, cylinder, drum, reaction vessel, storage tank, or the like that contains a hazardous chemical. For purposes of the Hazard Communication Standard, pipes or piping systems, and engines, fuel tanks, or other operating systems in a vehicle, are not considered to be containers.

Employee - a worker who may be exposed to hazardous chemicals under normal operating conditions or in foreseeable emergencies. Workers such as office workers or bank tellers who encounter hazardous chemicals only in non-routine, isolated instances are not covered.

Exposure or exposed - an employee is subjected in the course of employment to a chemical that is a physical or health hazard, and includes potential (e.g. accidental or possible) exposure. "Subjected" in terms of health hazards includes any route of entry (e.g. inhalation, ingestion, skin contact or absorption.)

Foreseeable emergency - means any potential occurrence such as, but not limited to, equipment failure, rupture of containers, or failure of control equipment which could result in an uncontrolled release of a hazardous chemical into the workplace.

Hazard category - the division of criteria within each hazard class, e.g., oral acute toxicity and flammable liquids include four hazard categories. These categories compare hazard severity within a hazard class and should not be taken as a comparison of hazard categories more generally.

Hazard class - the nature of the physical or health hazards, e.g., flammable solid, carcinogen, oral acute toxicity.

Hazard not otherwise classified (HNOC) - an adverse physical or health effect identified through evaluation of scientific evidence during the classification process that does not meet the specified criteria for the physical and health hazard classes addressed in this section. This does not extend coverage to adverse physical and health effects for which there is a hazard class addressed in this section, but the effect either falls below the cut-off value/concentration limit of the hazard class or is under a GHS hazard category that has not been adopted by OSHA (e.g., acute toxicity Category 5).

Hazard statement - a statement assigned to a hazard class and category that describes the nature of the hazard(s) of a chemical, including, where appropriate, the degree of hazard.

Hazardous chemical - any chemical which is classified as a physical hazard or a health hazard, a simple asphyxiant, combustible dust, pyrophoric gas, or hazard not otherwise classified.

Health hazard - a chemical which is classified as posing one of the following hazardous effects: acute toxicity (any route of exposure); skin corrosion or irritation; serious eye damage or eye irritation; respiratory or skin sensitization; germ cell mutagenicity; carcinogenicity; reproductive toxicity; specific target organ toxicity (single or repeated exposure); or aspiration hazard. The criteria for determining whether a chemical is classified as a health hazard are detailed in Appendix A to §1910.1200 -- Health Hazard Criteria.

Label - an appropriate group of written, printed or graphic information elements concerning a hazardous chemical that is affixed to, printed on, or attached to the immediate container of a hazardous chemical, or to the outside packaging.

Mixture - a combination or a solution composed of two or more substances in which they do not react.

Physical hazard - a chemical that is classified as posing one of the following hazardous effects: explosive; flammable (gases, aerosols, liquids, or solids); oxidizer (liquid, solid or gas); self-reactive; pyrophoric (liquid or solid); self-heating; organic peroxide; corrosive to metal; gas under pressure; or in contact with water emits flammable gas. See Appendix B to §1910.1200 - Physical Hazard Criteria.

Pictogram - a composition that may include a symbol plus other graphic elements, such as a border, background pattern, or color, that is intended to convey specific information about the hazards of a chemical. Eight pictograms are designated under this standard for application to a hazard category.

Precautionary statement - a phrase that describes recommended measures that should be taken to minimize or prevent adverse effects resulting from exposure to a hazardous chemical, or improper storage or handling.

Product identifier - the name or number used for a hazardous chemical on a label or in the SDS. It provides a unique means by which the user can identify the chemical. The product identifier used shall permit cross-references to be made among the list of hazardous chemicals required in the written hazard communication program, the label and the SDS.

Signal word - a word used to indicate the relative level of severity of hazard and alert the reader to a potential hazard on the label. The signal words used in this section are "danger" and "warning." "Danger" is used for the more severe hazards, while "warning" is used for the less severe.

Simple asphyxiant - a substance or mixture that displaces oxygen in the ambient atmosphere, and can thus cause oxygen deprivation in those who are exposed, leading to unconsciousness and death.

Substance - chemical elements and their compounds in the natural state or obtained by any production process, including any additive necessary to preserve the stability of the product and any impurities deriving from the process used, but excluding any solvent which may be separated without affecting the stability of the substance or changing its composition.

Use - means to package, handle, react, emit, extract, generate as a byproduct, or transfer.

Workplace - includes any office or job site where hazardous chemicals/products are stored or used.

Exhibit 2 - Hazard Communication Program Compliance Checklist

HAZARD COMMUNICATION PROGRAM COMPLIANCE CHECKLIST

Arcadis Office: _____ **Jobsite** (if applicable):_____

Completed By (name/job title): _____ **Date**:_____

	Yes	No	Comments
1. Do you have a copy of 29 CFR 1910.1200?			
• Have you read and understand the requirements?			
2. Do you have a written program?			
• Have program responsibilities been assigned?			
• Does the program establish a procedure to review and evaluate program on an annual basis?			
3. Has a list of all hazardous chemicals/substances in the office/jobsite been prepared?[1]			
• Does the program contain a method for updating this list?			
4. Is there an SDS for each hazardous chemical/substance?			
• Does the program ensure that incoming hazardous chemicals/substances have an SDS?			
5. Does the program ensure that all incoming hazardous chemicals/substances have labels?			
6. Does the program address how to identify			

[1] The Chemical Inventory Report Form should be used to complete this list.

new chemicals/substances before they are used? • Does the program address how employees will be informed of new chemicals/substances?			
7. Do employees understand how to detect the release of hazardous chemicals/substances?			
8. Are employees: • Aware of HazCom Standard requirements and information specific to this office/jobsite?			
• Familiar with hazards of the chemicals/substances at this office/jobsite? • Informed of the hazards of performing non-routine tasks?			
9. Has training been provided in regard to proper work practices and PPE?			
10. Does the training:			
• Provide information on emergency procedures/first aid including symptoms of overexposure?			
• Provide an explanation of labels and warnings that are used in the work area?			
• Describe where employees can find the SDS? • Describe how to read/use an SDS?			

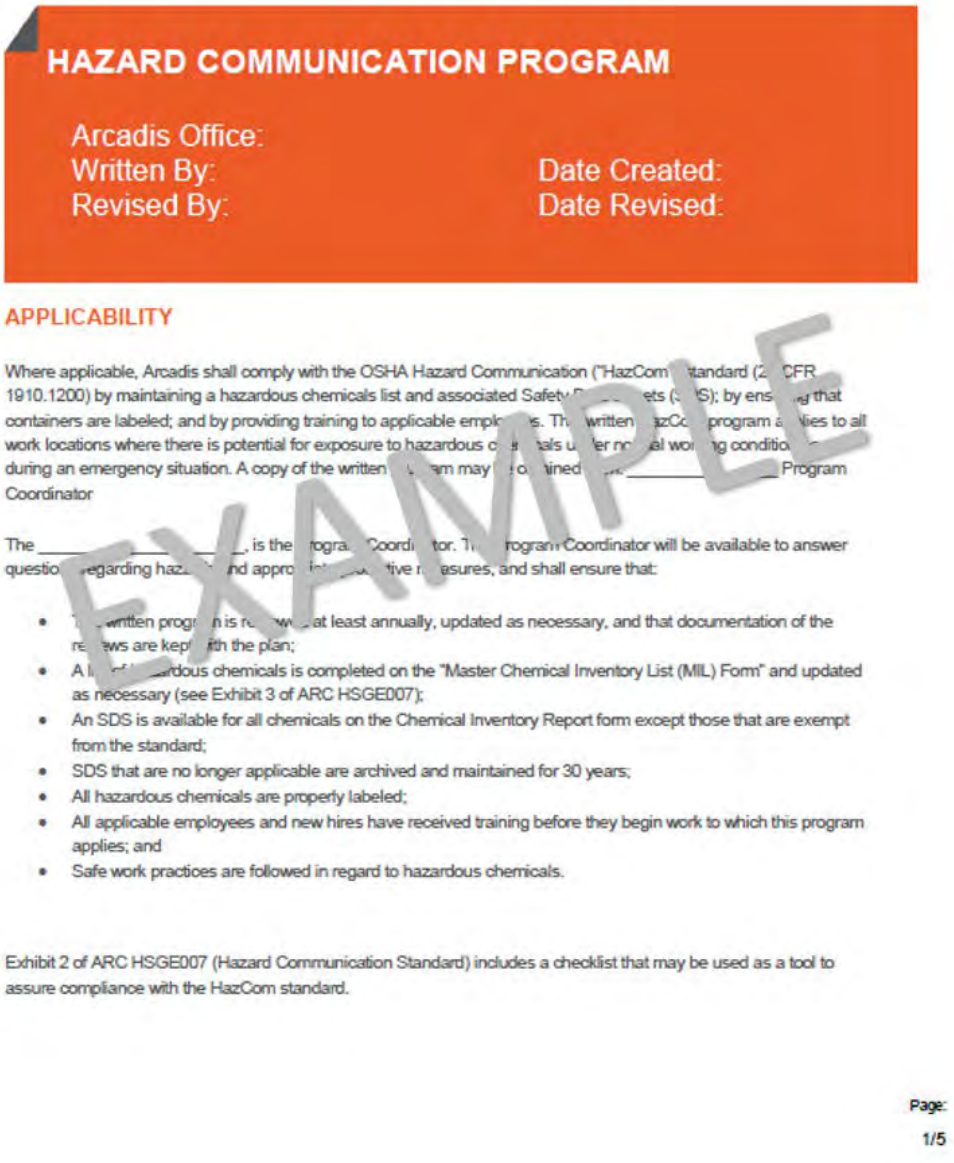
COMMENTS: _____

_____

_____

Exhibit 3 - Written HazCom Program Template for Offices

Link to the Hazard Communication Program template



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HAZARD COMMUNICATION PROGRAM

Arcadis Office:
Written By: Date Created:
Revised By: Date Revised:

APPLICABILITY

Where applicable, Arcadis shall comply with the OSHA Hazard Communication ("HazCom") standard (29 CFR 1910.1200) by maintaining a hazardous chemicals list and associated Safety Data Sheets (SDS); by ensuring that containers are labeled; and by providing training to applicable employees. This written HazCom program applies to all work locations where there is potential for exposure to hazardous chemicals under normal working conditions or during an emergency situation. A copy of the written program may be obtained from _____ Program Coordinator

The _____ is the Program Coordinator. The Program Coordinator will be available to answer questions regarding hazards and appropriate protective measures, and shall ensure that:

- The written program is reviewed at least annually, updated as necessary, and that documentation of the reviews are kept with the plan;
- A list of hazardous chemicals is completed on the "Master Chemical Inventory List (MIL) Form" and updated as necessary (see Exhibit 3 of ARC HSGE007);
- An SDS is available for all chemicals on the Chemical Inventory Report form except those that are exempt from the standard;
- SDS that are no longer applicable are archived and maintained for 30 years;
- All hazardous chemicals are properly labeled;
- All applicable employees and new hires have received training before they begin work to which this program applies; and
- Safe work practices are followed in regard to hazardous chemicals.

Exhibit 2 of ARC HSGE007 (Hazard Communication Standard) includes a checklist that may be used as a tool to assure compliance with the HazCom standard.

EXAMPLE

Page:
1/5

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LIST OF HAZARDOUS CHEMICALS

The Program Coordinator shall make a list of all hazardous chemicals and will review the list at least annually, or more often as necessary, and maintain and update the list as necessary. Hazardous chemicals that are bought for and kept at a particular job site will not be included on this list, but shall be included in the site specific health and safety plan. The completed MIL for the _____ office can be found _____.

The Program Coordinator must be informed of all new hazardous chemicals purchased unless the chemical is being purchased for and kept at a particular job site. Upon receiving this information, the Program Coordinator will update the MIL within 10 business days. Employees in a position to purchase materials must adhere to purchasing department guidelines and assure new chemicals are not used until the SDS information has been obtained and appropriate employee training occurs.

SAFETY DATA SHEETS

SDS provide specific information on the chemicals used by this office. For each chemical listed on the MIL (other than those exempt from the HazCom standard), an SDS shall be kept on file in a location that is easily accessible and known to all applicable employees.

Copies of applicable SDS for this office can be found _____, in a [indicate if the are kept in binder, folder or electronically] that is labeled _____ [if your office maintains SDS in other locations, such as a work vehicle or job site, note this information here]. Applicable SDS should accompany the hazardous chemical/chemicals to the project site, and the Project Manager shall ensure that each work [illegible] has applicable SDS on hand at the job site.

The Program Coordinator is responsible for acquiring and updating SDS and will contact the chemical manufacturer or vendor if additional research is necessary or if an SDS has not been supplied with an initial shipment/purchase.

The Program Coordinator must be informed of all new hazardous chemicals purchased unless the chemical is being purchased for and kept at a particular job site.

LABELING AND OTHER FORMS OF WARNING

All primary and secondary containers of hazardous chemicals/products listed on the MIL must be labeled. Labels or other forms of warning will be legible, in English, and prominently displayed on the container, or readily available in the work area. For employees who speak another language(s), information may be added in their language to the label or other form of warning.

The chemical manufacturer, importer, or distributor shall ensure that each container of hazardous chemicals leaving the workplace is labeled, tagged or marked. Hazards not otherwise classified do not have to be addressed on the container. Where the chemical manufacturer or importer is required to label, tag or mark the following information shall be provided on containers shipped to Arcadis:

- Product Identifer;
- A signal word, either "Danger" or "Warning";
- Hazard statement(s);
- A standard pictogram(s);
- Precautionary statement(s); and
- The name, address, and telephone number of the chemical manufacturer, importer or other responsible party.

EXAMPLE

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Workplace Labeling

Arcadis shall ensure that each container of hazardous chemicals in the workplace is labeled, tagged or marked with either:

- A product identifier, a signal word (either "Danger" or "Warning"), hazard statement(s), standard pictogram(s), and precautionary statement(s); or
- Product identifier and words, pictures, symbols, or combination thereof, which provide at least general information regarding the hazards of the chemicals, and which, in conjunction with the other information immediately available to employees under the hazard communication program, will provide employees with the specific information regarding the physical and health hazards of the hazardous chemical.

  NOTE: Arcadis may use signs, placards, process sheets, batch tickets, operating procedures, or other such written materials in lieu of affixing labels to individual stationary process containers, as long as the alternative method identifies the containers to which it is applicable and conveys the information required by the hazardous chemicals in the workplace labeling requirement. Arcadis must also ensure the written materials are readily accessible to the employees in their work area throughout each work shift.

The supervisor of each work area must ensure that secondary chemical containers are properly labeled. Secondary chemical container labeling can be labeled with the same shipping container labels, or information that communicates the following:

- Identity of the chemical.
- Hazards of the chemical.

The label may use a combination of words, symbols or pictures to communicate this information. The company will use a standard labeling method for all secondary containers.

NOTE: Arcadis is not required to label portable containers into which hazardous chemicals are transferred from labeled containers, and which are intended only for the immediate use of the employee who performs the transfer, however, best management practice would be that all portable containers even those intended only for the immediate use by employees should be labeled with chemical identity and hazard information, where feasible.

Where applicable, the contents of pipes or piping systems shall be described in training sessions, and they should be labeled as to contents. (This will be a site specific issue that should be addressed in site specific safety plans.)

[If you utilize stationary containers within a work area, include the following information in this program: If stationary containers within a work area have similar contents and hazards, labels shall be posted on them to convey hazard information.]

NON-ROUTINE TASKS

Where applicable, site specific health and safety plans shall address the chemical hazards associated with non-routine tasks (e.g., cleaning tanks, entering confined spaces, etc.). The site specific plan will inform applicable employees of the hazardous chemicals to which they may be exposed and the precautions they must take to reduce or avoid exposure. It will also address any additional training that may be required.

TRAINING

All employees who may be exposed to hazardous chemicals/products under normal operating conditions, or in foreseeable emergency situations, shall receive Hazard Communication training. Arcadis shall provide employees with effective information and training on hazardous chemicals in their work area at the time of their initial assignment.

EXAMPLE

and whenever a new chemical hazard the employees have not previously been trained on is introduced into their work area. Information and training is designed to cover categories of hazards (e.g., flammability, carcinogenicity) or specific chemicals. Chemical-specific information is always available to employees through labels and SDS.

The Program Coordinator_____ will conduct these training sessions in a _____ [indicate if you will use classroom, or an online/classroom combination] format. [Whether you are using an online or classroom program, information specific to your office must be part of the training. For example, who is the program coordinator, where is the chemical inventory form kept, where are the SDS located, etc.]

Whenever a new chemical hazard is introduced, additional information shall be provided to applicable employees.

Arcadis employees will be informed of:

- The requirements contained in the Hazard Communication Standard 29 CFR 1910.1200;
- Any operations in their work area where hazardous chemicals are present;
- The location and availability of the written HazCom program; and
- The location of the MIL and SDS.

Initial HazCom training shall include the following elements:

- Methods and observations that may be used to detect the presence or release of a hazardous chemical in the work area (such as monitoring conducted by the employer, continuous monitoring devices, visual appearance or odor of hazardous chemicals when being released, etc.);
- The physical, health, simple asphyxiation, combustible dust and pyrophoric gas hazards, as well as hazards not otherwise classified, of the chemicals in the work area;
- The measures employees can take to protect themselves from the[illegible]s, including specific procedures Arcadis has implemented to protect employees from exposure to hazardous chemicals, such as appropriate work practices, emergency procedures, and personal protective equipment to be used; and
- The details of the hazard communication program developed by Arcadis, including an explanation of the labels received on shipped containers and the workplace labeling system used by Arcadis; the SDS, including the order of information and how employees can obtain and use the appropriate hazard information.

The Program Coordinator or his/her designee will provide each employee with office specific information regarding the location of the MIL and SDS, any label specific information in use at the office and who to contact about questions. Additional information will be provided to employees when hazards change or when a new chemical hazard is introduced into the workplace.

CONTRACTORS

The Program Coordinator shall advise contractors performing work in Arcadis offices of any chemical hazards that may be encountered in the normal course of their work on the premises, the location of SDS, the labeling system in use, the protective measures to be taken, and the safe handling procedures to be used. Each contractor bringing chemicals on-site must provide the Program Coordinator with the appropriate hazard information for these substances, including SDS, labels, and precautionary measures to be taken when working with or around these chemicals.

Project Managers for Arcadis projects will follow the requirements of the project health and safety plan for communication with the contractors used on projects.

EXAMPLE

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ADDITIONAL INFORMATION

Employees can obtain further information on this written program, the hazard communication standard, applicable SDS, and chemical information lists from the Program Coordinator.

EXAMPLE

Exhibit 4 – Master Chemical Inventory List Form

Link to the Master Chemical Inventory List Form

MASTER CHEMICAL INVENTORY LIST (MIL) FORM

(Hazardous chemicals/substances bought specifically for one job and kept at that job site aren't listed here, but should be listed in the site specific Health and Safety Plan)

Arcadis Office: _____

Jobsite Address (if applicable): _____

Date Of Inventory: _____ Completed By (name/job title): _____

Chemical Name	Amount On Hand[1]	Container Size	Container Type (e.g., plastic, metal, drum)	Hazard Class (nature of the physical or health hazards)	Type of Hazard (physical, health, environmental)	Hazard Category	SDS On Hand (if no, explain below)	Work Practice(s) Associated With The Chemical	Check if Exempt (Per Arcadis definition and example list.)

EXAMPLE

Explain each "No" listed under the SDS column: _____

Page ___ of ___

[1] Indicate the amount that is usually kept on hand.

Exhibit 5 – List of Common Exemptions

The following chemicals are exempted from the labeling requirements of the HazCom program:

- Any pesticide as such term is defined in the Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. 136 et seq.), when subject to the labeling requirements of that Act and labeling regulations issued under that Act by the Environmental Protection Agency;
- Any chemical substance or mixture as such terms are defined in the Toxic Substances Control Act (15 U.S.C. 2601 et seq.), when subject to the labeling requirements of that Act and labeling regulations issued under that Act by the Environmental Protection Agency;
- Any food, food additive, color additive, drug, cosmetic, or medical or veterinary device or product, including materials intended for use as ingredients in such products (e.g. flavors and fragrances), as such terms are defined in the Federal Food, Drug, and Cosmetic Act (21 U.S.C. 301 et seq.) or the Virus-Serum-Toxin Act of 1913 (21 U.S.C. 151 et seq.), and regulations issued under those Acts, when they are subject to the labeling requirements under those Acts by either the Food and Drug Administration or the Department of Agriculture;
- Any distilled spirits (beverage alcohols), wine, or malt beverage intended for nonindustrial use, as such terms are defined in the Federal Alcohol Administration Act (27 U.S.C. 201 et seq.) and regulations issued under that Act, when subject to the labeling requirements of that Act and labeling regulations issued under that Act by the Bureau of Alcohol, Tobacco, Firearms and Explosives;
- Any consumer product or hazardous substance as those terms are defined in the Consumer Product Safety Act (15 U.S.C. 2051 et seq.) and Federal Hazardous Substances Act (15 U.S.C. 1261 et seq.) respectively, when subject to a consumer product safety standard or labeling requirement of those Acts, or regulations issued under those Acts by the Consumer Product Safety Commission; and
- Agricultural or vegetable seed treated with pesticides and labeled in accordance with the Federal Seed Act (7 U.S.C. 1551 et seq.) and the labeling regulations issued under that Act by the Department of Agriculture.

For purposes of the Arcadis HazCom program and to comply with the Occupational Safety and Health Administration Hazard Communication Standard (HCS), the following categories of materials are exempted from the requirements of the HazCom program:

- Any hazardous waste as such term is defined by the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act of 1976, as amended (42 U.S.C. 6901 et seq.), when subject to regulations issued under that Act by the Environmental Protection Agency;
- Any hazardous substance as such term is defined by the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) (42 U.S.C. 9601 et seq.) when the hazardous substance is the focus of remedial or removal action being conducted under CERCLA in accordance with Environmental Protection Agency regulations;
- Tobacco or tobacco products;

- Wood or wood products, including lumber which will not be processed, where the chemical manufacturer or importer can establish that the only hazard they pose to employees is the potential for flammability or combustibility (wood or wood products which have been treated with a hazardous chemical covered by this standard, and wood which may be subsequently sawed or cut, generating dust, are not exempted);
- Articles defined as:
    - Items that are formed to a specific shape or design during manufacture; and
    - Items that have end use functions dependent in whole or in part upon its shape or design during end use; and
    - Items that do not pose a physical hazard or health risk to employees; and
    - Items that, under normal use, do not release more than very small quantities (e.g., minute or trace amounts of a hazardous chemical).

        Note: If the use and/or repair of the article requires a modification that results in severe alterations of the article (e.g. grinding, cutting, welding, brazing, soldering, etc.), then the material that make up the article and any other material being used to alter the article ARE NOT exempted from the HazCom standard.
- Food or alcoholic beverages which are sold, used, or prepared in a retail establishment (such as a grocery store, restaurant, or drinking place), and foods intended for personal consumption by employees while in the workplace;
- Any drug, as that term is defined in the Federal Food, Drug, and Cosmetic Act (21 U.S.C. 301 et seq.), when it is in solid, final form for direct administration to the patient (e.g., tablets or pills); drugs which are packaged by the chemical manufacturer for sale to consumers in a retail establishment (e.g., over-the-counter drugs); and drugs intended for personal consumption by employees while in the workplace (e.g., first aid supplies);
- Cosmetics which are packaged for sale to consumers in a retail establishment, and cosmetics intended for personal consumption by employees while in the workplace;
- Any consumer product or hazardous substance, as those terms are defined in the Consumer Product Safety Act (15 U.S.C. 2051 et seq.) and Federal Hazardous Substances Act (15 U.S.C. 1261 et seq.) respectively, where the employer can show that it is used in the workplace for the purpose intended by the chemical manufacturer or importer of the product, and the use results in a duration and frequency of exposure which is not greater than the range of exposures that could reasonably be experienced by consumers when used for the purpose intended;
    - Examples of products used at Arcadis that are used as a consumer would use them are:
        - window cleaner
        - paper correction fluid
        - sealed containers of cartridge toner for copiers
        - cleaning supplies in consumer-available quantities
        - dry cell batteries that could be used in consumer equipment

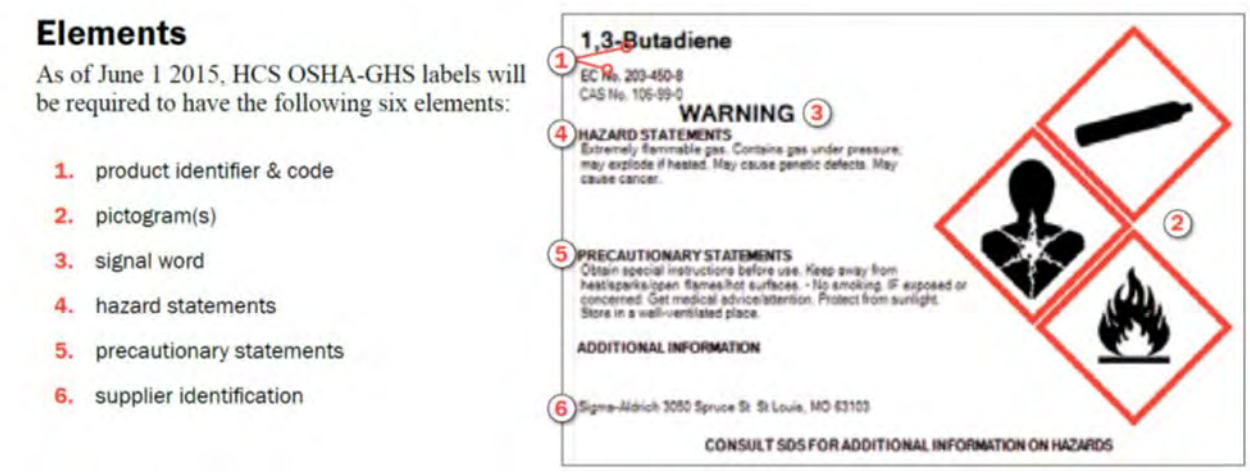
    Note: The following are examples of products that **are not exempt** because they are used in a manner not considered consumer use:

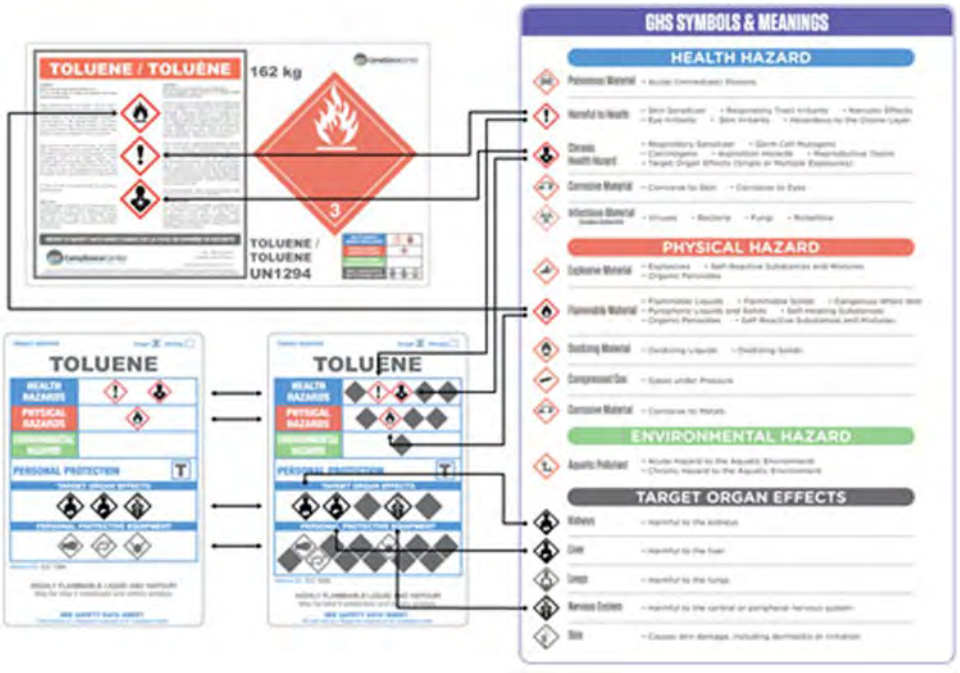
        - spray paint used for surveying, utility locates, etc,

  - lab chemicals and supplies
  - chemicals used for environmental testing equipment (pH buffers, chemical packets and dyes)
  - cleaning supplies associated with lab work and decontamination (e.g., Alconox detergent)
  - Cements and primers used for making PVC pipe connections
  - Spray lubricants used for industrial equipment maintenance (e.g., WD-40 and rust removers)
  - spray adhesives used as drafting supplies

- Nuisance particulates where the chemical manufacturer or importer can establish that they do not pose any physical or health hazard covered under this section;
- Ionizing and non-ionizing radiation.
- Biological hazards (e.g. bloodborne pathogens, snake venom, poison ivy/oak, etc.

Exhibit 6 – GHS Compliant Labels





EXECUTIVE SUMMARY

The purpose of the Arcadis Hearing Conservation Health and Safety Standard (HSS) is to provide a standard policy on the health and safety requirements and processes for all employees with potential exposure to excessive noise (levels in excess of 80 decibels in the A scale (dBA)) and to comply with occupational exposure limits established by the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV), detailed in Exhibit 2 and the Occupational Safety and Health Administration (OSHA) Occupational Noise Exposure Standard (29 CFR 1910.95).

This HSS and associated procedures apply to every project and all operations conducted by Arcadis. Hearing Protection Devices (HPDs) are supplied and/or approved by Arcadis for use by employees in carrying out their assignments. All employees conducting work where the potential for noise exposure exceeds 85 dBA as an 8-hour time-weighted average (TWA) are required to use their assigned HPDs as required by the project Health and Safety Plan (HASP), Job Safety Analysis (JSA), and/or client requirements.

When information indicates that an employee's exposure may equal or exceed an 8-hour TWA of 80 dBA, Arcadis shall conduct a noise exposure evaluation (e.g., review of historical exposure monitoring data, published sound levels for anticipated activities) and, as warranted, develop and implement a monitoring program. This evaluation and/or assessment where excessive noise may be present is conducted in order to evaluate potential engineering/administrative controls and to assist in identifying the necessity for HPDs.

Arcadis will make hearing protection devices available to staff to wear when exposed to noise that exceeds an 8-hour TWA of 80 dBA or a peak sound pressure level of 130 dB C-weighted (dBC) for any amount of time.

Where noise exposure cannot be eliminated or minimized by engineering and administrative controls and an Arcadis employee will be exposed to noise at or over an 8-hour TWA of 85 dBA, employees will be required to wear appropriate hearing protection. When in doubt, Arcadis will provide hearing protection.

If an employee is exposed to noise at 85 dBA or higher for an 8-hr TWA, then they are required to have audiometric testing included as part of their workplace medical surveillance. Audiometric tests will be scheduled in conjunction with pre-placement, periodic, and termination medical examinations as required by the Medical Surveillance Program.

Where work area noise levels exceed 85 dBA and it is feasible to do so, Arcadis shall require that noise hazard signs be posted.

Managers have the responsibility to steward the Health & Safety (H&S) program to ensure that staff in their practice are appropriately equipped with the necessary HPDs and have been provided the appropriate training.

Employees required to wear HPDs will receive training in the use and care of all hearing protectors provided to them. The training program shall be repeated annually for each employee included in the hearing conservation program.

All records regarding noise exposure measurements will be maintained by the offices for two years. All audiometric test records will be maintained the third party administrator (TPA) for the Arcadis medical surveillance program (currently WorkCare) for the duration of the affected employee’s employment.

1. POLICY

It is the policy of Arcadis to assess noise hazards resulting from or encountered by our staff during job activities and to control such noise hazards to minimize and eliminate hearing loss among our staff, subcontractors, clients, and the public. Arcadis will make hearing protection devices available to staff to wear when exposed to noise that exceeds an 8-hour time-weighted average (TWA) of 80 decibels in the A scale (dBA) or a peak sound pressure level of 130 dB C-weighted (dBC) for any amount of time. Where noise exposure cannot be eliminated or minimized by engineering and administrative controls and an Arcadis employee will be exposed to noise at or over an 8-hour TWA of 85 dBA, employees will be required to wear appropriate hearing protection. When in doubt, Arcadis will provide hearing protection.

2. PURPOSE AND SCOPE

2.1 Purpose

Arcadis is committed to providing a healthy and safe work environment for our employees, subcontractors, clients and visitors. The purpose of the Arcadis Hearing Conservation Health and Safety Standard (HSS) is to provide a standard policy on the health and safety requirements and processes for employees with potential exposure to excessive noise (levels in excess of 80 dBA) and to comply with occupational exposure limits established by the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV), detailed in Exhibit 2 and the Occupational Safety and Health Administration (OSHA) Occupational Noise Exposure Standard (29 CFR 1910.95)..

2.2 Scope

This HSS applies to every project and all operations conducted by Arcadis. Hearing Protection Devices (HPDs) will be supplied and/or approved by Arcadis for use by employees in carrying out their assignments. All employees conducting work where the potential for noise exposure exceeds 85 dBA as an 8-hour TWA are required to have their assigned HPDs available and used as required by the project Health & Safety Plan (HASP), Job Safety Analysis (JSA) and/or client requirements.

3. DEFINITIONS

There are a number of definitions associated with this standard. These definitions are presented in Exhibit 1 of this document.

4. RESPONSIBILITIES

4.1 Employees

Employees are required to wear prescribed HPDs during activities where noise levels will exceed 85 dBA as an 8-hour TWA. The requirements for availability, selection and use of HPDs shall be defined by project HASPs, JSAs and/or client requirements.

In addition, employees have the responsibilities to adhere to this HSS and to communicate H&S concerns, issues and questions to their supervisor or their respective H&S resource. In addition, all employees have the responsibility to:

- Maintain hearing protectors in sanitary condition and proper working order;
- Use the **TRACK** process prior to any activity;
- Follow all Arcadis and client requirements;
- Participate in the medical surveillance program, including annual audiogram and hearing conservation training, as applicable based on their job duties;
- Notify both their Supervisor and Corporate Health and Safety if they were exposed to high noise levels and required to wear hearing protection during the previous year and are not already in the medical surveillance program; and
- Understand and appropriately use the “Stop Work Authority” concept.

4.2 Supervisors and Operations Managers

Supervisors and Operations Managers have the responsibility to steward the H&S program to ensure that staff in their practice are appropriately equipped with the necessary hearing protection and have been provided the appropriate training. To accomplish this, Supervisors have the responsibility to know and understand our H&S program, policy, vision, and this HSS in detail enough so as to be prepared to explain it to a client when required. In addition, Supervisors have the responsibility to provide oversight management for the H&S of employees in their respective operations. Each will assure that appropriate time and resources are provided to facilitate the implementation of this HSS. In addition, the Supervisors will involve themselves in any “Stop Work” issued by an employee, as requested by an Arcadis employee, project manager, or Operations Managers. Supervisors will assist in resolving the issue associated with the “Stop Work Authority” issued by an employee.

4.3 Project Managers and Task Managers

Project Managers (PMs) and Task Managers (TMs) have the responsibility to know and follow applicable Arcadis and client H&S requirements for ensuring work is conducted in accordance with this HSS, and for implementing the requirements in this HSS on any project and/or office that pose hazards to Arcadis employees or employees of its subcontractors, clients, and other organizations present in the vicinity of work controlled by Arcadis.

For project related work, PMs and TMs responsibilities also include determining and communicating any specific client requirements that are applicable, including:

- Taking appropriate steps to minimize the risk of noise-induced hearing loss that may include implementing noise control measures, as well as the provision of hearing protection devices to employees, as required;
- Communicating with and appropriately managing subcontractors, ensuring that employees have appropriate training and qualifications, and for ensuring all client HS requirements are met;

- Involving the appropriate Arcadis H&S staff and project client staff, as necessary;
- Ensuring that all subcontractors have been communicated with concerning the minimum H&S requirements for the project;
- Providing adequate resources and budget for personal protective equipment (PPE), including HPDs, at no cost to the employee; and
- Ensure that Arcadis employees working on their projects are properly using and caring for their HPDs.

In addition, as project and client agents and on behalf of Arcadis, the Project Managers and Task Managers for client-related work shall be responsible for:

- Stewarding H&S and setting expectations that all Arcadis employees working on their projects must comply with H&S rules and requirements;
- Guaranteeing each employee the absolute right to exercise “Stop Work Authority” in good faith without fear of retribution or disciplinary action; and
- Using the Arcadis Incident Investigation process for formally resolving a “Stop Work” condition.

Using this “Stop Work Authority” process, the Project and/or Task Manager and the employee will:

- Discuss and document the condition;
- Identify and document the root cause for the condition;
- Determine and document the solutions;
- Implement the solutions; and
- Sign and acknowledge the solutions are in place to the satisfaction of the employee.

4.4 Corporate H&S Staff

Corporate H&S Staff have the responsibility for:

- Communicating the policy and standard requirements in this HSS with Arcadis staff;
- Ensuring that Operations Management, Supervisors, Project/Task Managers, and staff affected by excessive noise are aware of this HSS;
- Ensuring this HSS is being implemented effectively;
- Provide technical services and advice regarding control measures, assist employees in the selection of appropriate hearing protective devices and provide instruction on their use, maintenance and care, as requested;
- Provide required training or guidance on approved training options; and

- Review, evaluate and maintain this HSS on a routine basis.

4.5 Health & Safety Managers, Specialists and Site Safety Officers

Health and Safety Managers and Specialists and Site Safety Officers are responsible for facilitating the policy and standard requirements in this HSS in their area of responsibility and for providing “hands-on” assistance to Arcadis staff to ensure this standard is appropriately implemented.

5. PROCEDURES

5.1 Noise Monitoring and Exposure Assessments

When information indicates that an employee's exposure may equal or exceed an 8-hour TWA of 80 dBA, Arcadis shall conduct a noise exposure evaluation (e.g., review of historical exposure monitoring data, published sound levels for anticipated activities) and, as warranted, develop and implement a monitoring program. This evaluation and/or assessment where excessive noise may be present is conducted in order to evaluate potential engineering/administrative controls and to assist in identifying the necessity for HPDs.

Noise monitoring will be prescribed by H&S professionals during the development of HASP and/or JSA. Noise monitoring may also be conducted at the discretion of the Site Safety Officer (SSO) or any staff members that have questions or concerns about potential noise exposure that could result in employee exposure above 85 dBA as an 8-hour TWA. If noise monitoring is not feasible, Arcadis staff will assume that exposures that require elevated speech are above 85 dbA and will use appropriate hearing protection. Noise monitoring results will be collected in accordance with the OSHA *Occupational Noise Exposure Standard* (29 CFR 1910.95). Monitoring results will be communicated to staff and used to determine adequate types and effectiveness of hearing protection device.

The measurement of the A-weighted sound pressure level in a work place shall be performed instantaneously, during normal working conditions, using the slow response setting of a sound level meter. Noise exposure level is determined through the integration of all continuous, intermittent and impulsive sounds between 80 dB and 130 dB.

During this noise hazard investigation, the following matters shall be considered:

- the sources of sound in the work place;
- the A-weighted sound pressure levels to which the employee is likely to be exposed and the duration of such exposure;
- the methods being used to reduce this exposure;
- whether the exposure of the employee is likely to exceed the 85 dBA as an 8-hour TWA or other limits defined in the Threshold Limit Values for Chemical Substances and Physical Agents & Biological Exposure Indices; and
- whether the employee is likely to be exposed to a noise exposure level equal to or greater than 85 dBA as an 8-hour TLV-TWA.

On completion of the noise hazard assessment or monitoring, the person appointed to carry out the assessment or monitoring shall document:

- observations with regards to potential noise exposure;
- recommendations respecting the measures that should be taken to limit employee exposure to noise;
- requirements that HPDs will be made available to staff to wear when exposed to noise that exceeds an 8-hour TWA of 80 dBA or a peak sound pressure level of 130 dBC for any amount of time; and
- requirements for use of hearing protection by employees who are exposed to a noise exposure level equal to or greater than 85 dBA as an 8-hour TWA.

5.2 Reduction / Control of Noise Exposure

Insofar as is reasonably practicable, Arcadis shall, by engineering controls or physical means other than hearing protectors, reduce the exposure to sound of employees to a level that does not exceed an 8-hour TWA noise exposure level of 85 dBA or other limits defined in the ACGIH TLV – refer to Exhibit 2.

The hierarchy of control that must be followed:

1. *Eliminating the Noise Source* - The elimination of a source of noise is the most effective way to prevent risks to employees, and should always be considered when new work equipment or workplaces are planned.

2. *Engineering Controls* – The next best method of dealing with noise in the workplace is to reduce the noise at the source through the use of engineering controls. Engineering controls can eliminate the need for hearing protection; audiometric testing, and other elements of a hearing conservation program. Even if noise cannot be reduced to safe levels at the source, reducing noise increases the likelihood that hearing protection will be even more effective in reducing noise exposures below the 85 dBA exposure limit. Some possible options include reduction of noise at source, enclosure of noise source, enclosure of employees, acoustical treatment of room, separating workers from the noise source and a combination of these controls. In addition, substitution controls may be employed, as part of the engineering control measures.

3. *Administrative Controls* - Education and training are the primary administrative controls for hearing protection. Administrative controls also include measures such as work-rest cycles and infrequent work tasks. These controls are aimed at reducing the time a worker is potentially exposed to noise.

4. *Use of Personal Protective Equipment (PPE)* - When engineering controls cannot eliminate the noise hazard, HPDs will be used to lower noise exposures to acceptable levels. Hearing protection in the form of ear plugs and/or ear muffs are examples of hearing protection devices that can help serve to minimize noise exposures.

5.3 Warning Signs

Workplaces in which the noise level exceeds 85 dBA TWA, and where it is feasible to do so, will have signs posted. Signs shall read “Caution - Hearing Protection Required." In extreme noise areas with measured noise levels greater than 105 dBA, signs shall read “Danger – Hearing Protection Required.” In some cases, the responsibility will fall upon the client and/or contractor to post these warning signs. For temporary work locations, Arcadis will coordinate/discuss required warning sign requirements with the controlling contractor.

5.4 Audiometric Testing

Arcadis has established and maintains an audiometric testing program by making audiometric testing available to all employees whose exposures equal or exceed an 8-hour TWA of 85 decibels.

Within 6 months of an employee's first exposure at or above the action level, Arcadis shall establish a valid baseline audiogram against which subsequent audiograms can be compared.

At least annually after obtaining the baseline audiogram, Arcadis shall obtain a new audiogram for each employee exposed at or above an 8-hour TWA of 85 decibels.

Audiometric tests will be scheduled in conjunction with pre-placement, periodic, and termination medical examinations as required by the Medical Surveillance Program (ARC HSGE010). All employees that are not already part of the medical surveillance program must inform their supervisor and Corporate Health and Safety if they were exposed to high noise levels as part of their job duties. Employees that were exposed to high noise levels must receive an audiogram as specified by the Medical Surveillance Program. Employees will be informed of the requirement that they avoid both non-occupational and occupational noise exposure for 14 hours prior to audiometric testing.

Audiograms will be compared to baseline and prior tests to determine if a standard threshold shift has occurred. The TPA for the Arcadis Medical Surveillance Program (currently WorkCare) will directly notify an employee and the Arcadis Corporate Health and Safety Medical Surveillance Program Administrator in writing of a standard threshold shift within 21 days of determination. If a shift is detected, retesting may be done within 30 days. If a shift is confirmed, the employee will be informed in writing and may need to be refitted and retrained in hearing protection use. If subsequent testing shows that a standard threshold shift is not present, the employee will be informed. Additional audiometric testing may be conducted at the discretion of Health and Safety.

The TPA physician or audiologist will determine if further evaluation is needed and, if so, will provide to the specialist all the information that is required. If the physician determines that the medical pathology is unrelated to work exposure or wearing hearing protectors, the employee will be informed by the physician.

The Audiometric Testing program will be managed by Arcadis’ TPA for the medical surveillance program.

5.5 Hearing Protection Devices

HPDs will be available to all workers exposed to noise levels that exceed 80 dBA as an 8-hour TWA and will be required when workers are exposed to noise levels that exceed

85 dBA as an 8-hour TWA. HPDs will be provided at no cost to the employee. Some types of hearing protection include:

- Ear Muffs – fit over the whole ear and seal the ear from noise. The efficiency of the muff type may decrease if the muff is not fitted properly or if glasses are worn with them.
- Ear Plugs – which are worn in the internal part of the ear and they are made of a variety of materials (rubber, plastic, or other material) that will fit tightly in the ear.

Arcadis shall supply a hearing protector that:

- Has appropriate Environmental Protection Agency (EPA) labeling for hearing protectors (40 CFR 211), which requires manufacturers to identify the noise reduction capability of all hearing protectors on the hearing protector package. This measure is referred to as the noise reduction rating (NRR); and
- Prevents the employee using the hearing protector from being exposed to a level of sound that exceeds the limits detailed in Exhibit 2.

Note: The actual effectiveness of any individual hearing protector cannot be determined under workplace conditions. However, OSHA's noise standards (29 CFR 1910.95(j)(2) and 29 CFR 1926.52(b)) require that personal hearing protection be worn to attenuate the occupational noise exposure of employees. Arcadis chooses to implement the ACGIH-TLV for noise exposure. OSHA Occupational Noise Exposure Standard, Appendix B: Methods For Estimating the Adequacy of Hearing Protector Attenuation provides information on how to determine the adequacy of hearing protector attenuation using the NRR of a given hearing protector.

As a Best Management Practice, Arcadis employees working in **extreme** noise areas are directed to wear “dual” hearing protection, consisting of earplugs along with earmuffs. Additional engineering and/or administrative controls limiting the exposure time to keep the sound from reaching the worker’s ear drum below 85 dBA TWA must also be initiated. *Extreme noise areas are defined as areas with measured noise levels greater than 105 dBA for any amount of time*. Based on current OSHA policy, the wearing of ear muffs over ear plugs will boost the overall attenuation of the earplugs by 5 dB.

Employees will be given the opportunity to select their HPDs from a suitable variety.

Arcadis shall provide training in the use and care of all HPDs provided to employees.

6. TRAINING

Employees who have noise exposure exceeds 80 dBA as an 8-hour TWA value, will be required to receive training on noise hazards, the selection, use and care of HPDs.

Employees required to wear hearing protection will receive training as provided by Corporate H&S. The training will be provided at least annually with refresher training as necessary and will include:

- information regarding: effects of noise on hearing;
- purpose of hearing protectors;

- advantages, disadvantages, and attenuation of various types of hearing protectors;
- selection, fitting, use, and care of hearing protectors; and
- purpose of audiometric testing and an explanation of the test procedures.

7. REFERENCES (regulation citation, technical links, publications, etc.)

- OSHA Standard 29 CFR 1910.95
- ACGIH Threshold Limit Values for Chemical Substances and Physical Agents & Biological Exposure Indices
- Noise Navigator™ Sound Level Database with over 1700 Sound Level Measurement Values; E-A-R 88-34/HP; 3M Occupational Health & Environmental Safety Division; July 6, 2010; Version 1.5 (Refer to Noise Hazard question #2 link to excel file)

8. RECORDS

Record Maintenance – All records regarding noise exposure measurements will be maintained by the offices for two years. All audiometric test records will be maintained by the TPA for the Arcadis Medical Surveillance Program for the duration of the affected employee's employment.

9. APPROVALS AND HISTORY OF CHANGE

Approved By: Julie Santaniello, CSP – Corporate H&S, Manager of Technical Programs



History of Change

Revision Date	Revision Number	Standard Developed/Reviewed By or Revised By	Reason for change
1 December 2007	01	Mike Thomas/Tony Tremblay	Original document
30 January 2008	02		Change to new template
5 October 2010	03		Change name from Procedure to Standard; revision of section 5.3

Revision Date	Revision Number	Standard Developed/Reviewed By or Revised By	Reason for change
12 December 2012	04		Executive Summary Added; HSP changed to HSS; Definitions relocated to Exhibit 1 and added Representative Exposure definition; Added BMP regarding use of both ear plugs and ear muffs when noise level exceeds 105 dBA; Requirement for use of HPD aligned with ACGIH Noise TLV; Training Section updated; References hyperlinked; Section 7 Hyperlinks added, including link to Common Noise Level Reference table; NRR to assess hearing protector adequacy calculation added to Exhibit 1 NRR definition
10 June 2013	05	Tony Tremblay	Noise Exposure values clarified in Executive Summary; Section 5 reformatted to include noise monitoring exposure and assessment, reduction/control of noise exposure, warning signs, audiometric testing and HPDs; Section 6 determining when noise exposure Training clarified
01 October 2013	06	Lauren Edwards	Changed the requirement for an audiometric exam within in 6 months if an employee is exposed to noise at 85 dBA or higher for an 8-hr TWA. Section 5.4
6 October 2014	07	Amanda Tine/Tony Tremblay	Clarified employee audiometric testing requirements in Section 5.4 based on OSHA 29 CFR 1910.95

Revision Date	Revision Number	Standard Developed/Reviewed By or Revised By	Reason for change
20 April 2017	08	Sharon Lingle, Tony Tremblay/Julie Santaniello	New format. Added TPA will notify the Arcadis employee within 21 days of a threshold shift. Updated requirements include making hearing protection devices available to staff to wear when exposed to noise that exceeds an 8-hour TWA of 80 dBA or a peak sound pressure level of 130 dBC for any amount of time; and staff are required to wear prescribed HPDs during activities where noise levels will exceed 85 dBA as an 8-hr TWA. Excessive noise definition modified.

Exhibit 1 – Definitions

Decibels – A Weighted – the unit of measure to be used when measuring noise levels on Arcadis work sites and when comparing to occupational exposure standards and limits.

Excessive Noise – noise levels in excess of 80 dBA for any amount of time (noise environment that requires speech levels above those used for normal conversation).

Extreme Noise Areas are defined as areas with measured noise levels greater than 105 dBA for any amount of time.

HSS – Health and Safety Standard

NRR – Noise Reduction Rating is the measure, in decibels, of how well a hearing protector reduces noise, as specified by the Environmental Protection Agency. The higher the number, the greater the noise reduction. When dual protectors are used, the combined NRR provides approximately 5 decibels more than the higher rated of the two products. For example, using ear plugs (NRR of 29 decibels) with ear muffs (NRR 27) would provide a Noise Reduction Rating of 34 decibels. For practical purposes, users should assume they will actually receive protection that is 5 decibels less than the published value.

> When using the NRR to assess hearing protector adequacy and the sound level measurement reported is in the "A" scale, the following method is used to evaluate the adequacy of the hearing protector attenuation:
>
> Step 1: Convert the A-weighted dose to TWA (dBA)
>
> Step 2: Subtract 7 dB from the NRR
>
> Step 3: Subtract the remainder of Step 2 from the A-weighted TWA (Step 1 value) to obtain the estimated A-weighted TWA under the ear protector.

Representative Exposure - Measurements of an employee's noise dose or 8-hour time-weighted average sound level that the employers deem to be representative of the exposures of other employees in the workplace.

Sound Level Meter means a device for measuring sound pressure level that meets the performance requirements for a Type 2 instrument as specified in the International Electrotechnical Commission Standard 651 (1979).

Sound Pressure Level means 20 times the logarithm to the base 10 of the ratio of the root mean square pressure of a sound to the reference sound pressure of 20 µPa, expressed in decibels.

Summary of Noise Trigger Levels:

- 80 dBA – Noise exposure assessment will be conducted if worker is or is likely to be exposed to noise at a workplace in excess of 80 dBA.
- 80 dBA – HPDs will be made available to staff to wear when exposed to noise that exceeds an 8-hour TWA of 80 dBA or a peak sound pressure level of 130 dBC for any amount of time. This will also trigger training on the selection, use and care of HPDs.
- 85 dBA – AUS staff will be **required** to use HPDs for noise levels at or exceeding 85 dBA as an 8-hour TWA.

- 85 dBA as 8-hour TWA – If employee exposed at 85 dBA or higher for an 8-hr TWA, then they are required to have audiometric testing included as part of their workplace medical surveillance.
- 85 dBA or higher – noise hazard signs posted.
- 105 dBA or higher – Employee must use both ear plugs and ear muffs together for exposure to noise for any amount of time that exceeds 105 dBA.

TWA – Time Weighted Average; The average exposure to a contaminant or condition (such as noise) to which workers may be exposed without adverse effect over a period of 8 hours a day or a 40 hour work week.

Exhibit 2 – ACGIH TLV FOR NOISE

	Duration per Day	Sound Level dBA (slow response)
Hours	24	80
	16	82
	8	85
	4	88
	2	91
	1	94
Minutes	30	97
	15	100
	7.5	103
	3.75	106
	1.88	109
	0.94	112
Seconds	28.12	115
	14.06	118
	7.03	121
	3.52	124
	1.76	127
	0.88	130
	0.44	133
	0.22	136
	0.11	139

Note: No exposure to continuous, intermittent, or impact noise in excess of a peak C-weighted level of 140 dB.

EXECUTIVE SUMMARY

ARCADIS employs a wide range of heavy and mechanized equipment in various operations. ARCADIS staff operating heavy equipment requires, at minimum, compliance with the policies set forth in this Health and Safety Standard (HSS). In addition to federally mandated requirements, each state may enforce more stringent standards related to training, licensure, inspection and documentation.

The requirements set forth in this policy provide direction in heavy equipment operations:

- Specific training for Powered Industrial Trucks (forklifts) will be in compliance with OSHA 29CFR 1910.178. Refer to ARCADIS Forklifts HS Procedure ARC HSSP006 for additional details and requirements.

- All employees involved in Heavy Equipment Operations shall read and understand documented hazard identification and risk assessments conducted using the Hazard Assessment and Risk Control (HARC) Process. Understand and actively use TRACK and Stop Work Authority during heavy equipment operations.

- ARCADIS Utility Location Standard ARCHSFS019 shall be followed prior to beginning subsurface intrusive work which involves heavy or mechanized equipment.

- Preventative maintenance and pre-operation checks shall be conducted in accordance with the manufacturer's requirements and documented daily prior to equipment usage.

- All prospective ARCADIS Heavy and Mechanized Equipment Operators and Heavy and Mechanized Equipment Site Supervisors (Site Supervisors) must complete Online Heavy Equipment General Awareness Training, and review & understand this HSS. Prospective ARCADIS Heavy and Mechanized Equipment Operators and Site Supervisors will be evaluated by the Heavy and Mechanized Equipment Review Board and designated as Heavy and Mechanized Equipment Operator Awareness Trained, requires additional training or designate as Heavy and Mechanized Equipment Site Supervisor.

- Only authorized personnel will operate heavy and mechanized equipment.

- Site Supervisors will complete the ARCADIS Heavy Equipment Operator Authorization Form (Task Specific Hazard Review, Operator Evaluation and Operator Authorization for Heavy Equipment Operators) prior to authorizing any ARCADIS employee to operate heavy equipment. A copy of this form must be maintained onsite and kept in project files for review. Authorization is only valid for the project, operational task, and piece of heavy or mechanized equipment listed on the ARCADIS Heavy Equipment Operator Authorization Form. The required Task Specific Hazard Review, Operator Evaluation and Operator Authorization form for Heavy Equipment Operators can be found in Exhibit 2.

- Authorized Operators must maintain all current & applicable licensing, ARCADIS Heavy Equipment Operator Authorization Form (Task Specific Hazard Review, Operator Evaluation and Operator Authorization for Heavy Equipment Operators), and project documentation as required by federal and state regulations.

- PICs, PMs and TMs will be responsible for verifying operator training, operator authorization and maintenance documentation, identifying all operations which use heavy equipment in the work plan and researching and adhering to any additional policies required by the state in which the project operates.

1. POLICY

It is ARCADIS-US policy to be proactive in the identification, assessment and control of health and safety hazards and associated risks. To those means, it is ARCADIS' policy that ARCADIS staff will be adequately trained and experienced before authorized to operate heavy and mechanized equipment. If it becomes necessary for ARCADIS employees to operate heavy or mechanized equipment, this HSS, at a minimum, will be strictly followed.

2. PURPOSE AND SCOPE

2.1 Purpose

ARCADIS developed this HSS to effectively mitigate or eliminate the hazards presented by working with or around heavy or mechanized equipment (i.e., back-hoes, track-hoes, bobcats, concrete crushers, etc.).

2.2 Scope

This HSS includes an Equipment Inspection Checklist (Exhibit 3) and an ARCADIS Heavy Equipment Operator Authorization Form (Task Specific Hazard Review, Operator Evaluation and Operator Authorization for Heavy Equipment Operators) (Exhibit 2) that applies to employees of ARCADIS that operate heavy or mechanized equipment. Only trained and authorized personnel are permitted to operate heavy or mechanized equipment. For work with Powered Industrial Trucks (Forklifts) refer to ARCADIS Standard ARC HSSP006 for details.

3. DEFINITIONS

Definitions related to Heavy Equipment Operations can be found in Exhibit 1.

4. RESPONSIBILITIES

4.1 Corporate H&S with Business Line and Practice Experts

- Review and update, as necessary, this standard, associated attachments and training requirements.
- Audit Project, Business Line, and Training Team documentation files of Authorized Operators and Site Supervisors.
- A Heavy and Mechanized Equipment Review Board (Review Board) consisting of Corporate H&S with Business Line and Practice Experts will conduct heavy and mechanized equipment operator general awareness reviews for nominated individuals. The Review Board will approve and designate staff as heavy and mechanized equipment operator general awareness trained, requires further training or designate as a Site Supervisor using the Review Board Evaluation Form for Heavy and Mechanized Operations & Site Supervisor (Exhibit 5).
- Provide technical assistance regarding proper heavy and mechanized equipment for excavations, trenching, grading, PPE, hazard assessment and research information on unusual hazards.

4.2 Principal in Charge (PIC), Project Manager (PM) and Task Manager (TM):

- Verify that all activities that require use of heavy or mechanized equipment are properly identified and addressed within the project work plan, project health & safety plan, and/or other project-related documents.
- Investigate the State and Local licensure and/or certification requirements for mechanized equipment operation and verify ARCADIS operators or subcontractors have required licenses and certifications.
- Verify that their divisional or project team employees have received the proper training and have the required experience and skills to operate heavy or mechanized equipment.
- Verify that copies of the completed ARCADIS Heavy Equipment Operator Authorization Form (Task Specific Hazard Review, Operator Evaluation and Operator Authorization for Heavy Equipment Operators) are maintained on site and in project files.
- Verify that copies of the completed Heavy Equipment Inspection Checklists are maintained on site and in project files

4.3 Health and Safety Plan Writers and Reviewers

Use this procedure as guidance to ensure the appropriate identification, assessment and control of heavy and mechanical equipment operations are covered in the HASP.

Investigate the State and Local licensure and permit requirements for mechanized equipment operation and verify all ARCADIS operators or subcontractors have required licenses and certifications. A summary of state specific requirements is provided in Exhibit 4. However, the current regulations should be consulted.

4.4 Heavy and Mechanized Equipment Site Supervisors

Heavy and Mechanized Equipment Site Supervisors (Site Supervisors) must complete the Online Heavy and Mechanized Equipment General Awareness Training and have been designated by the Review Board as a Site Supervisor. Site Supervisors are responsible for evaluating, authorizing, monitoring and coaching/mentoring of heavy equipment operators.

Site Supervisors will have a minimum of 5 years construction management and/or hands-on operating experience and demonstrated proficiency with the skills required for heavy and mechanized equipment. Site Supervisors will have completed the 10-hour or 30-hour OSHA Construction Training. If working on an environmental project where HAZWOPER training is required by ARCADIS, the Site Supervisor must also have completed the 40-hour HAZWOPER training, be current on their annual 8-hour HAZWOPER refresher and complete the 8-hour Hazwoper Supervisor Training. A list of qualified Site Supervisors will be maintained by the Corporate Training Team.

Specific job responsibilities include:

- Interface with the client representative to identify hazards associated with the client's project site.

- Review the client's equipment operating procedures and permit requirements, as applicable.
- ARCADIS Utility Location Standard ARCHSFS019 shall be followed prior to beginning subsurface intrusive work which involves heavy or mechanized equipment.
- Above grade utilities in proximity to a heavy equipment work area must be marked with warning signs, shields or other protective measures, if the minimum required clearance distances cannot be maintained.
- Ensure Authorized Operators have completed the Online Heavy and Mechanized Equipment General Awareness Training and have been designated as heavy and mechanized equipment operator general awareness trained.
- Ensure Authorized Operators are certified or licensed if required by state/local regulations.
- Evaluate prospective Authorized Operators using the attached ARCADIS Heavy Equipment Operator Authorization Form (Task Specific Hazard Review, Operator Evaluation and Operator Authorization for Heavy Equipment Operators) and determine if an adequate level of hands-on skill has been demonstrated to safely operate the equipment.
- Upon completing the ARCADIS Heavy Equipment Operator Authorization Form (Task Specific Hazard Review, Operator Evaluation and Operator Authorization for Heavy Equipment Operators), the Site Supervisors will either authorize the Operator to operate the equipment or require additional training prior to authorizing the Operator to operate the equipment. Operator Authorization will be documented on the ARCADIS Heavy Equipment Operator Authorization form and must be available on the project site for review and retained in project files.
- Ensure Daily Equipment Inspection Form or an equivalent inspection form provided by the manufacturer or vendor is completed and maintained at the project site and retained with the project files.
- Conduct Task Improvement Process (TIP's) Observations on Authorized Operators and provide coaching and feedback as necessary. All TIP's will be recorded in the 4-Sight Database.
- Revoke operating privileges as necessary, if required skill level is not maintained. Outline a specific Corrective Action Plan and discuss with employee and supervisor.

4.5 Authorized Operators

Authorized Operators must complete the Online Heavy and Mechanized Equipment General Awareness Training and have been designated by the Review Board as Heavy and Mechanized Equipment Operator awareness Trained. Additionally Authorized Operators must have adequate training and instruction in their duties and responsibilities regarding equipment operation, as documented in the ARCADIS Heavy Equipment

Operator Authorization Form (Task Specific Hazard Review, Operator Evaluation and Operator Authorization for Heavy Equipment Operators).

Responsibilities include:

- Complete required daily preventive maintenance and pre-operation checks in accordance with the manufacturer's requirements and the attached Equipment Inspection Checklist (Equipment/Manufacturer Specific Checklists may be used in lieu of this form where appropriate to cover all required items).
- Conduct TRACK Assessment in order to identify, assess and control the hazards which may be faced during equipment operation as well as the signs and symptoms of exposure to the hazard(s) of the work environment.
- Above grade utilities in proximity to a heavy equipment work area must be marked with warning signs, shields or other protective measures, if the minimum required clearance distances cannot be maintained.
- ARCADIS Utility Location Standard ARCHSFS019 shall be followed prior to beginning subsurface intrusive work which involves heavy or mechanized equipment.
- Maintain visual contact and/or verbal communications with the spotters and other personnel in the area at all times.
- Use the PPE, air monitoring and testing equipment as specified in the HASP.
- Maintain an awareness of all barriers, operating limits and other warning devices required to protect from external hazards (e.g., traffic, pedestrians) and the proper use of those barriers.
- Obey "Stop Work" orders given by personnel in the area automatic alarm activation, or when self-perceived.

4.6 Affected Employees

- Complete online Heavy Equipment General Awareness Training.
- Conduct TRACK Assessment and monitor activities near areas where heavy and mechanized equipment is in operation.
- Maintain visual contact or verbal communication with all Authorized Operators and Designated Signal Person prior to approaching or when within the operating range of the equipment.
- Order evacuation of the area if a hazard develops, either within or outside the operating area.
- Warn unauthorized persons away from the operating area.
- Summon rescue and other emergency services as necessary.
- Minimum Class II High visibility vest/clothing shall be worn by Affected Employees.

4.7 All ARCADIS Employees

Use the TRACK process described below regularly and frequently. In addition, employees read and understand all documented hazard identification and risk assessments conducted using the HARC process. ARCADIS employees will:

- Participate in entry operations only if trained and authorized to do so.
- Never enter an active work area without first getting acknowledgment and approval of the operator and Designated Signal Person, as applicable.
- Use STOP WORK Authority if unsafe or unexpected conditions arise during operation and immediately notify other personnel in the area.

5. PROCEDURE

Heavy and mechanized equipment operation can present a unique set of hazards. Only trained, qualified and, authorized employees will be allowed to operate heavy or mechanized equipment in accordance with this standard (Authorized Operator). Prior to starting work with heavy or mechanized equipment all of the required permits, clearance and required project documentation will be in place. ARCADIS Utility Location Standard ARCHSFS019 shall be followed prior to beginning subsurface intrusive work which involves heavy or mechanized equipment.

For work with Powered Industrial Trucks (Forklifts) refer to ARCADIS Standard ARC HSSP006 for details.

5.1 Operator Approval

Prior to operating any heavy or mechanized equipment including but not limited to:

- Track-hoes and Wheel Mounted Excavators
- Back-hoes
- Articulating Trucks
- Street Sweepers
- Compactors
- Tractors
- Water Trucks Concrete Pulverizing Equipped Machinery
- Hydraulic Shearing Equipped Machinery
- Hydro seeding and other truck or vehicle mounted equipment
- Other Heavy Mechanized Equipment

All operators must be evaluated by a Site Supervisor and be observed on the specific equipment that will be in use. The Site Supervisor will complete the attached ARCADIS

Heavy Equipment Operator Authorization Form (Task Specific Hazard Review, Operator Evaluation and Operator Authorization for Heavy Equipment Operators) to deem the operator as an Authorized Operator. The form must be completed in full to demonstrate employees have been evaluated, deemed qualified, and have been "Authorized" by ARCADIS as Heavy Equipment operators. This form must be maintained on site and in the project files and is only valid for the project, operational task, and piece of heavy or mechanized equipment listed on the form. It should be noted that in some cases, state specific licensing or registration may be required for heavy equipment operators.

All heavy and mechanized equipment will be inspected daily prior to use, using the attached Equipment Inspection Form or an equivalent inspection form provided by the manufacturer or vendor to address equipment specific items.

Note: **Forklifts, Gantry & Bridge Cranes and other equipment that require more formal certification or licensure are not covered by this procedure. Project Managers are required to verify that selected contractors have the required training, certification and equipment maintenance programs in place.**

5.2 Heavy Equipment Requirements

All vehicles used in construction must have:

- brake lights;
- appropriate lights or reflectors, or barricades equipped with appropriate lights or reflectors, to identify the location of the equipment;
- service, parking and emergency brakes;
- fenders on vehicles with rubber tires made after 1972;
- mud flaps on vehicles with rubber tires made before 1972;
- seats and compliant seat belts for the intended number of passengers;
- an audible warning system;
- an audible reverse alarm if the vehicle travels in reverse with an obstructed view;
- lights, if the vehicle operates in dimness or darkness;
- a defroster, if windshields fog;
- a windshield and wipers on vehicles with cabs
- *rollover protective structure* (ROPS); and
- properly secured fire extinguisher with a minimum rating of 10-B:C

5.3 General Requirements

The following Work Practices must be followed for heavy and mechanized equipment operations:

- Must be equipped with appropriate lights or reflectors.
- Controls must be in a neutral position, with the motors stopped and brakes set, unless work being performed requires otherwise.
- Whenever the equipment is parked, the parking brake shall be set. Wheeled equipment parked on inclines shall have the wheels chocked and the parking brake set.
- All cab glass shall be safety glass, or equivalent, that introduces no visible distortion affecting the safe operation of equipment.
- Do not move heavy or mechanized equipment or vehicles upon any access roadway or grade unless the access roadway or grade is constructed and maintained to accommodate the safe movement of the equipment and vehicles involved.
- Maintain 3-points of contact with the steps and hand rails while getting on/into the equipment. Do not use the controls or steering wheel as a handhold.
- Operate equipment only in well ventilated areas.
- Select a gear that will prevent excessive speed when going downhill – Do not coast downhill.
- Lower all the hydraulic equipment before shutting down or getting off the machine.
- Adequate illumination in accordance with OSHA standards and work activities must be provided for all work areas. An approved type (explosion-proof as necessary) lighting device must be used.
- Rigging and lifts will only be made when the operator judges it a safe operation.
- Personnel in the vicinity of equipment will wear hard hats, safety-toe shoes, high visibility vests and safety glasses. Personnel are also strongly encouraged to wear hearing protection in the vicinity of operating heavy equipment.
- Hoist hooks will have safety latches.
- Equipment will only be used within the maximum rated capacity.
- Personnel will remain at a distance from overhead loads.
- Test directional and speed controls prior to operation.
- Test limit switches (as applicable) and the emergency stop.
- Do not engage in practices that will divert attention while operating the equipment.
- Cellphones and other hand held electronic devices are prohibited from being used while equipping is in operation.
- Respond to signals only from the person who is directing the lift or appointed signal person.

- Do not move a load over people.
- Do not exceed the rated capacity of the equipment or rigging.
- Determine the center of gravity and balance of the equipment and the load before moving it.
- Verify the stability of the structure or area that the equipment will be used on. When working on an elevated level a Professional Engineer or qualified building inspector must determine the adequacy of the work surface prior to placing equipment.
- Initially lift the load only a few inches to test the rigging and balance.
- Check the travel path in order to avoid personnel and obstructions.
- Center the sling over the load to keep the cables from slipping, and to prevent the load from swinging when it is lifted.
- Use a tag line when loads require precise control.
- Lift the load only high enough to clear the tallest obstruction in the travel path.
- Start and stop slowly.
- Choose a safe landing.
- Land the load when the move is finished.
- Never leave suspended loads unattended.
- When Heavy or Mechanized equipment is in transit with no load and boom is lowered, the equipment clearance shall be a minimum of 4 feet for voltage less than 50kV, and 10feet for voltages over 50kV, or twice the length of the line insulator, but never less than two feet.

5.3.1 Motor Vehicle Specific Requirements

- Must be inspected at the beginning of each shift to ensure that the equipment and safety controls are in safe operating condition.
- Must have a service brake system, an emergency brake system, and a parking brake system.
- When working in areas of low visibility, motor vehicles must be equipped with at least two headlights and two taillights, which are operable.
- If motor vehicle has an obstructed rear view, it must be equipped with reverse signal alarm that must be audible above the surrounding noise level or the vehicle is backed up only when an observer signals that it is safe to do so.
- Dumping, lifting and hauling vehicles must have overhead protection for the operator.
- Operating levers controlling hoisting or dumping devices on haulage bodies must be equipped with a latch or other device which will prevent accidental starting or tripping of the mechanism.

- Trip handles for tailgates of dump trucks shall be so arranged that, in dumping, the operator will be in the clear.
- Never exceed load capacities for the vehicle.
- Use seat belts and do not carry passengers were not intended on the vehicle.
- Use the parking brake when parking and chock the wheels when needed to prevent rolling.
- Secure loose tools in the cab with workers.
- Dumping and lifting mechanisms must be secured when not in use.
- Verify that areas are clear before lifting, loading and unloading.
- All controls shall be in a neutral position, with the motors stopped and brakes set, unless work being performed requires otherwise

5.3.2 Earthmoving Equipment

- Use seat belts and do not carry passengers where not intended on the vehicle. Seat belts need not be provided for equipment which is designed only for standup operation.
- All bidirectional machines, such as rollers, compacters, front-end loaders, bulldozers, and similar equipment, shall be equipped with a horn, distinguishable from the surrounding noise level, which shall be operated as needed when the machine is moving in either direction.
- Use the audible reverse alarm or signals from another worker when driving in reverse with an obstructed view.

5.3.3 Working in the Vicinity of Overhead Power Lines

Unless the overhead power lines are deenergized and visibly grounded at the worksite, with confirmation from utility owner, encroachment prevention measures must be implemented to prevent the heavy equipment from breaching a minimum clearance distance. For heavy equipment work near energized electrical lines up to 350kV, the minimum clearance distance options would be:

1. Maintain 20 feet clearance distance from electrical line by maintaining encroachment prevention measures (refer to section 5.3.4); or
2. Determine the actual electric line voltage and implement encroachment prevention measures (refer to section 5.3.4) to maintain minimum clearance distance specified in Table 1 below.

Table 1: Minimum Clearance Distance

Voltage (nominal, kV, alternating current)	Minimum Clearance (feet)
Up to 50	**10**
>50 to 200	**15**
>200 to 350	**20**
>350 to 500	**25***
>500 to 750	**35***
>750 to 1,000	**45***
> 1,000	**Determined by utility/owner**

* According to OSHA 29 CFR 1926.1409, for power lines over 350 to 1,000 kV, the minimum distance is presumed to be 50 feet. Over 1,000 kV, the utility/owner or a registered engineer, who is a qualified person with respect to electrical power transmission and distribution, must establish the minimum distance.

If any vehicle or mechanical equipment (e.g., crane or drilling rig) capable of having parts of its structure elevated near energized overhead power lines is operated in California, a durable warning sign legible at 12 feet reading: "Unlawful To Operate This Equipment Within 10 Feet Of High-Voltage Lines of 50,000 Volts Or Less" shall be posted and maintained in plain view of the operator and driver. In addition to the above wording, the following statement in small lettering shall be provided on the warning sign: "For Minimum Clearances of High-Voltage Lines In Excess of 50,000 Volts, See California Code of Regulations, Title 8, Article 37, High-Voltage Electrical Safety Orders."

5.3.4 Preventing Encroachment/Electrocution

Where encroachment precautions are required under Option (1) or Option (2) of section 5.3.3, all of the following requirements must be met:

1. Conduct a planning meeting with the operator and the other workers who will be in the area of the equipment or load to review the location of the power line(s), and the steps that will be implemented to prevent encroachment/electrocution.

2. If tag lines are used, they must be non-conductive.

3. Erect and maintain an elevated warning line, barricade, or line of signs, in view of the operator, equipped with flags or similar high-visibility markings, at 20 feet from the power line (if using Option 1 of this section) or for Option 2, at the minimum approach distance listed under Table 1. If the operator is unable to see the elevated warning line, a dedicated spotter must be used.in addition to implementing one of the following measures:

   i) A proximity alarm set to give the operator sufficient warning to prevent encroachment;

   ii) A device that automatically warns the operator when to stop movement, such as a range control warning device. Such a device must be set to give the operator sufficient warning to prevent encroachment;

   iii) A device that automatically limits range of movement, set to prevent encroachment; or

iv) An insulating link/device installed at a point between the end of the load line (or below) and the load; and

4. Implement at least one of the following measures:

i. A proximity alarm set to give the operator sufficient warning to prevent encroachment;

ii. A dedicated spotter who is in continuous contact with the operator. Where this measure is selected, the dedicated spotter must:

- Be equipped with a visual aid to assist in identifying the minimum clearance distance. Examples of a visual aid include, but are not limited to: A clearly visible line painted on the ground; a clearly visible line of stanchions; a set of clearly visible line-of-sight landmarks (such as a fence post behind the dedicated spotter and a building corner ahead of the dedicated spotter).
- Be positioned to effectively gauge the clearance distance.
- Where necessary, use equipment that enables the dedicated spotter to communicate directly with the operator.
- Give timely information to the operator so that the required clearance distance can be maintained.

iii. A device that automatically warns the operator when to stop movement, such as a range control warning device. Such a device must be set to give the operator sufficient warning to prevent encroachment;

iv. A device that automatically limits range of movement, set to prevent encroachment; or

v. An insulating link/device installed at a point between the end of the load line (or below) and the load; and

5.3.5 Designated Signal Person

The site will use only Designated Signal Person(s) to direct heavy equipment.

Only persons who are competent and qualified by experience and/or training with the operations being directed shall be used as signal persons.

Where manual (hand) signals are used, only one person shall be designated to give signals to the operator. This signal person shall be located to see the load and be clearly visible to the operator at all times.

Manual (hand) signals may be used when the distance between the operator and signal person is not more than 100 ft. (30.4 m). Radio, telephone, or a visual and audible electrically operated system shall be used when the distance between operator and signal person is more than 100 ft. (30.4 m) or when they cannot see each other.

Standard hand signals shall be posted onsite and/or in a job trailer, signal control points, and other points as necessary to inform those concerned.

Signal persons shall back one vehicle at a time. While under control of a signal person, the heavy equipment driver shall not back or maneuver until directed and the driver shall stop when visual contact with the signal person is lost.

The signal person shall have a warning device, clear range of vision and a penetrating sound to warn persons when the load is coming in so they have time to get in the clear.

Minimum Class II High visibility vests shall be worn by flag and signal persons.

5.3.6 Refueling

- If refueling on site, the fueling area must be clearly marked (NO SMOKING), and ignition sources eliminated.
- Turn off the engine before refueling.
- If refueling could result in gasoline/diesel coming into contact with hot engine parts, shut off and cool the engine and any electrical equipment before refueling.
- Ensure the fueling area is well ventilated.
- Do not smoke while refueling. Keep open flames and sparks away from area.
- Ground the funnel or fuel nozzle against the filler neck to avoid sparks when refueling.
- Do not use gasoline or diesel fuel for cleaning parts.
- A dry chemical or carbon dioxide fire extinguisher (rated 10:BC or larger) is in a location accessible to the fueling area.
- A 5 gallon or larger spill kit is in a location accessible to the fueling area.
- Diesel cold start systems containing ether, which is explosive, are prohibited from being used.

6. TRAINING

All affected employees must complete online Heavy Equipment General Awareness Training.

All prospective ARCADIS Heavy and Mechanized Equipment Operators and Site Supervisors must complete the following.

- Online Heavy Equipment General Awareness training.
- Review and understand this HSS prior to participating in the competency review.
- Be evaluated by the Review Board and designated as Heavy and Mechanized Equipment Operator Awareness Trained and/or Site Supervisors.

Additionally, Site Supervisors will have a minimum of 5 years construction management and/or hands-on operating experience and demonstrated proficiency with the skills required for heavy and mechanized equipment. Site Supervisors will have completed the 10-hour or 30-hour OSHA Construction Training. If working on an environmental project

where HAZWOPER training is required by ARCADIS, the Site Supervisor must also have completed the 40-hour HAZWOPER training, be current on their annual 8-hour HAZWOPER refresher and complete the 8-hour Hazwoper Supervisor Training. A list of qualified Site Supervisors will be maintained by the Corporate Training Team.

Hands on training, including on-the-job training, when required, will be provided by a qualified vendor or through supervised operation by a Site Supervisor under controlled conditions and must be document on the ARCADIS Heavy Equipment Operator Authorization Form (Task Specific Hazard Review, Operator Evaluation and Operator Authorization for Heavy Equipment Operators). A copy of this form must be maintained onsite and keep in project files for review.

7. REFERENCES

ARCADIS Health and Safety Procedure ARC HSCS003 – Hoisting and Rigging (Cranes, Mobile Cranes, Pile Drivers, Derricks, and variations of such equipment)

ARCADIS Health and Safety Procedure ARC HSSP006 – Powered Industrial Trucks (Forklifts)

ARCADIS Health and Safety Procedure ARCHSFS019 – Utility Location and Clearance

ARCADIS Employee Field Health & Safety Handbook

OSHA 29 CFR 1926 Subpart O - Motor Vehicles, Mechanized Equipment and Marine Operations

US Army Corps of Engineers EM 385-1-1. 15 Sep 08 18.G Machinery and Mechanized Equipment

8. RECORDS - DATA RECORDING AND MANAGEMENT

Certification and Training records will be kept by the individual employee with copies of such certificates kept by Corporate Training Team. Training dates and times will be kept by Corporate Training Team.

Online Heavy Equipment General Awareness training, and designated as heavy and mechanized equipment operator general awareness training will be maintained by the Corporate Training Team.

A list of qualified Site Supervisors will be maintained by the Corporate Training Team.

ARCADIS Heavy Equipment Operator Authorization Form (Task Specific Hazard Review, Operator Evaluation and Operator Authorization for Heavy Equipment Operators) documentation will be maintained at the project site and retained with the project files.

All daily Equipment Inspection Form or an equivalent inspection form provided by the manufacturer or vendor documentation will be maintained at the project site and retained with the project files.

9. APPROVALS AND HISTORY OF CHANGE

Approved by: Julie Santaniello, CSP – Corporate H&S, Manager of Technical Programs



History of Change

Revision Date	Revision Number	Standard Developed/Reviewed By or Revised By	Reason for change
22 November 2011	01	Greg Ertel	Original document
22 November 2013	02	Tony Tremblay	Section 5.3 added that it's encouraged that hearing protection be worn. Formatted History of Change table, Updated Header, and fixed links.
10 March 2015	03	Andrew McDonald/Tony Tremblay	Removal of Heavy Equipment Operator Permit and adjusted text within standard to accommodate the establishing of a single ARCADIS Heavy Equipment Operator Authorization Form (Task Specific Hazard Review, Operator Evaluation and Operator Authorization for Heavy Equipment Operators) to evaluate equipment operators and authorize equipment operators; Header and Footer format update; History of Change Format update
2 March 2018	04	David Kobe/Julie Santaniello	Added CA-specific signage text in Section 5.3.3. Updated approver to Julie Santaniello.

EXHIBIT 1 – DEFINITIONS

Affected Employees – Employees who are trained and authorized to work on projects where heavy or mechanized equipment is in use by either ARCADIS employees or subcontractors.

Authorized Operator – A trained, authorized individual with the experience, training, license (as applicable) and demonstrated skills to safely operate heavy or mechanized equipment in accordance with this procedure and applicable regulatory requirements.

Backhoe-Loader – As the name implies, it has a loader assembly on the front and a backhoe on the back.

Bulldozer – A powerful crawler (caterpillar tracked tractor) equipped with a blade.

Crane – A machine for hoisting and moving heavy objects by means of cables attached to a movable boom. Cranes can include the following types: overhead, gantry, locomotive and truck. Requirements for cranes are covered under ARCADIS standard ARCHSCS003. Cranes are not usually operated by ARCADIS employees; the PM is responsible for verifying proper qualifications and licensure for crane operation by subcontractors.

Earthmoving Equipment – Scrapers, loaders, crawler or wheel tractors, bulldozers, off-highway trucks, graders, agricultural and industrial tractors, and similar equipment.

Excavator – An engineering vehicle consisting of a backhoe and cab mounted on a pivot (turntable is a more apt description) atop an undercarriage with tracks or wheels.

Heavy Equipment – includes excavators/track-hoes, back-hoes, bucket loaders, bulldozers, articulating all terrain trucks, graders, agricultural and industrial tractors, sweepers and other powered mechanical equipment.

Manlifts – includes boom lifts, scissor lifts and other powered equipment designed to provide an elevated work surface. Manlifts require training by an authorized vendor or provider that includes a hands-on demonstration of competency that meets regulatory requirements and meets fall protection requirements. Refer to the ARCADIS Aerial Lifts Standard ARC HSFS017 for details.

Motor Vehicles (as referenced in this standard) – Vehicles that operate within an off-highway jobsite, not open to public traffic. The definition of Motor Vehicles does not include earthmoving equipment.

Powered Industrial Truck (Forklift) – includes fork trucks, tractors, platform lift trucks, motorized hand trucks and other specialized industrial trucks powered by electric motors or internal combustion engines. Forklifts require training by an authorized vendor or provider that includes a hands-on demonstration of competency and meets the regulatory requirements. Refer to the ARCADIS Powered Industrial Truck (Forklift) Standard ARC HSSP006 for details.

Heavy and Mechanized Equipment Site Supervisor – The employee responsible for reviewing the project scope and determining if an acceptable skill level has been achieved and demonstrated by an employee, prior to being considered an Authorized Operator.

Skid Loader – Also called a skid steer, is a compact, low capacity machine used for pushing or lifting material and for digging. It is typically used for earth moving during construction and landscaping in limited spaces but is also used to move loose materials in farming and industry.

Skidder – A type of vehicle used in forestry for pulling cut down trees (timber) out of a forest (logging).

EXHIBIT 2 – Heavy Equipment Operator Authorization Form (Task Specific Hazard Review, Operator Evaluation and Operator Authorization for Heavy Equipment Operators)

EXHIBIT 3 – Heavy Equipment Inspection Checklist

EXHIBIT 4 – State by State Summary of Equipment Operations Regulations

EXHIBIT 5 – Review Board Evaluation Form for Heavy and Mechanized Equipment Operators & Site Supervisors

EXECUTIVE SUMMARY

This Injury and Illness Prevention Program (IIPP) has been developed as part of the overall ARCADIS Health and Safety Program in an effort to provide our employees with a safe and healthful working environment. This program is a supplement to the ARCADIS Health and Safety program with the specific intent of meeting the requirements of the State of California Code of Regulations, Title 8, Section 3203.

This standard serves as the ARCADIS written program for compliance with the requirements of an IIPP as contained in Title 8 of the California Code of Regulations, Section 3203 (8 CCR 3203). While it is required to be maintained by ARCADIS offices and project sites within the State of California, it is recommended that it be maintained in other ARCADIS US offices and project sites as a Best Management Practice (BMP).

The Director of Health and Safety has the authority and responsibility for the overall development and implementation of the ARCADIS IIPP.

The H&S Coordinator is responsible for implementing the IIPP at his/her office and notifying workers of updates or changes in the IIPP.

The Site Health and Safety Officer (SHSO) is responsible for implementing the IIPP at the project site and notifying site employees and subcontractors of updates or changes in the IIPP.

The ARCADIS office Location Leader, manager, and supervisor will be responsible for periodically reviewing the health and safety needs of employees under their direction, and will serve as the initial contact for their employees' health and safety-related questions.

Employees are responsible for immediately reporting unsafe conditions in the workplace to their supervisors so that potentially hazardous situations can be addressed and in a timely fashion.

No specific training is required on this Health & Safety Standard (HSS); however, Section 5.8 defines training and competency requirements for other parts of the ARCADIS H&S program.

Documentation and records required by the IIPP standard will be maintained for a minimum of 1 year in the following locations:

- The written IIPP HSS will be maintained on The Source, which is accessible by all employees of the company.
- H&S Training will be documented in the ARCADIS training system.
- The Source, H&S team sites, and 4-Sight will be used to maintain records of inspections, incident investigations, Task Improvement Process (TIPs), Job Safety Analyses (JSAs), and other documentation.
- Site Health and Safety Plans (HASPs) and tailgate safety meeting documentation will be kept on site and in the project file at the office where the project is managed.

1. POLICY

It is ARCADIS US policy that, prior to the conduct of any task or work-related activity, hazards will be recognized and identified, analyzed, and assessed for the level of risk associated with those hazards, and that appropriate controls are implemented to assist in the prevention of injuries and illnesses to ARCADIS staff.

2. PURPOSE AND SCOPE

2.1 Purpose

This Injury and Illness Prevention Program (IIPP) has been developed as part of the overall ARCADIS Health and Safety Program in an effort to provide our employees with a safe and healthful working environment. This program is a supplement to ARCADIS' program for the purposes of meeting the requirements of State of California Code of Regulations, Title 8, Section 3203. It references other standards and documents within the ARCADIS program to help ensure that we identify, evaluate, and correct occupational hazards or unsafe acts in the workplace that may lead to employee illness or injury.

2.2 Scope

This standard serves as ARCADIS' written program for compliance with the requirements of an IIPP as contained in Title 8 of the California Code of Regulations, Section 3203 (8 CCR 3203). While it is required to be maintained by ARCADIS offices and project sites within the State of California, it is recommended that it be maintained in other ARCADIS US offices as well. All ARCADIS employees working in the State of California are required to be informed of their responsibility under Labor Code 6407.1, which requires them to comply with occupational safety and health standards applicable to their own actions and conduct.

For ARCADIS project sites in California, the project Health and Safety Plan (HASP) – ARC HSFS010 must include the IIPP HASP Supplement. This IIPP supplement shall be prepared to provide staff working at the site or field office with specific details on injury and illness prevention. The IIPP supplement within the HASP meets the requirements of the California CCR regulation (See Exhibit 1).

Preparation of the IIPP supplement shall be a best management practice (BMP; not a requirement) in those states where preparation of a specific IIPP is not required.

3. DEFINITIONS

Definitions of terms used with the ARCADIS H&S program are presented in ARC HSMS000 – ARCADIS H&S Management System.

4. RESPONSIBILITIES

4.1 Director of Health and Safety

The Director of Health and Safety has the authority and responsibility for the overall development and implementation of the ARCADIS IIPP. The Director of Health and

Safety and corporate H&S staff will also assist in resolving health and safety-related issues and questions as they arise.

4.2 Location Leaders, Managers, and Supervisors

In each ARCADIS California office, each Location Leader, manager, and/or supervisor will be responsible for periodically reviewing the health and safety needs of employees under their direction, and will serve as contacts for their employees' health and safety-related questions. If an issue arises that cannot be adequately addressed by the supervisor, he or she will contact the Director of Health and Safety or designate as soon as practical to resolve the issue. The supervisor is also responsible for notifying Corporate H&S within the timeframe designated by the Incident Reporting and Investigation standard (ARC HSMS010) following their being notified by an employee of a work-related injury or illness.

4.3 Office H&S Coordinators

An H&S Coordinator is designated in each office. In ARCADIS California offices, this employee is responsible for implementing the IIPP at his/her office and notifying workers of updates or changes in the IIPP. H&S Coordinators will forward employee suggestions, concerns, complaints, and other contacts regarding Health and Safety to the Corporate Health and Safety group as issues arise.

4.4 Project-Specific Site Health and Safety Officers

Similar to the Office H&S Coordinator role for ARCADIS offices, ARCADIS project sites will have a designated Site Health and Safety Officer (SHSO). The SHSO will be identified by name in the HASP and is responsible for implementing the site-specific HASP and components of this IIPP, as applicable. The SHSO will notify site workers of changes to the HASP, IIPP, and any other site-specific health and safety documents. The SHSO will forward employee, suggestions, concerns, complaints, and site-specific observations regarding site health and safety to the project H&S manager (if applicable) or to the Corporate Health and Safety group.

4.5 ARCADIS Employees

Employees are responsible for immediately reporting unsafe conditions in the workplace to their supervisors so that potentially hazardous situations can be addressed in a timely fashion. Employees must also report incidents per ARC HSMS010 to their supervisors so they can be investigated, root causes determined, and appropriate corrective and preventive actions implemented.

Employees are encouraged to communicate with their supervisors or with the Director of Health and Safety or designate whenever they have a health and safety question, concern, or suggestion.

5. PROCEDURE

5.1 General Requirements

All ARCADIS employees will conduct themselves in accordance with the ARCADIS H&S Vision and Policy as described in ARC HSMS000 – ARCADIS H&S Management System. The ARCADIS Global H&S Vision Policy describes the commitment by

ARCADIS management to align health and safety with the company's core values of integrity, entrepreneurship, and agility. ARCADIS is committed to preventing injuries and illness for the benefit of all employees, clients, partners, and all other stakeholders.

Employees are frequently advised that they are expected to comply with the ARCADIS H&S program, including all rules, policies, and standards concerning health and safety in the workplace. Positive reinforcement and recognition of safety-conscious employees will be an integral part of the strategy to promote compliance. The company will periodically distribute discretionary awards to employees who display exemplary safety attitudes or contribute to ARCADIS' health and safety efforts. This recognition can come from a variety of sources including supervisors, managers, H&S staff, or others.

Health and safety performance will be reviewed as a part of each employee's performance evaluation. Failure to comply with ARCADIS' code of conduct may result in disciplinary action per the ARCADIS discipline program as administered in cooperation with the Human Resources Department.

A definition of health and safety violations includes, but is not limited to the following actions: an employee not following ARCADIS or client-specific verbal or written safety procedures, guidelines or rules, engaging in horseplay on the job, failure to wear required personal protective equipment (PPE) or abuse of selected PPE, or other such activity.

5.2 Communication

Employees will be informed regarding health and safety issues in the following ways:

- During initial orientation of new hires, employees will be informed of the procedures associated with this standard and ARCADIS' Hazard Communication Program (ARC HSGE007).
- New hires will be informed of the location of ARCADIS H&S standards and documents which are housed on The Source.
- H&S communications will be distributed during regular staff meetings at the project, group, or office level.
- H&S communications will be distributed via the conduct of H&S Moments at the beginning of meetings and conference calls.
- H&S communications will be distributed through regular communications via email, weekly announcements, The Source, and other vehicles.
- H&S communications will be distributed through the regular distribution of health and safety shares and lessons learned.
- H&S communications will be distributed through the ARCADIS Field Employee H&S Handbook.
- H&S communications will be distributed through periodic Health and Safety webinars or informational memoranda distributed by Corporate Health and Safety.
- Daily tailgate safety meetings will be conducted during field operations including review of the site HASP and or related Job Safety Analyses (JSAs).

- H&S communications will be distributed during various training courses provided for employees based on their job function.

Employees are encouraged to communicate directly with managers and supervisors in verbal or written form about hazardous health and safety conditions. Internal communication processes include mechanisms to ensure that employees have a way to communicate their H&S concerns, questions, suggestions, comments, or other issues. Once appropriate action is taken, the employee raising the issue is (at a minimum) provided a response within a practical timeframe.

Internal communication may be accomplished through a variety of vehicles, including but not limited to company newsletters, H&S moments, emails, Safety Shares, and Snap Communications. In addition, through the ARCADIS risk management tools, feedback is provided to discuss safe and questionable behaviors when appropriate.

Additionally, communications resulting from regulatory requirements are distributed to ensure employee access to the information.

It is the policy of ARCADIS that employees who report a hazardous situation or make a suggestion for improving health and safety conditions in the workplace will not be subject to any type of retaliation. In addition, anonymous reporting of concerns, complaints, or suggestions is also available through the ARCADIS Employee Assistance Program (EAP).

5.3 Hazard Recognition, Identification, Assessment, Communication, and Control

Hazard recognition, identification, assessment, communication, and control processes are defined by the following ARCADIS HSS:

ARC HSMS000 – ARCADIS H&S Management System

ARC HSMS002 – Hazard Assessment and Risk Control

ARC HSFS010 – Health and Safety Plans

ARC HSMS010 – Incident Reporting and Investigation

ARC HSGE007 – Hazard Communication

All project sites are required to have a HASP prepared in accordance with the above referenced HSS. The HASP will include a detailed hazard assessment identifying hazards and hazard controls for each planned task and scope of work specific to the project.

All employees are empowered, authorized, and expected to use their Stop Work Authority if they feel their health and safety is or is perceived to be compromised.

Unsafe or unhealthy conditions and work practices must be corrected expeditiously, with the most hazardous exposures given correction priority.

5.4 Incident Reporting and Investigation

Per ARC HSMS010, loss and near miss incidents will be reported and investigated. Through the use of the 4-Sight database, these investigations will determine the contributing factors and root causes of incidents, and the identification and implementation of corrective and preventive actions. Contributing factors, root causes, and corrective actions will be communicated to appropriate staff related to lessons learned developed from the incident investigation.

5.5 H&S Procedures

ARCADIS employees will follow the ARCADIS H&S standards and/or the ARCADIS Employee Field H&S handbook as published on the H&S section of The Source. These HSS form the basis for the code of conduct expected by ARCADIS staff including supervisors, managers, and leaders.

5.6 H&S Inspections

Periodic inspections of the workplace (office or project site) will be conducted by performing Task Improvement Process (TIP), evaluations, ARCADIS global/Third Party/Client-led assessments, and H&S site visits per the ARCADIS audit and assessment processes described in ARCADIS H&S Standard ARC HSMS009 – H&S Conformance Assessments. For the purposes of this HSS, the primary criteria for completing H&S inspections include inspections based on hours worked at the project site and/or the risk ranking of hazards present. The frequency of these inspections depends on the operations involved, the magnitude of the hazards, the proficiency of employees, changes in equipment or work processes, and the history of work-place injuries and illnesses. Inspections should be conducted by personnel who, through experience or training, are able to identify actual and potential hazards and understand safe work practices. The project site or office is expected to complete routine H&S inspections. An inspection must be completed when an injury or incident has occurred or where a hazard analysis has not been completed.

5.7 Corrective and Preventive Action

Root causes will be determined for deficiencies identified during inspections, issues identified during incident investigations, and questionable behaviours identified during TIPs. Based on these root causes, the appropriate solutions will be determined and implemented per ARC HSMS011.

5.8 Competency, Training, and Experience

ARCADIS US defines and documents the necessary competence levels that their employees require to work in conformance with the ARCADIS H&S Vision and Policy. A training matrix is provided to assist supervisors and managers in selecting training that employees need to maintain the defined competencies required for their job responsibilities. Competency is achieved through a variety of mechanisms including:

- Training
- Education
- Experience

In addition, ARCADIS defines and implements methods to evaluate the effectiveness of training provided to employees. These methods may include but are not limited to:

- Written or oral testing
- Auditing and review
- Hands-on demonstrations
- Behavioral observations and feedback

ARCADIS ensures that training is completed to meet company, legal, and client requirements within our areas of operation. In addition, ARCADIS US trains its employees and makes them aware of:

- The importance of conforming to the H&S Vision and Policy and any standards provided them to conduct their work in a healthy and safe way
- The H&S consequences of their work and the benefits of completing their work in a safe and healthful fashion
- The employees' roles and responsibilities within the HSMS
- The safe behaviors for completing job tasks and the at-risk or unsafe behaviors that could result in employee injury or illness

Documentation of health and safety training for each employee is maintained for at least 1 year.

5.9 Emergency Planning, Preparedness, and Response

Each location will develop and implement an emergency preparedness and response plan per ARC HSMS008.

6. TRAINING

No specific training is required on this HSS; however, Section 5.8 defines training and competency requirements for other parts of the ARCADIS H&S program.

7. REFERENCES

H&S Page on The Source

ARC HSFS010 – Health and Safety Plans

ARC HSGE007 – Hazard Communication

ARC HSMS000 – ARCADIS H&S Management System

ARC HSMS002 – Hazard Assessment and Risk Control

ARC HSMS008 – Emergency Preparedness and Response

ARC HSMS010 – Incident Reporting and Investigation

ARC HSMS009 – H&S Conformance Assessments

8. RECORDS

Consistent with the ARCADIS Human Resources Records Retention policy HR 2.12, documentation and records required by the IIPP standard will be maintained for a minimum of 1 year in the following locations:

- The written IIPP will be maintained by the Director of Health and Safety on The Source, which is accessible by all employees of the company.
- H&S Training will be documented in the ARCADIS training system.
- The Source, H&S team sites, and 4-Sight will be used to maintain records of inspections, incident investigations, TIPs, Job Safety Analyses (JSAs), and other documentation.
- Site HASPs and tailgate safety meeting documentation will be kept on site and in the project file at the office where the project is managed.

9. APPROVALS AND HISTORY OF CHANGE

Approved By: Tony Tremblay, CSP – Corporate H&S, Director of Technical Programs



History of Change

Revision Date	Revision Number	Standard Developed/Reviewed By or Revised By	Reason for change
11 January 2010	01	Mike Thomas	Original document
16 April 2012	02	Sue Byers	Executive Summary added; terminology changed from JLA to JSA, LPO to TIP
25 June 2014	03	Alec MacAdam/Tony Tremblay	Updated Header/Footer; updated online reference from APEX to The Source; updated for CalOSHA CCR Title 8 3203 compliance; section 5.6 clarifies “project site or office inspections will be conducted based on the operations involved, the magnitude of the hazards, the proficiency of employees, changes in equipment or work processes, and the history of work-place injuries and illnesses”, and inclusion of the IIPP HASP Supplement

EXHIBIT 1 – IIPP HASP Supplement Template

Link to IIPP HASP Supplement

IIPP HASP Supplement for Project Sites and Offices

The purpose of the ARCADIS Illness and Injury Prevention Program (IIPP) is to establish location specific written guidelines to ensure the safety of employees working at ARCADIS offices or project sites located in the state of California (best management practice for other locations). It is the intention of ARCADIS to provide a safe and healthy working environment for all of its employees.
All ARCADIS employees and subcontractors will be offered a copy and are required to implement and following the principles set forth in this IIPP.
The purpose of this HASP Supplement is to communicate the specific details of the IIPP associated with the specific California office or project site for which this supplement has been prepared.
A copy of the ARCADIS H&S Standard ARC HSGE008 (Injury and Illness Prevention Program) must be included as an attachment to all California project site HASPs or office Emergency Response Hazard Communication Plans to meet the requirements of CCR Title 8 3203.
The programmatic details of the ARCADIS H&S Standard ARC HSGE008 are incorporated by reference.

This IIPP HASP supplement has been prepared to be used as a location specific IIPP template to address the required components of the IIPP as mandated by CCR Title 8, Section 3203.

Scope and Application:
This document serves as the written Injury Illness Prevention Plan for ARCADIS activities for the following ARCADIS office and/or project site:

ARCADIS Office or Project Site: _____

This HASP supplement is supported by the following documents, which are presented as references supporting this supplement:

ARCADIS Office or Project Site Documents: _____
(e.g., HASP or Office Emergency Response & HazCom Plan, Field Sampling Plan, SOPs, etc.)

Responsibility §3203(a)(1):
Roles and responsibilities are detailed in the office/site HASP. See the "Emergency Information" and "Tasks, Roles & Training Sections".

ARCADIS California IIPP Program Administrator: _____
ARCADIS Office H&S Coordinator / Site Health and Safety Officer: _____

Compliance §3203(a)(2):
All employees are responsible for applying the ARCADIS TRACK process in evaluating hazards and assessing risk for all work tasks, using safe work practices, following all directives, policies and procedures, and for assisting in maintaining a safe work environment. See the ARCADIS H&S Standard ARC HSGE008 for the steps detailing compliance with the ARCADIS H&S program.

Communication §3203(a)(3):
ARCADIS recognizes the importance of two-way communication between management and staff to address health and safety issues with the objective of planning for and maintaining an injury-free, productive workplace. A description of the policy and procedures developed to facilitate a continuous flow of health and safety focused communications between management and staff is provided in the ARCADIS H&S Standard ARC HSGE008.

Office/site specific workplace hazard methods of communication include the following:

- ☐ Site Health & Safety Plan
- ☐ Tailgate Safety Meetings
- ☐ Job Safety Analysis (JSA)
- ☐ Safety Data Sheets (SDS)
- ☐ Other: _____
- ☐ Task Improvement Process (TIPs)
- ☐ Emergency Response & HazCom plan
- ☐ Safety Committee Meetings
- ☐ Safety bulletins/Client procedures

Workplace Hazard Assessment §3203(a)(4):
Initial workplace hazard analysis is completed during the preparation of the project site HASP or office HazCom plan. Periodic inspections will be performed to identify and evaluate workplace hazards in all areas of the office or project site. Inspections and the associated observations will be conducted in accordance with the ARCADIS H&S Standard ARC HSGE008.
Periodic inspections will consist of identification and evaluation of workplace hazards using the H&S management assessments, H&S compliance assessments, TIPs, site/office inspections or ARCADIS global/Third Party/Client-Led H&S assessments to identify and evaluate workplace hazards.

Note: The primary criteria for conducting inspections are the number of hours worked at the site or office and the risk ranking of the hazards present. See the project specific HASP "Signatures" tab or office Emergency Response and Hazard Communication plan for a detail of proposed TIPs, assessments and inspections.

Accident Investigations §3203(a)(5):
All near misses, calls to WorkCare, and injuries must be reported to ARCADIS Corporate H&S as soon as possible. Procedures for investigating workplace accidents, incidents and injuries are described in the ARCADIS H&S Standard ARC HSGE008 and documents referenced therein. For incidents involving third parties the ARCADIS Legal Counsel must be contacted. Approval from legal counsel is required before a 4-Sight incident investigation entry is prepared.

Hazard Correction and Communication §3203(a)(6):
Unsafe or unhealthy work conditions, practices or procedures shall be corrected in a timely manner based on the severity of the hazard(s). Hazards shall be corrected according to the procedures outlined in the ARCADIS H&S Standard ARC HSGE008.

Note: When an imminent hazard exists which cannot be immediately abated without endangering employee(s) and/or property, All ARCADIS employees and subcontractors will Stop Work and leave the area. Employees identified to correct the hazardous condition will do so only when provided with the necessary training and protection to address the hazard safely.

Training and Instruction §3203(a)(7):
All employees, including managers and supervisors, shall have training and instruction on general and job-specific health and safety practices. Project site specific training requirements are communicated in the site specific HASP under the "Tasks, Roles and Training" tab.
A detailed discussion of the competency, training requirements and training process for the IIPP are covered in the ARCADIS H&S Standard ARC HSGE008.

Record Keeping §3203(b)(1) & (2):
Records of workplace hazard assessments and inspections will be maintained in accordance with the ARCADIS Human Resources policy HR 2.12 for record retention.
Project teams or office staff who are responsible for recording of the assessment or inspection will include at a minimum; the person(s) conducting the inspection, any unsafe conditions and work practices that have been identified and the action taken to correct the identified unsafe conditions and work practices.
Also, Documentation of health and safety training for each employee including the employees name, training dates, training program, and training providers are recorded and maintained by the ARCADIS Training Center. All employees receiving training conducted via third party training vendors are required to send a certificate of completion or similar record to the Training Center.

Labor - Management Safety Committee §3203(a)(3):
Establishment of a "Labor - Management Safety Committee" is a recommendation of §3203(c) when working in facilities with unionized employees and as such is not required for an IIPP to be complete. If establishment of a Labor - Managment Safety Committee is not applicable the process and procedures to formalize, document and communicate the health and safety related reporting is described in this IIPP. The components of the ARCADIS H&S Communications program is provided in the ARCADIS H&S Standard ARC HSGE008.

Notes:

EXECUTIVE SUMMARY

Through the use of personal protective equipment (PPE), ARCADIS employees are protected from occupational hazards in the event that engineering and administrative controls are not sufficient or practical. PPE will be provided to ARCADIS full time and permanent part time employees who regularly conduct field work or visit project sites outside of office environments at no cost following training on the proper use and maintenance of PPE.

Project managers are responsible for assessing potential hazards on a worksite and determining the applicable PPE.

Project personnel are responsible for understanding and utilizing "Stop Work Authority" should a hazard present itself that was not previously identified or has been identified in concentrations that are higher than anticipated.

This minimum level of PPE (hard hat; safety glasses; class II high-visibility vest, shirt or coat; and protective footwear with safety toe cap) is expected to be worn on all project sites unless in a field trailer or vehicle, unless a specific exemption has been established within an approved HASP or modification to a task specific JSA or Permit to Work upon completion/review of the hazard analysis.

PPE selection will be based on an evaluation of the performance characteristics of the PPE relative to the following:

- The requirements and limitations of the tasks or work environment
- The task-specific conditions and duration of the work
- The hazards and potential hazards identified at the site

PPE may be categorized into levels A, B, C or D.

- Level A offers the highest skin and respiratory protection
- Level B offers a high degree of respiratory protection with lesser levels of skin protection
- Level C is used when the concentration and type of airborne substance is known, and the criteria for using an air purifying respirator are met
- Level D offers the least skin and respiratory protection

PPE training will include, at minimum:

- When and what PPE is necessary
- How to put on, adjust, wear and take off the PPE
- Limitations of the PPE
- Proper care, maintenance, useful life, and proper disposal of PPE

1. POLICY

It is the policy of ARCADIS to assess the workplace to identify and assess hazards in order to appropriately implement controls for those hazards. In addition, it is ARCADIS policy to supply personal protective equipment (PPE) for employees in a working environment where engineering and administrative controls are not feasible or effective in the control of hazards. ARCADIS will train and supply this PPE at no cost to the employee.

2. PURPOSE AND SCOPE

2.1 Purpose

The purpose of PPE is to shield or isolate individuals from the chemical, physical and biologic hazards that may be encountered in their work environment. A hazard analysis or assessment will be performed before a job task is begun to evaluate if PPE is necessary to protect an employee from identified hazards and determine the type of PPE required. This analysis will include the identification of hazards/suspected hazards and their routes of exposure.

Combinations of protection may be needed to provide the appropriate level of protection for any given work environment. The level of PPE may change during a job, so periodic task evaluation will be conducted to ensure that the most appropriate PPE is being used. Over-protection, as well as under-protection, can create additional hazards and should be avoided where possible.

Subcontractors and other non-ARCADIS employees must supply their own PPE. ARCADIS will not supply PPE to any non-ARCADIS employees unless specific arrangements and agreements are made with the other party.

This Health and Safety Standard (HSS) provides guidance on the proper selection, use, care and maintenance of PPE.

2.2 Scope

Whenever possible, engineering, substitution and administrative controls will be used to reduce or eliminate hazards. When such controls are not feasible, practical or adequate, PPE will be used to protect employees from exposure to hazards during ARCADIS-related work tasks.

3. DEFINITIONS

Definitions related to personal protective equipment can be found in Exhibit 1.

4. RESPONSIBILITIES

4.1 ARCADIS Management

ARCADIS Management is responsible for providing resources for the acquisition of PPE and for the conduct of hazard assessments.

4.2 Project Managers

Project Managers are responsible, as part of the project hazard assessment, for determining PPE necessary to complete the project. In addition, the Project Manager is responsible for determining client requirements with respect to PPE. Project Managers notify health and safety staff of biological, chemical and physical hazards present or potentially present on the site, as well as verifying that any specific state and/or local requirements for PPE have been identified. Project Managers are also responsible for ensuring that project staff has the appropriate and applicable training for PPE use prior to those staff beginning work.

4.3 Corporate Health and Safety

Corporate Health and Safety is responsible for keeping this standard up-to-date with current regulatory requirements and best practices and for assisting in determining the appropriate PPE for a particular task and work environment and for assisting in the identification of appropriate vendors of such PPE.

4.4 Health and Safety Staff

Project Health and Safety Staff including designated Writers and Reviewers of Project Health and Safety Plans (HASPs) are responsible for developing control processes and techniques on specific projects based on the physical, chemical and biological hazards expected to be encountered on project facilities.

It is the responsibility of the Site Safety Officer (SSO) to verify that any employee-owned PPE brought to the job site is adequate for the task, properly fitted to the employee, and has been properly maintained and is cleaned in accordance with this standard.

4.5 ARCADIS Staff

ARCADIS staff is responsible for completing PPE training as required by this policy and standard, and for following all hazard control processes designated by the Project Manager, Project Health and Safety Staff and the project HASP. Employees must choose appropriate, properly fitted PPE where required, and are responsible for inspecting their PPE for wear, damage and effectiveness. Employees that bring their own PPE to the job site must ensure that the equipment is adequate for the task (e.g., meets minimum ANSI requirements, AUS requirements and client requirements), and has been properly maintained in a sanitary and reliable condition in accordance with this standard.

If project personnel believe that a hazard is present that was not previously identified or is at levels that are higher than expected, they should stop work and notify project health and safety staff or the project manager immediately and not proceed until authorized.

Staff are expected to comply with minimum PPE requirements as established by ARCADIS policy and HASP requirements and/or task specific PPE requirements detailed in the task specific Job Safety Analysis (JSA) or Permit to Work.

5. PROCEDURE

5.1 Minimum PPE Requirements

All full time and permanent part time employees that regularly conduct field work or visit project sites outside of office environments will be issued a field bag that contains, at a minimum, the following PPE:

- An ARCADIS branded hardhat
- Two pair of safety glasses, one clear pair and one tinted pair, or one pair of prescription safety glasses with transitional lenses
- Hearing protection
- A minimum, Type 2 reflective vest in either orange, lime green or yellow

Office locations will stock extra bags with the equipment listed above for use by other staff that do not regularly go to field locations. Additional PPE and H&S equipment will be issued to staff based on the hazards they face on specific projects (i.e. respirators, goggles, chaps, etc.).

ARCADIS has established the following minimum PPE requirement for field activities that must be worn unless excepted by the HASP, JSA or Permit to Work:

- Type I Hardhat (Class G rating if there is potential danger of contact exposure to low voltage conductors)
- Safety Glasses (Z87.1)
- Class 2 reflective traffic vest, coat or shirt in either orange, lime green or yellow
- Protective Footwear, e.g. steel toe safety shoes (minimum I/50 Impact resistance for the toe area which is an impact resistance rating of at least 50-foot pounds; C/50 Compression resistance for the toe area which correlates to 1750 pounds of compression resistance).

This minimum level of PPE is expected to be worn on all project sites unless in a field trailer or vehicle, unless a specific exemption has been established within an approved HASP or modification to a task specific JSA or Permit to Work upon completion/review of the hazard analysis.

The goal in this section is to specify PPE for work that is not governed by a JSA or Permit to Work to avoid conflicts in PPE requirements. The PPE specified in a JSA/Permit to Work is automatically the PPE requirement for all work governed by the JSA/Permit to Work. As a result, it is critical to take the time during JSA/Permit development to consider and identify the proper PPE required for the activity. Please note that the template JSA

PPE information may not be the appropriate PPE for your project and should be adjusted accordingly.

Note: Project Teams must check and comply with state, local and/or client requirements for specific minimum PPE requirements and adjust the HASP, JSA or Permit to Work process accordingly.

Temporary full time/part time employees (temp staff) will be provided all of the above PPE; however, standard steel toed safety boots will only be provided to temp staff employees with the approval of the administrative supervisor and Project Manager. If the administrative supervisor or Project Manager elects to not provide protective footwear or other non-specialty required footwear to temp staff, the employee will be informed of the requirement to provide their own footwear meeting project health and safety requirements prior to hire.

No ARCADIS staff should arrive at a field or project site without this minimum PPE.

5.2 The PPE Program

The basic objectives of a PPE program are to protect the wearer from safety and health hazards; and to prevent injury to the wearer from incorrect use and/or malfunction of the PPE. This document serves as the overall ARCADIS PPE program and is used as guidance for the development of a project-specific PPE program which becomes part of a project-specific health and safety plan. A project-specific PPE program in combination with this HSS will address the following:

- PPE selection based upon site hazards (Hazard Identification/Assessment).
  - Identify the hazards/suspected hazards and their potential routes of exposure (e.g., skin, inhalation, ingestion or eye contact).
- The use and limitations of the equipment including limitations during temperature extremes and under certain medical conditions;
- The work mission duration;
- Maintenance, storage, decontamination and disposal of PPE;
- Training including proper fit and how to properly put on and take off PPE;
- PPE inspection procedures prior to, during, and after use; and
- Periodic evaluation of the effectiveness of the PPE program.

5.3 PPE Selection

The use of PPE can itself create significant worker hazards, such as heat stress, physical and psychological stress and impaired vision, mobility and communication. Over-protection, as well as under-protection and poor fit, can be hazardous and should be avoided where possible. Site or project-specific health and safety plans take into

consideration engineering, substitution, and administrative controls first as a means to eliminate/reduce the need for PPE. When it is not feasible or practical to eliminate the use of PPE, PPE must be properly fitted to each affected employee, and PPE selection will be based on an evaluation of the performance characteristics of the PPE relative to the following:

- The requirements and limitations of the tasks or work environment;
- The task-specific conditions and duration; and
- The hazards and potential hazards identified at the site.

The level of protection will be increased whenever it is shown that increased protection is necessary to reduce employee exposures to the hazards. It may be decreased when it is shown that this will not result in hazardous exposure to employees.

5.4 Levels of PPE Protection

For work on hazardous sites, a combination of PPE may be categorized into levels A, B, C, or D with level A offering the highest level of protection and D the lowest. Monitoring the effectiveness of PPE will be done throughout a project to ensure that the appropriate level of protection is being worn. These levels of protection are described below.

5.4.1 Level A Protection

Level A PPE offers the highest level of respiratory and skin protection and should be worn when:

- The hazardous substance has been identified and requires the highest level of protection of the skin, eyes, and respiratory system based on either:
  - The measured (or potential) high concentrations of atmospheric gases, vapors, or particulates; or
  - If site operations and work functions involve a high potential for splash, immersion, or exposure to unexpected vapors, gases, or particulates which are harmful to skin eyes, or the respiratory system.
- There is a known or suspected high degree of hazard to the skin and skin contact is possible.
- Conducting work in a confined, poorly ventilated area and the other criteria requiring Level A PPE have not been determined.

Level A equipment includes:

- NIOSH approved positive pressure, full-face piece self contained breathing apparatus (SCBA), or positive pressure supplied airline respirator with escape SCBA;
- Totally encapsulating chemical-protective suit (material based on the hazard);

- Chemical resistant outer **and** inner gloves (type and material based on the hazard);
- Chemical resistant boots with steel toe and shank;
- Disposable protective suit, gloves and boots (depending on suit construction, may be worn over the totally encapsulating suit);
- Coveralls (optional, as applicable);
- Long underwear (optional, as applicable); and
- Hard-hat - under suit (optional, as applicable).

5.4.2 Level B Protection

Level B PPE offers a high degree of respiratory protection with lesser levels of skin protection. Level B PPE should be worn when:

- The type and atmospheric concentration of substances have been identified and require a high level of respiratory protection but less skin protection;
- The atmosphere contains less than 19.5 percent oxygen; or
- The presence of incompletely identified vapors or gases is indicated by direct reading organic vapor detection instruments, but the vapors and gases are not suspected of containing high levels of chemical harmful to the skin or capable of being absorbed through the skin. Level B is the minimum level of protection that should be worn when there is insufficient information to determine the hazards or potential hazards of the substance.

Level B PPE equipment includes:

- NIOSH approved positive pressure, full face piece self contained breathing apparatus 1(SCBA), or positive pressure supplied air respirator with escape SCBA;
- Hooded chemical resistant clothing (overalls and long sleeve jacket; coveralls; one or two piece chemical splash suit; disposable chemical resistant overalls) (materials based on the hazards);
- Chemical resistant outer **and** inner gloves (material based on the hazards);
- Chemical resistant boots with steel toe and shank;
- Coveralls (optional, as applicable);
- Outer chemical resistant boot covers (optional, as applicable);
- Hard hat (optional, as applicable); and

- Face shield (optional as applicable).

5.4.3 Level C Protection

Level C PPE is used when the concentration and type of airborne substance is known, and the criteria for using an air purifying respirator are met. It should be worn when:

- Atmospheric contaminants, liquid splashes, or other direct contact will not adversely affect or be absorbed through any exposed skin;
- The types of air contaminants have been identified, concentrations measured, and an air purifying respirator is available that can remove the contaminants; and
- All criteria for the use of an air purifying respirator are met.

Level C PPE equipment includes:

- NIOSH approved full face or half mask air purifying respirator (with appropriate cartridges based on the hazards);
- Hooded chemical resistant clothing (overalls and long sleeve jacket; coveralls; one or two piece chemical splash suit; disposable chemical resistant overalls) (materials based on the hazards);
- Chemical resistant outer **and** inner gloves (select appropriate materials based on the hazards);
- Chemical resistant boots with steel toe and shank;
- Coveralls (optional, as applicable);
- Outer chemical resistant boot covers (optional, as applicable);
- Hard hat (optional, as applicable);
- Escape mask (optional, as applicable); and
- Face shield (optional, as applicable).

5.4.4 Level D Protection

Level D PPE offers the least skin and respiratory protection and should be worn when the atmosphere contains no known hazards, and work functions preclude splashes, immersions or the potential for unexpected inhalation of or contact with hazardous levels of any chemicals.

Level D PPE equipment may include any or all of the following depending on the hazards of the site:

- Chemical resistant boots with steel toe and shank (optional, as applicable);
- Coveralls (optional, as applicable);
- Gloves (optional, as applicable);
- Outer chemical resistant boots (disposable) (optional, as applicable);
- Safety glasses or chemical splash goggles (optional, as applicable);
- Hard hat (optional, as applicable);
- Escape mask (optional as applicable); and
- Face shield (optional as applicable).

5.5 Combinations of Protection

Combinations of protection are acceptable if the task hazard analysis and the site conditions warrant modification of PPE levels.

5.6 Equipment List

5.6.1 Eye/Face Protection

All employees engaged in or working in or adjacent to areas with eye-hazardous activities or operations, such as but not limited to flying objects and hazardous chemicals shall wear appropriate eye protection.

It is strongly encouraged that eye protection be worn when present on any project site, including construction sites

- Safety glasses with side shields are required for impact protection and shall meet ANSI Standard Z87.1 requirements.
- Chemical goggles (for protection against chemical splash).
- Face shields (for face protection from chemical splash and are not a substitute for primary eye protection).
- Full-face respirators can provide eye and face protection in lieu of safety glasses, goggles or face shields.
- Shaded eye protection meeting the minimum shade requirements established in 29 CFR 1910.133 (for employees exposed to sources of injurious light radiation [e.g., welding, cutting, lasers]).
- For prescription eye protection contact your supervisor to fill out an AOSafety order form available on the ARCADIS Health and Safety website (The Source). For temporary staff, standard prescription safety glasses will be provided with the

approval of the administrative supervisor and Project Manager. If the administrative supervisor or Project Manager elects to not provide standard prescription safety glasses to temp staff, the employee will be informed of the requirement to provide their own prescription safety meeting project health and safety requirements prior to hire.

5.6.2 Respiratory Protection

Respirators will be provided and used in accordance with the ARCADIS Respiratory Protection Policy/Standard ARC HSGE017 and 29 CFR 1910.134.

5.6.3 Hearing Protection

Hearing protection will be provided and used in accordance with the ARCADIS Hearing Conservation Policy/Standard ARC HSIH008 and 29CFR 1910.95.

5.6.4 Foot Protection

Basic foot protection is required for all ARCADIS job sites and industrial locations. Specialized footwear will be provided as required by the nature of the work. Special foot protection may include, but is not limited to, chemically resistant, thermally shielded, metatarsal guards, etc.

One pair of leather safety boots will be provided as necessary by ARCADIS. The employee purchasing the footwear is required to ensure that it meets any of the consensus standards as specified by OSHA 29 CFR 1910.136 which include:

- ASTM F2413-11 Standard Specification for Performance Requirements for Protective (Safety) Toe Cap Footwear

  Note: ASTM F2413-11 Standard Specification for Performance Requirements for Protective (Safety) Toe Cap Footwear contains performance requirements for footwear to protect workers' feet from the following hazards by providing:

  1. Impact resistance (I) for the toe area of footwear (75 foot-pounds);
  2. Compression resistance (C) for the toe area of the footwear (75/ 2,500 pounds);
  3. Metatarsal impact protection (Mt) that reduces the chance of injury to the metatarsal bones at the top of the foot (75 foot-pounds);
  4. Conductive properties (Cd) which reduce hazards that may result from static electricity buildup; and reduce the possibility of ignition of explosives and volatile chemicals (electrical resistance zero â€“ 500,000 ohms);
  5. Electric hazard protection (EH) to protect the wearer when accidental contact is made by stepping on live electrical wire (capable of withstanding the application of 18,000 volts at 60 hertz for one minute

with no current flow or leakage current in excess of one milliampere, under dry conditions);

6. Static dissipative properties (SD) to reduce hazards due to excessively low footwear electrical resistance that may exist where SD footwear is required (must have a lower limit of electrical resistance of 106 ohms and an upper limit of 108 ohms when tested at 50-volts); and
7. Puncture resistance (PR) (when viewed at a 90° angle, the test pin tip must not visually penetrate beyond the face of the material nearest the foot after an applied force of 270 pounds, no signs of de-lamination or cracking after 1.5 million flexes and no sign of corrosion, de-lamination or deterioration after being exposed to a five percent salt solution for 24-hours.)

- ASTM F-2412-2005, "Standard Test Methods for Foot Protection," and ASTM F-2413-2005, "Standard Specification for Performance Requirements for Protective Footwear"
- ANSI Z41-1999, "American National Standard for Personal Protection -- Protective Footwear"

Safety shoes worn by ARCADIS staff during field work must be equipped with protective (safety) toe cap that has a minimum I/50 Impact resistance rating for the toe area which is an impact resistance rating of at least 50-foot pounds and a C/50 Compression resistance rating for the toe area which correlates to 1750 pounds of compression resistance.

Puncture resistant soles or in-soles equipped in the safety boots are project driven based on the Hazard Assessment. Some clients may require puncture resistant soles or in-soles.

The maximum expenditure or reimbursement for approved safety shoe purchases will be $150. Reimbursement requests must be approved by the employee's supervisor.

It should be noted that some clients may prohibit the use of athletic-style safety shoes ("safety sneakers") due to the difficulties created by these styles in supervising proper use of protective footwear.

5.6.5 Head Protection

Hard hats meeting ANSI Z89.1 will be provided to protect employees from impact, penetration, falling objects and/or limited electrical shock and burn, as appropriate for work site hazards. A hard hat must be replaced when it becomes damaged, contaminated (and contamination cannot be removed) or it has been struck by an object of sufficient size to potentially compromise its integrity.

Hardhats must resist penetration by objects, be water resistant and slow burning, and have a chin strap if it is worn while working at elevation. It must be worn square on the head and not be pushed back, to the side or forward.

Baseball-style caps will interfere with the ability of a suspension to work properly during an impact; they should not be worn under protective headgear.

There are two types and three classes of head protection described in ANSI standard.

Other hazard situations to consider are:

- In areas of heavy vegetation or in any area where hunters may be present, it is recommended that some type of brightly colored head protection be worn. For example, a bright orange or yellow baseball cap or stocking cap.
- If cold exposure is an issue, hardhat liners are available (made specifically for the particular hardhat) or if a hardhat is not required, some type of insulated head protection such as a stocking cap should be worn.
- Because it can degrade headwear material and reduce the level of protection, insect repellent should not be applied to or inserted into headwear. The headwear manufacturer should be consulted for instructions on the use of insect repellents and other chemicals on its' products.

5.6.6 Hand Protection

Appropriate hand protection will be provided if employee's hands are exposed to hazards while on the job.

Such as:

- pinch points
- sharp/pointed tools or objects
- incorrect or inadequate tool use
- improper use
- rotating/energized/automated parts
- abrasive materials
- inadequate job planning
- lack of/inadequate protection
- changing weather conditions and extreme temperatures
- hazardous material
- Jewelry and loose clothing.

Once these hazards are identified, the appropriate glove or hand protection must be selected. When choosing gloves, keep in mind:

- Hazardous Chemicals/Substances to be Contacted
- Nature of Contact (total immersion, splash, etc.)
- Duration of Contact
- Area of Protection (hand only, forearm, arm)
- Equipment (rotating, sharp edges, etc.)
- Grip (dry, wet, oily)
- Thermal Protection
- Abrasion/Cut/Puncture Resistance
- Tear/Tensile Strength
- Ergonomics (size, heat stress, dexterity)
- Decontamination/Disposal

In selecting chemically protective gloves, the toxic properties of the chemical(s) will be determined. Information provided on the manufacturer's label or by chemical compatibility charts regarding breakthrough time, permeation rate and degradation should be considered during selection.

5.6.7 Body Protection

Protective clothing, gloves, boots, and other protective equipment will be provided as appropriate for the hazards associated with the tasks being performed.

Long pants are required for all field work unless approval is granted by corporate H&S. Additional protection such as cooling vests may be required. In environments with potential biological hazards such as ticks, plants or snakes, gloves and long sleeves should be worn along with head protection of some kind to protect the scalp. In areas of roadway work or other vehicle traffic high visibility Class II safety vests will be worn.

Chemically Protective Clothing (CPC) will be selected by evaluating the performance characteristics of the CPC against the requirements and limitations of the site and task-specific conditions. This selection should be performed by an employee with training and experience taking into consideration:

- Permeation, degradation, penetration of the CPC by the chemical and;
- Durability, flexibility, fit, temperature effects, ease of decontamination, compatibility with other necessary equipment (e.g., hardhats, SCBA, etc.); and duration of use that could affect the employees ability perform the task.

Where required, appropriate Fire Resistant (FR) protective clothing must be used where there is a potential for electrical arc flash hazards (refer to the ARCADIS Electrical Safety

Standard HSFS006 for additional information). Jobs that expose workers to fire dangers require the use of FR protective clothing.

5.6.8 Specialized Equipment

All other specialized safety equipment required for an assignment (e.g., work gloves, specialized protective clothing, hip boots, field rain gear, personal floatation devices) will be provided by ARCADIS as specified in the HASP.

5.6.9 Extreme Cold Environments

Supervisors are responsible for ensuring that staff is properly equipped to protect themselves while working in extreme cold environments. The following is suggested as appropriate PPE for cold conditions:

- Hats/hat liners and gloves
- Thermal clothing
- Hi-Visibility clothing
- Winter footwear

Use of specialized equipment will be charged to projects in accordance with established policy and rental rates.

5.7 Maintenance/Storage/Disposal

5.7.1 PPE Maintenance and Disposal

PPE must be inspected by the user before and after each use for defects, rips, tears and/or damaged parts. Damaged or compromised PPE will not be used and must be repaired before re-use or disposed. PPE must be disposed of according to the HASP and other project plans for the site. If non-disposable, PPE must be decontaminated and sanitized before being reused according to the HASP. Contaminated PPE which cannot be properly decontaminated by normal procedures must be disposed of accordingly.

Employees are responsible for using and maintaining PPE in a sanitary and reliable condition.

5.7.2 PPE Storage

All PPE must be stored to protect against dust, sunlight, extreme heat and cold, excessive moisture and damaging chemicals. Storage must be in accordance with the manufacturer's specifications and OSHA requirements.

5.7.3 Contaminated Boots

Single-use boots or boot covers which become contaminated on the job will be waste profiled, as necessary, and properly disposed. Work boots will be properly decontaminated upon exiting contaminated work zones (exclusion zones). Work boots that are damaged on the job must be replaced.

6. TRAINING

Training in the proper use of PPE will generally be provided in conjunction with HAZWOPER training or via coursework selected and approved by Corporate H&S. Training will be completed prior to the employee's use of PPE, when changes in the work place alter the use or type of PPE, and when inadequacies in the employee's knowledge or use of PPE are noted.

The training will include at a minimum:

- When and what PPE is necessary;
- How to put on, adjust, wear and take off the PPE;
- Limitations of the PPE; and
- Proper care, maintenance, useful life, and proper disposal of PPE.

Retraining will be conducted when the workplace changes making the earlier training obsolete, the type of PPE changes or when the employee demonstrates lack of use, improper use, or insufficient skill or understanding.

7. REFERENCES (regulation citation, technical links, publications, etc.)

29 CFR 1910.120 "Hazardous Waste Operations and Emergency Response"

29 CFR 1910 Subpart I "Personal Protective Equipment"

29 CFR 1910.136 Foot Protection

29 CFR 1910.6 Incorporation by reference

8. RECORDS - DATA RECORDING AND MANAGEMENT

Records of the PPE training are retained by the employee and in the ARCADIS training database. Medical clearance for respirator use is maintained by the employee and ARCADIS' medical vendor.

9. APPROVALS AND HISTORY OF CHANGE

Approved by: Tony Tremblay, CSP – Corporate H&S, Director of Technical Programs



History of Change

Revision Date	Revision Number	Standard Developed/Reviewed By or Revised By	Reason for change
20 February 2009	01	Miriam Koesterich/Mike Thomas	Original document
19 August 2011	02	Sue Byers/Mija Coppola	Updated footwear protection consensus standards, clarified contaminated work boot section and updated document format
2 February 2012	03	Tony Tremblay	Clarified temp staff PPE issues in sections 5.1 and 5.6.1
16 January 2013	04	Pat Vollertsen/Tony Tremblay	Added hand protection to section 5.1, added to employee responsibility in section 4.5, and added information on when eye protection should be worn in section 5.6
12 February 2013	05	Amanda Tine/Tony Tremblay	Added that PPE must be properly fitted. Added requirements for employees that bring their own PPE; Added Retraining information into Section 6
23 June 2014	06	Tony Tremblay	Identified minimum PPE requirements for ARCADIS field work in section 5.1 of HSS; Updated footwear protection consensus standard information in Section 5.6.4; and updated foot protection definition

Exhibit 1 – Definitions

Eye/Face Protection - Equipment designed to provide eye or face protection when exposed to hazards from flying particles, molten metal, liquid chemicals, acids or caustic liquids, chemical gases or vapors, or potentially injurious light radiation.

Foot Protection - Footwear designed to provide foot and toe protection when working in areas where there is a danger of foot injuries due to falling or rolling objects, or objects piercing the sole, and/or where an employee's feet are exposed to electrical hazards. These include such measures as safety toe cap and puncture resistant soles.

Hand and Body Protection - Equipment designed to provide protection to the hands and body during exposures to potential hazards such as potential for skin absorption of harmful substances, sharp objects, abrasive surfaces, punctures, temperature extremes and chemical contact.

Hazard Assessment - The process utilized to identify hazards in the workplace and to select the appropriate PPE to guard people against potential hazards.

Head Protection - Equipment designed to provide protection to the head during exposure to potential hazards such as falling objects, striking against objects or electrical hazards.

Hearing Protection - Equipment designed to provide protection to an individual's hearing during exposure to excessive noise levels and any 8hr work day with noise levels consistently 85dB or above.

Personal Protective Equipment (PPE) - Equipment designed to provide protection to the wearer from potential hazards to the eyes, face, hands, head, feet, ears, extremities and respiratory system.

Respiratory Protection - Equipment designed to provide protection to the wearer from potential inhalation hazards such as vapors, mists, particulates and gases.

EXECUTIVE SUMMARY

It is the policy of Arcadis to prevent or minimize all occupational exposure to respirable crystalline silica, through the use of engineering and administrative controls, and personal protective equipment (PPE). Respirable crystalline silica particles are typically at least 100 times smaller than ordinary sand found on beaches or playgrounds, and is generated by high-energy operations including but not limited to cutting, sawing, grinding, drilling and crushing stone, rock, concrete, brick, block and mortar, or when abrasive blasting with sand. “Silica-containing dust” in this Health & Safety Standard (HSS) refers to “Respirable Crystalline Silica” unless otherwise specified.

The following personal exposure limits are established for silica-containing dust by inhalation:

- OSHA ACTION LEVEL
    - Time Weighted Average (TWA) – 25 micrograms per cubic meter of air (µg/m^3) silica in air averaged over an 8-hour period
- OSHA PERMISSIBLE EXPOSURE LEVELS (PELs)
    - TWA – 50 µg/m^3 silica in air averaged over an 8-hour period.
- ACGIH THRESHOLD LIMIT VALUES (TLVs)
    - TWA – 0.025 mg/m^3 silica-in-air averaged over an 8-hour period for the respirable crystalline silica fraction which are those particles that enter deep into the lung where gas exchange takes place.

The Action Level, PEL, and TLV apply to three forms of silica-containing dust: Quartz, Cristobalite, and Trydimite. Quartz is by far the most common form of silica-containing dust found at construction workplaces.

This HSS applies to all occupational exposures to silica-containing dust, except where employee exposure will remain below 25 µg/m^3 as an 8-hour TWA under any foreseeable conditions. Projects where exposure to silica-containing dust will occur will comply specified exposure control methods or alternative exposure control methods.

Initial silica awareness training is required for all employees who must comply with this HSS and/or are assigned to a work area where silica-containing dust is likely to be generated. A written Exposure Control Plan is required when exposure to silica-containing dust is or can reasonably be expected to exceed 25 µg/m^3 of silica-containing dust in air averaged over an 8-hour period. A Competent Person will implement the written plan and make frequent and regular inspection of job sites, material, and equipment.

Initial and Annual Medical Surveillance is required if:

- If employee personal exposures are reasonably expected to exceed the Action Level on at least 30 calendar days per year.
- If work is to be conducted where silica-containing dust concentrations are reasonably expected to exceed the PEL.
- All air monitoring and personal exposure monitoring records shall be kept for 30 years.

1. POLICY

Arcadis understands the hazards of personal exposure to respirable crystalline silica (silica-containing dust), and will implement the appropriate controls to minimize or eliminate the hazards associated with silica-containing dust. These controls will focus first on engineering controls to mitigate silica-containing dust hazards where appropriate and practical. In most circumstances, dust suppression (wetting cutting surface) is effective in managing silica-containing dust. Work practices (administrative controls) may also be implemented as appropriate and practical. Wherever engineering and administrative controls are not sufficient to reduce employee exposure to or below the OSHA Permissible Exposure Limit (PEL), Arcadis will nonetheless use the controls to reduce employee exposure to the lowest feasible level and will supplement them with the use of respiratory protection that complies with the requirements of Section 5.5.

2. PURPOSE AND SCOPE

2.1 Purpose

This Health & Safety Standard (HSS) meets the Title 29 Code of Federal Regulations (CFR) Part 1926.1153 (Construction) requirements of the U.S. Occupational Safety and Health Administration (OSHA) regulation.

2.1.1 Exposure to Silica-Containing Dust

This HSS and associated standards provides information to protect Arcadis employees, subcontractors, and other affected personnel from exposures to silica-containing dust while conducting work on Arcadis projects.

The following personal exposure limits are established for silica-containing dust by inhalation:

- OSHA ACTION LEVEL
    - Time Weighted Average (TWA) – 25 micrograms per cubic meter of air (µg/m^3) silica in air averaged over an 8-hour period
- OSHA PERMISSIBLE EXPOSURE LEVELS (PELs)
    - TWA – 50 µg/m^3 silica in air averaged over an 8-hour period.
- ACGIH THRESHOLD LIMIT VALUES (TLVs)
    - TWA – 0.025 mg/m^3 silica-in-air averaged over an 8-hour period for the respirable crystalline silica fraction which are those particles that enter deep into the lung where gas exchange takes place.

The Action Level, PEL, and TLV apply to three forms of silica-containing dust: Quartz, Cristobalite, and Trydimite. Quartz is by far the most common form of silica-containing dust found at construction workplaces.

2.2 Scope

This HSS and the associated standards apply to all projects where silica-containing dust is generated in a manner in which Arcadis employees, subcontractors and other affected personnel are or could be exposed to silica-containing dust above the Action Level.

3. DEFINITIONS

Definitions related to this HSS can be found in Exhibit 1.

4. RESPONSIBILITIES

4.1 Project Manager, Associate Project Manager and Task Manager

Project Managers, Associate Project Managers and Task Managers (Project Team) are responsible, as part of the project hazard assessment, for determining if silica-containing dust may be generated at the project site. In addition, Project Teams are responsible for determining client requirements with respect to the control of silica-containing dust hazards. Project Teams will assign a Competent Person to oversee all activities that are likely to generate silica-containing dust. Project Teams are also responsible for ensuring that project staff have the appropriate and applicable training for silica-containing dust prior beginning work.

Project Teams are responsible for maintaining exposure monitoring records, if required, for a minimum of 30 years and submitting copies to Corporate Health and Safety, as required by the Industrial Hygiene H&S Standard (ARC HSIH009).

4.2 Project Personnel

Project personnel are responsible for reading and following all hazard control processes, as required by the project Health & Safety Plan (HASP). If unforeseen activities are required that may generate silica-containing dust, Project Personnel are expected to stop work and notify the Site Safety Officer and the Project Manager immediately, and not proceed with the associated task until authorized.

4.3 Competent Person

The Competent Person is an individual who is capable of identifying existing and foreseeable silica-containing dust hazards in the workplace and who has authorization to take prompt corrective measures to eliminate or minimize them. The competent person must have the knowledge and ability necessary to fulfill the responsibilities set forth in the Exposure Control Plan. The Competent Person is expected to make frequent and regular inspections of job sites, materials, and equipment to implement the written exposure control plan.

4.4 Corporate Health & Safety

Corporate Health and Safety is responsible for keeping this HSS up-to-date with current regulatory requirements and best practices. In addition, Corporate Health and Safety oversees the medical surveillance program for silica-containing dust, as applicable and provides a silica training program for presentation to appropriate staff.

5. PROCEDURE

5.1 Respirable Crystalline Silica

Exposure to silica-containing dust occurs when the following tools are used on concrete, brick, block, stone, mortar, and other materials that contain silica:

- Stationary masonry saws;
- Handheld power saws;
- Walk-behind saws;
- Drivable saws;
- Rig-mounted core saws or drills;
- Handheld and stand-mounted drills (including impact and rotary hammer drills);
- Dowel drilling rigs;
- Vehicle-mounted drilling rigs;
- Jackhammers and handheld powered chipping tools;
- Handheld grinders;
- Walk-behind milling machines and floor grinders;
- Drivable milling machines;
- Crushing machines; and
- Heavy equipment and utility vehicles when used to abrade or fracture silica-containing materials (such as hoe-ramming or rock ripping) or during demolition activities, and for tasks such as grading and excavating.

Exposures to silica-containing dust also occurs during tunneling operations and during abrasive blasting when sand or other blasting agents containing silica are used, or when abrasive blasting is performed on substrates that contain silica, such as concrete.

The health effects of silica-containing dust are based on the type of exposure encountered. Silicosis is a progressive lung disease resulting from prolonged and repeated exposure to silica-containing dusts. When inhaled, silica-containing dust passes into the lungs, and scavenger cells such as macrophages engulf it. Enzymes released by the scavenger cells cause the lung tissue to scar. The onset and degree of scarring is often dependent upon the duration and frequency of exposure.

- Chronic silicosis usually occurs after 10 or more years of exposure to silica-containing dust at relatively low concentrations, and is often first realized due to breathing difficulty during exercise. Sometimes the breathing difficulty progresses to shortness of breath even during rest. Some people have a cough that may produce

sputum. Breathing may worsen for years after the person stops working with silica-containing dust. The lung damage can lead to lower levels of oxygen in the blood and can also strain the right side of the heart. This strain can lead to a type of heart failure called cor pulmonale (also known as Pulmonary Hypertension), which can be fatal.

- Accelerated silicosis results from exposure to high concentrations of silica-containing dust and develops 5 to 10 years after the initial exposure.

- Acute silicosis occurs where exposure concentrations are the highest and can cause symptoms to develop within a few weeks to 4 or 5 years after the initial exposure.

5.2 Standard Applicability

This HSS applies to all occupational exposures to silica-containing dust, except where employee exposure will remain below 25 µg/m^3 as an 8-hour TWA under any foreseeable conditions.

Some tasks, identified by OSHA, can reasonably be anticipated to remain below 25 µg/m^3 as an 8-hour TWA that involved only minimal exposure to silica-containing dust. Such tasks include:

- Mixing concrete for post holes;

- Pouring concrete footers, slab foundation, and foundation walls; and

- Removing concrete formwork.

When tasks are performed in which exposure is anticipated to remain under 25 µg/m^3 as an 8-hour TWA, and isolated from tasks that generate significant exposures to silica-containing dust, this HSS does not apply. Some employees may perform construction-related tasks involving occasional, brief exposures (below 25 µg/m^3 as an 8-hour TWA) to silica-containing dust that are incidental to their primary work.

> **Example:** For employees using a hand-held drill to install a singular sub slab vapor point, if the duration of exposure is 15 minutes or less, the 8-hour TWA exposure can reasonably be anticipated to remain under the 25 µg/m^3 threshold (assuming no exposure for the remainder of the shift), and this HSS would not apply. If the duration of the exposure is greater than 15 minutes, active real-time air monitoring equipment must be utilized to determine applicability of this HSS.

5.3 Exposure Controls

Project Teams have two options to comply with this HSS when employee exposure is anticipated to be at or above 25 µg/m^3 as an 8-hour TWA under any foreseeable conditions:

1. Specified exposure control methods; or

2. Alternative exposure control methods.

5.3.1 Specified Exposure Control Methods

The specified exposure control option requires full compliance with OSHA's Table 1-Specified Exposure Control Method When Working With Materials Containing Crystalline Silica (Exhibit 2). When controls in Exhibit 2 are fully and properly implemented, Project Teams are not required to assess employees' exposure levels or keep employee exposure at or below the PELs.

When implementing the control measures specified in Exhibit 2, Project Teams shall ensure the following:

- For tasks performed indoors or in enclosed areas, provide a means of exhaust, as needed, to minimize the accumulation of visible airborne dust;
- For tasks performed using wet methods, apply water at flow rates sufficient to minimize release of visible dust;
- For measures implemented that include an enclosed cab or booth, ensure that the enclosed cab or booth:
    - Is maintained as free as practicable from settled dust;
    - Has door seals and closing mechanisms that work properly;
    - Has gaskets and seals that are in good condition and working properly;
    - Is under positive pressure maintained through continuous delivery of fresh air;
    - Has intake air that is filtered through a filter that is 95% efficient in the 0.3-10.0 µm range (e.g., MERV 16 or HEPA [MERV 17-20]); and
    - Has heating and cooling capabilities.
- Where an employee performs more than one task in Exhibit 2 during the course of a shift, and the total duration of all tasks combined is more than four hours, the required respiratory protection for each task is the respiratory protection specified for more than four hours per shift. If the total duration of all tasks in Exhibit 2 combined is less than four hours, the required respiratory protection for each task is the respiratory protection specified for less than four hours per shift.

5.3.2 Alternative Exposure Control Methods

For tasks not listed in Exhibit 2, or where engineering controls, administrative controls, and respiratory protection described in Exhibit 2 are not fully and properly implemented, alternative exposure control methods shall be implemented.

No employee will be exposed to an airborne concentration of silica-containing dust in excess of 50 µg/m^3, calculated as an 8-hour TWA. This is determined by assessing the exposure of each employee who is or may reasonably be expected to be exposed to silica-containing dust at or above the Action Level (25 µg/m^3 as an 8-hour TWA) in

accordance with either the performance option or the scheduled monitoring option (Section 5.4).

Project Teams who follow alternative exposure control methods must:

1. Determine the levels of silica-containing dust that employees are exposed to over an 8hr TWA in accordance with Section 5.4;
2. Limit employee exposures to a PEL of 50 µg/m^3 as an 8-hour TWA;
3. Use engineering and administrative controls, to the extent feasible, to limit employee exposures to the PEL, and supplement the controls with respiratory protection when necessary. If exposure controls are not sufficient in reducing worker exposure to at or below the PEL, the controls must still be implemented and supplemented with respiratory protection (Approved Protection Factor [APF] of 10 or greater).
4. Keep records of employee exposure to silica-containing dust in accordance with the Arcadis Industrial Hygiene HSS (ARC HSIH009).

5.4 Exposure Assessment

Project Teams following alternative exposure control methods must assess the 8-hour TWA exposure for each employee who is or may reasonably be expected to be exposed to silica-containing dust at or above the Action Level.

Personal exposure monitoring shall utilize standard industrial hygiene sampling techniques and recordkeeping as required in Arcadis Industrial Hygiene HSS (ARC HSIH009). Exposure assessments will be completed either using:

- Performance Option; or
- Scheduled Monitoring Option

5.4.1 Performance Option

The Project Team shall assess the 8-hour TWA exposure for each employee on the basis of any combination of air monitoring data or objective data sufficient to accurately characterize employee exposures to silica-containing dust.

Example: Objective data includes:

- Air monitoring data from industry-wide surveys, which includes well-documented procedures for measuring exposures and methods for controlling dust, could be used by Project Team to characterize employee exposures where employees perform tasks consistent with those described in the survey;
- Calculations based on the composition of a substance; area sampling results and exposure mapping profile approaches. Project Teams can use direct-reading instruments to measure real-time levels of respirable dust in the air. Only if Arcadis has information on the percentage of silica-containing dust in that respirable dust (for example, from the analysis of a bulk sample or

information from a safety data sheet), Project Teams can then calculate the level of silica-containing dust in air; and

- Historic air monitoring data collected by Arcadis. Historic air monitoring data collected by the Arcadis could be used to assess employee exposures if the Project Team can show that the data was collected during work operations and conditions that are consistent with the processes, types of material, control methods, work practices, and environmental conditions in the Project Team's current operations.

Project teams choosing the performance options must:

- Conduct the exposure assessments before work begins;
- Reassess exposures, whenever a change in production, process, control equipment, personnel, or work practices may reasonably be expected to result in new or higher exposures at or above the Action Level, or when the Project Team has any reason to believe that new or additional exposures at or above the Action Level have occurred;
- Be able to demonstrate that employee exposures have been accurately characterized; and
- Make sure that the exposure assessment reflects the exposures of employees on each shift, for each job classification, in each work area.

The Performance Option may be especially useful when measuring employee exposures is challenging, such as when tasks are conducted for short durations of time or performed under different weather conditions. Under the Performance Option, Project Teams can characterize employee exposure within a range to account for exposure variability. Project Teams can also use that this option to show that exposures exceed the PEL by a certain level, such as less than 10 times the PEL, after using all feasible controls. Project Teams would then provide respiratory protection (APF of 10 or greater) and medical surveillance for employees required to wear a respirator under this HSS for 30 or more days per year.

5.4.2 Scheduled Monitoring Option

The Project Team shall perform initial personal exposure monitoring with laboratory analysis to assess the 8-hour TWA exposure for each employee on the basis of one or more personal breathing zone air samples that reflect the exposures of employees on each shift, for each job classification, in each work area. Where several employees perform the same tasks on the same shift and in the same work area, the employer may sample a representative fraction of these employees in order to meet this requirement. In representative sampling, the employer shall sample the employee(s) who are expected to have the highest exposure to silica-containing dust.

If initial monitoring indicates that employee exposures are below the Action Level, the Project Team may discontinue monitoring for those employees whose exposures are represented by such monitoring.

When the most recent exposure monitoring indicates that employee exposures are at or above the Action Level but at or below the PEL, the project team shall repeat such monitoring within six months of the most recent monitoring.

Where the most recent exposure monitoring indicates that employee exposures are above the PEL, the Project Team shall repeat such monitoring within three months of the most recent monitoring.

Where the most recent (non-initial) exposure monitoring indicates that employee exposures are below the Action Level, the Project Team shall repeat such monitoring within 6 months of the most recent monitoring until two consecutive measurements, taken seven or more days apart, are below the Action Level, at which time the project team may discontinue monitoring for those employees whose exposures are represented by such monitoring.

The Project Team shall reassess exposures whenever a change in the production, process, control equipment, personnel, or work practices may reasonably be expected to result in new or additional exposures at or above the Action Level, or when the Project Team has any reason to believe that new or additional exposures at or above the Action Level have occurred.

Personal exposure monitoring data will be collected using the Scheduled Monitoring Sampling Form for Silica (Exhibit 3). Completed Scheduled Monitoring Sampling Forms for Silica should be submitted along with a copy of the sample chain of custody (COC), photos and analytical data to 4-Sight-Support@arcadis-us.com. Additional information on Scheduled Monitoring sampling protocol can be found in Exhibit 4.

5.4.3 Exposure Air Monitoring Notification

Project Teams must notify each affected employee of the results of the exposure assessment within 5 working days of completing it, in accordance with the Arcadis Industrial Hygiene HSS (ARC HSIH009). The 5-day period for notification starts when:

- The Project Team following the Performance Option finishes the exposure assessment; or
- The Project Team following the Scheduled Monitoring Approach receives the laboratory results.

Exposures can be characterized and reported as a range (for example, between the Action Level and the PEL), but must reflect exposures that would occur if the employee were not using a respirator.

When an exposure assessment reveals exposure above the PEL, the written notification must also describe the corrective action the Project Team is taking to reduce employee exposures to or below the PEL. Corrective actions must include engineering controls. However, if engineering controls are not feasible or the project team needs more than 5 days to identify the right engineering controls, respiratory protection is the corrective action that would be described in the written notification.

5.5 Respiratory Protection

Project Teams will provide employees with appropriate respirators where required by this HSS. Respirators will be used in accordance with the Arcadis Respiratory Protection HSS (ARC HSGE017). Project Teams who follow the specified exposure control methods listed in Exhibit 2 must provide respiratory protection where required. Project Teams who follow alternative exposure control methods must provide respiratory protection:

- Where exposures exceed the PEL during periods necessary to install or implement feasible engineering and work practice controls;
- Where exposures exceed the PEL during tasks, such as some maintenance and repair tasks, for which engineering and work practice controls are not feasible;
- During tasks in which the employer has implemented all feasible engineering and work practice controls but exposures remain above the PEL.

5.6 Abrasive Blasting

Provision 29 CFR 1910.94(a)(5)(ii)(b) of the General Industry Ventilation Standard requires that "abrasive-blasting respirators" shall be worn by all abrasive-blasting operators when using silica sand in manual blasting operations where the nozzle and blast are not physically separated from the operator in an exhaust ventilated enclosure.

The ventilation standard for Construction, 29 CFR 1926.57, also contains requirements for ventilation and PPE, including respirators when using silica-based abrasive blasting media.

5.7 Housekeeping

Cleaning methods such as dry sweeping, dry brushing, and use of compressed air can cause silica-containing dust to get into the air and be inhaled by employees. Therefore, the use of these cleaning methods is prohibited to prevent unnecessary exposures to employees. Other cleaning methods such as wet sweeping and HEPA filtered vacuums shall be used because such methods reduce employee exposures by preventing silica-containing dust from getting into the air. Compressed air maybe used as a cleaning method, if used in conjunction with a ventilation system that effectively captures the silica-containing dust created by compressed air.

Project Teams are not required to follow these housekeeping requirements when cleaning ordinary soil, large debris, and non-silica-containing materials, such as sawdust.

5.8 Written Exposure Control Plan

A written Exposure Control Plan (written plan), Exhibit 5 is required when exposure to silica-containing dust is or can reasonably be expected to exceed 25 µg/m^3 of silica-containing dust in air averaged over an 8-hour period. The written plan will be included in the site-specific HASP, which will be reviewed at least annually to evaluate the effectiveness of the written plan in accordance with the Arcadis Health and Safety Plan HSS (ARC HSFS010). The written plan shall be made readily available to each employee covered by this HSS.

The written exposure plan must include:

- A description of the tasks in the workplace that involve exposure to silica-containing dust;
- A description of the engineering controls, administrative controls, and respiratory protection used to limit employee exposure to silica-containing dust for each task;
- A description of the housekeeping measures used to limit employee exposure to silica-containing dust;
- A description of the procedures used to restrict access to work areas, when necessary, to minimize the number of employees exposed to silica-containing dust and their level of exposure, including exposures generated by other employers or sole proprietors;
- Designation of the Competent Person who is responsible for implementing the written plan and making frequent and regular inspection of job sites, material, and equipment; and
- A copy of or location of the safety data sheet (SDS) for crystalline silica products in accordance with the Arcadis Hazard Communication HSS (ARC HSGE007).

5.9 Medical Surveillance Program

Arcadis employees will complete an initial (baseline) medical examination for silica within 30 days after initial assignment (the day the employee starts working in a job/task in which he or she will be required by this HSS to wear a respirator for 30 or more days per year). Respirator use with past employers does not count toward the 30-day threshold. Periodic exams will be completed every three years from the employee's last examination or more frequently as determined by the Arcadis a third-party administrator (TPA) for the Arcadis medical surveillance program (currently WorkCare (1-800-455-6155)) occupational health physician.

Refer to the Arcadis Medical Surveillance Program HSS (ARC HSGE010) for additional information on the administration of the Medical Surveillance Program and instructions on requesting an exam.

The medical surveillance program for silica is intended to:

- Identify respirable crystalline silica-related diseases so that employees with those diseases can take actions to protect their health;
- Determine if an employee has any condition, such as a lung disease, that might make him or her more sensitive to silica exposure; and
- Determine the employee's fitness to use respirators.

6. TRAINING

Silica awareness training is required for all employees who must comply with this HSS and/or are assigned to a work area suspected or known to contain silica-containing dust. Awareness training is available in the Arcadis Learning Center and will consist of:

- Operations that involve silica-containing dust exposure;
- Methods/observations that can be used to detect the presence or release of silica-containing dust;
- Physical and health hazards of silica-containing dust;
- Methods used to protect against the hazards of silica-containing dust including PPE and respiratory protection;
- A review of the applicable standard and where copies can be found; and
- An explanation of the medical surveillance program and an employee's right to access medical and exposure records.

6.1 Competent Person Training

The Silica Competent Person training covers all points described previously with the addition of a competency exam following the successful completion of the training. Retraining may be required as determined by Arcadis policy or management or by client or state-specific requirements.

7. REFERENCES

OSHA Silica Page

Arcadis Medical Surveillance H&S Standard – ARC HSGE010

Arcadis Respiratory Protection H&S Standard – ARC HSGE017

Arcadis Industrial Hygiene H&S Standard – ARC HSIH009

Arcadis Health and Safety Plan H&S Standard - ARC HSFS010

8. RECORDS - DATA RECORDING AND MANAGEMENT

Medical records will be maintained by Arcadis' medical surveillance TPA (WorkCare). Employees may obtain a copy of their complete medical record by contacting the medical surveillance TPA directly and a copy will be provided at no cost to the employee.

All records regarding occupational exposure measurements will be provided to employees by the project manager, Site H&S Officer or the Competent Person responsible for administering the exposure monitoring program, maintained in the applicable project team file and copies of such exposure monitoring records provided to both Corporate H&S (4-sight-support@arcadis-us.com) and Human Resources (HRSolutionsCenter.ANA@arcadis.com) for file retention. See the Arcadis Industrial Hygiene HSS (ARC HSIH009) for additional information.

9. APPROVALS AND HISTORY OF CHANGE

Julie Santaniello, CSP - Corporate H&S, Manager of Technical Programs



History of Change

Revision Date	Revision Number	Standard Developed/Reviewed By or Revised By	Reason for change
22 September 2017	01	Greg Mason / Andrew McDonald/ Julie Santaniello	Original document
13 November 2017	02	Greg Mason / Andrew McDonald/ Julie Santaniello	Clarified when Engineering and Administrative controls are to be used in Section 1. Updated example in Section 5.2. Clarified using compressed air during housekeeping in Section 5.7.

Exhibit 1 – Definitions

Action Level is the airborne concentration established by OSHA that triggers certain regulatory requirements (25 µg/m3 silica in air 8-hour time weighted average).

Affected Employee means all employees whose exposures were assessed, including employees whose exposures were represented by other employees' exposure measurements, and those whose exposure assessments were based on objective data.

Air Monitoring Data are any results of air monitoring (analyzed according to the procedures and requirements in 29 CFR 1926.1153 Appendix A methods of sample analysis) that the employer has done to meet the requirements of this HSS.

Crystalline Silica is a common mineral found in many naturally occurring and man-made materials used at construction sites. Materials like sand, concrete, brick, block, stone and mortar contain crystalline silica. Amorphous silica, such as silica gel, is not crystalline silica.

Competent person is an individual who is capable of identifying existing and foreseeable respirable crystalline silica hazards in the workplace and who has authorization to take prompt corrective measures to eliminate or minimize them.

Fully and properly implemented means that controls are in place, are properly operated and maintained, and employees understand how to use them. Several factors required for full and proper implementation of controls are listed in the discussion for each Exhibit 2 entry. The presence of large amounts of visible dust generally indicates that controls are not fully and properly implemented. A small amount of dust can be expected from equipment that is operating as intended by the manufacturer; however, a noticeable increase in dust generation during the task is a sign that the dust controls are not operating correctly. The difference between the small amounts of dust generated when control measures are working properly and the large amount of dust generated during tasks when control measures are not used or not operated effectively is easily observed. When this happens, prompt corrective actions are required.

High-Efficiency Particulate Air (HEPA) filter means a filter capable of trapping and retaining at least 99.97 percent of mono-dispersed particles of 0.3 micrometers in diameter.

Objective Data is information demonstrating that a particular product or material containing silica or a specific process, operation, or activity involving silica cannot release dust or fumes in concentrations at or above the Action Level even under the worst-case release conditions. Objective data can be obtained from an industry-wide study or from laboratory product test results from manufacturers of silica-containing products or materials. The data the used from an industry-wide survey must be obtained under workplace conditions closely resembling the processes, types of material, control methods, work practices and environmental conditions in the employer's current operations.

Permissible Exposure Limit (PEL) is an average airborne concentration regulatory limit established by OSHA above which requires control to protect people from adverse health effects (50 µg/m3 silica in air averaged over an 8-hour period).

Respirable Crystalline Silica means quartz, cristobalite, and/or tridymite contained in airborne particles that are determined to be respirable by a sampling device designed to meet the characteristics for respirable-particle-size-selective samplers specified in the International Organization for Standardization (ISO) 7708:1995: Air Quality – Particle Size Fraction Definitions for Health-Related Sampling https://www.iso.org/standard/14534.html.

Threshold Limit Value is a recommended average airborne concentration limit established by ACGIH. The TLVs are reviewed and updated as appropriate annually.

Time Weighted Average (TWA) is the average exposure to a contaminant or condition (such as silica) to which workers may be exposed without adverse effect over a period of 8 hours a day or a 40-hour work week.

Exhibit 2 - OSHA's Table 1- Specified Exposure Control Method When Working With Materials Containing Crystalline Silica

Construction Task or Equipment Operation		Engineering and Work Practice Control Methods	Required Respiratory Protection	
			≤ 4 hours/shift	>4 hours/shift
1	Stationary masonry saws	• Use saw equipped with integrated water delivery system that continuously feeds water to the blade. • Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.	None	None
2a	Handheld power saws (any blade diameter) when used outdoors	• Use saw equipped with integrated water delivery system that continuously feeds water to the blade. • Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.	None	N95 (or Greater Efficiency) Filtering Facepiece or Half Mask
2b	Handheld power saws (any blade diameter) when used indoors or in an enclosed area	• Use saw equipped with integrated water delivery system that continuously feeds water to the blade. • Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.	N95 (or Greater Efficiency) Filtering Facepiece or Half Mask	N95 (or Greater Efficiency) Filtering Facepiece or Half Mask
3	Handheld power saws for cutting fiber-cement board (with blade diameter of 8 inches or less) for tasks performed outdoors only	• Use saw equipped with commercially available dust collection system. • Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. • Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency.	None	None
4a	Walk-behind saws when used outdoors	• Use saw equipped with integrated water delivery system that continuously feeds water to the blade. • Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.	None	None
4b	Walk-behind saws when used indoors or in an enclosed area	• Use saw equipped with integrated water delivery system that continuously feeds water to the blade. • Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.	N95 (or Greater Efficiency) Filtering Facepiece or Half Mask	N95 (or Greater Efficiency) Filtering Facepiece or Half Mask
5	Drivable saws for tasks performed outdoors only	• Use saw equipped with integrated water delivery system that continuously feeds water to the blade. • Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.	None	None
6	Rig-mounted core saws or drills	• Use tool equipped with integrated water delivery system that supplies water to cutting surface. • Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.	None	None

Construction Task or Equipment Operation		Engineering and Work Practice Control Methods	Required Respiratory Protection	
			≤ 4 hours/shift	>4 hours/shift
7	Handheld and stand-mounted drills (including impact and rotary hammer drills)	• Use drill equipped with commercially available shroud or cowling with dust collection system. • Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. • Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism. • Use a HEPA-filtered vacuum when cleaning holes.	None	None
8	Dowel drilling rigs for concrete for tasks performed outdoors only	• Use shroud around drill bit with a dust collection system. • Dust collector must have a filter with 99% or greater efficiency and a filter cleaning mechanism. • Use a HEPA-filtered vacuum when cleaning holes.	N95 (or Greater Efficiency) Filtering Facepiece or Half Mask	N95 (or Greater Efficiency) Filtering Facepiece or Half Mask
9a	Vehicle-mounted drilling rigs for rock and concrete	• Use dust collection system with close capture hood or shroud around drill bit with a low-flow water spray to wet the dust at the discharge point from the dust collector.	None	None
9b	Vehicle-mounted drilling rigs for rock and concrete	• Operate from within an enclosed cab and use water for dust suppression on drill bit.	None	None
10a	Jackhammers and handheld powered chipping tools when used outdoors	• Use tool with water delivery system that supplies a continuous stream or spray of water at the point of impact.	None	N95 (or Greater Efficiency) Filtering Facepiece or Half Mask
10b	Jackhammers and handheld powered chipping tools when used indoors or in an enclosed area	• Use tool with water delivery system that supplies a continuous stream or spray of water at the point of impact.	N95 (or Greater Efficiency) Filtering Facepiece or Half Mask	N95 (or Greater Efficiency) Filtering Facepiece or Half Mask
10c	Jackhammers and handheld powered chipping tools when used outdoors	• Use tool equipped with commercially available shroud and dust collection system. • Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. • Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism.	None	N95 (or Greater Efficiency) Filtering Facepiece or Half Mask
10d	Jackhammers and handheld powered chipping tools when used indoors or in an enclosed area	• Use tool equipped with commercially available shroud and dust collection system. • Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. • Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism.	N95 (or Greater Efficiency) Filtering Facepiece or Half Mask	N95 (or Greater Efficiency) Filtering Facepiece or Half Mask
11	Handheld grinders for mortar removal (i.e., tuckpointing)	• Use grinder equipped with commercially available shroud and dust collection system. • Operate and maintain tool in accordance with manufacturer's instructions to minimize dust	N95 (or Greater Efficiency) Filtering Facepiece or	Powered Air-Purifying Respirator (PAPR) with

Construction Task or Equipment Operation		Engineering and Work Practice Control Methods	Required Respiratory Protection	
			≤ 4 hours/shift	>4 hours/shift
11 cont.	Handheld grinders for mortar removal (i.e., tuckpointing)	emissions. • Dust collector must provide 25 cubic feet per minute (cfm) or greater of airflow per inch of wheel diameter and have a filter with 99% or greater efficiency and a cyclonic pre-separator or filter-cleaning mechanism.	Half Mask	P100 Filters
12a	Handheld grinders for uses other than mortar removal for tasks performed outdoors only	• Use grinder equipped with integrated water delivery system that continuously feeds water to the grinding surface. • Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.	None	None
12b	Handheld grinders for uses other than mortar removal when used outdoors	• Use grinder equipped with commercially available shroud and dust collection system. • Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. • Dust collector must provide 25 cubic feet per minute (cfm) or greater of airflow per inch of wheel diameter and have a filter with 99% or greater efficiency and a cyclonic pre-separator or filter-cleaning mechanism.	None	None
12c	Handheld grinders for uses other than mortar removal when used indoors or in an enclosed area	• Use grinder equipped with commercially available shroud and dust collection system. • Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. • Dust collector must provide 25 cubic feet per minute (cfm) or greater of airflow per inch of wheel diameter and have a filter with 99% or greater efficiency and a cyclonic pre-separator or filter-cleaning mechanism.	None	N95 (or Greater Efficiency) Filtering Facepiece or Half Mask
13a	Walk-behind milling machines and floor grinders	• Use machine equipped with integrated water delivery system that continuously feeds water to the cutting surface. • Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.	None	None
13b	Walk-behind milling machines and floor grinders	• Use machine equipped with dust collection system recommended by the manufacturer. • Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. • Dust collector must provide the air flow recommended by the manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism. • When used indoors or in an enclosed area, use a HEPA-filtered vacuum to remove loose dust in between passes.	None	None
14	Small drivable milling machines (less than half-lane)	• Use a machine equipped with supplemental water sprays designed to suppress dust. • Water must be combined with a surfactant. • Operate and maintain machine to minimize dust emissions.	None	None

Construction Task or Equipment Operation		Engineering and Work Practice Control Methods	Required Respiratory Protection	
			≤ 4 hours/shift	>4 hours/shift
15a	Large drivable milling machines (half-lane and larger) for cuts of any depth on asphalt only	• Use machine equipped with exhaust ventilation on drum enclosure and supplemental water sprays designed to suppress dust. • Operate and maintain machine to minimize dust emissions.	None	None
15b	Large drivable milling machines (half-lane and larger) for cuts of four inches in depth or less on any substrate	• Use machine equipped with exhaust ventilation on drum enclosure and supplemental water sprays designed to suppress dust. • Operate and maintain machine to minimize dust emissions.	None	None
15c	Large drivable milling machines (half-lane and larger) for cuts of four inches in depth or less on any substrate	• Use a machine equipped with supplemental water spray designed to suppress dust. • Water must be combined with a surfactant. • Operate and maintain machine to minimize dust emissions.	None	None
16	Crushing machines	• Use equipment designed to deliver water spray or mist for dust suppression at crusher and other points where dust is generated (e.g., hoppers, conveyers, sieves/sizing or vibrating components, and discharge points). • Operate and maintain machine in accordance with manufacturer's instructions to minimize dust emissions. • Use a ventilated booth that provides fresh, climate-controlled air to the operator, or a remote-control station.	None	None
17a	Heavy equipment and utility vehicles used to abrade or fracture silica-containing materials (e.g., hoe-ramming, rock ripping) or used during demolition activities involving silica-containing materials	• Operate equipment from within an enclosed cab.	None	None
17b	Heavy equipment and utility vehicles used to abrade or fracture silica-containing materials (e.g., hoe-ramming, rock ripping) or used during demolition activities involving silica-containing materials	• When employees outside of the cab are engaged in the task, apply water and/or dust suppressants as necessary to minimize dust emissions.	None	None
18a	Heavy equipment and utility vehicles for tasks such as grading and excavating but not including demolishing, abrading, or fracturing silica-containing materials	• Apply water and/or dust suppressants as necessary to minimize dust emissions.	None	None
18b	Heavy equipment and utility vehicles for tasks such as grading and excavating but not including demolishing, abrading, or fracturing silica-containing materials	• When the equipment operator is the only employee engaged in the task, operate equipment from within an enclosed cab.	None	None

Exhibit 3 - Scheduled Monitoring Sampling Form for Silica

ARCADIS Design & Consultancy for natural and built assets

Scheduled Monitoring Sampling Form for Silica

Filter/Cassette #_____

Page 1 of 2

Project Number	Date	Project Name

Employee Name	Employee Number

Employee Business Line

Job Description

Type of Work Being Performed

Task	% Time Performing	Task	% Time Performing
☐ Abrasive Blasting	☐ <25% ☐ 25-50% ☐ 50-75%, ☐ >75%	☐ Mixing Concrete	☐ <25% ☐ 25-50% ☐ 50-75%, ☐ >75%
☐ Cutting	☐ <25% ☐ 25-50% ☐ 50-75%, ☐ >75%	☐ Mixing Mortar	☐ <25% ☐ 25-50% ☐ 50-75%, ☐ >75%
☐ Chipping	☐ <25% ☐ 25-50% ☐ 50-75%, ☐ >75%	☐ Patching	☐ <25% ☐ 25-50% ☐ 50-75%, ☐ >75%
☐ Drilling	☐ <25% ☐ 25-50% ☐ 50-75%, ☐ >75%	☐ Polishing	☐ <25% ☐ 25-50% ☐ 50-75%, ☐ >75%
☐ Excavating	☐ <25% ☐ 25-50% ☐ 50-75%, ☐ >75%	☐ Scabbing/ Scappling	☐ <25% ☐ 25-50% ☐ 50-75%, ☐ >75%
☐ Formwork Cleaning	☐ <25% ☐ 25-50% ☐ 50-75%, ☐ >75%	☐ Sc...g	☐ <25% ☐ 25-50% ☐ 50-75%, ☐ >75%
☐ Grading	☐ <25% ☐ ...-50% ☐ 50-75%, ☐ >75%	☐ Scra...g	☐ <25% ☐ 25-50% ☐ 50-75%, ☐ >75%
☐ Grindi...	☐ <25% ☐ ...-50% ☐ 50-75%, ☐ >75%	☐ Terra... Wor...	☐ <25% ☐ 25-50% ☐ 50-75%, ☐ >75%
☐ ...and Sweeping	☐ <25% ☐ ...-50% ☐ 50-75%, ☐ >75%	☐ ... Wo...	☐ <25% ☐ 25-50% ☐ 50-75%, ☐ >75%
☐ ...	☐ <25% ☐ ...-50% ☐ 50-75%, ☐ >75%		
☐ O... :			☐ <25% ☐ 25-50% ☐ 50-75%, ☐ >75%

Base Material Spec.		Silica Contained in Base Material
☐ Asphalt ☐ Block ☐ Brick ☐ Concrete ☐ Cement ☐ Grout	☐ Gunite ☐ Mortar ☐ Soil ☐ Terrazo ☐ Tile ☐ Other Material: _____	☐ From bulk sample _____ ☐ From estimate (SDS or list) _____

Tool Being Used Attach Photo	PPE Utilized
Make: _____ Model: _____	☐ Dust Mask (DM) ☐ Half Face (HF) ☐ Full Face (FF) ☐ Protective Clothing (PC) ☐ Gloves (G)

Control Methods

☐ None (N)
☐ Dry (D)
☐ Natural Ventilation (NV)
  ☐Employee Downwind
  ☐Employee Upwind
  ☐Employee Crosswind
☐ General Mechanical (GM)
☐ Local Exhaust Ventilation - with HEPA vacuum (LE-HEPA)
☐ Local Exhaust Ventilation - with shop vac or other vacuum (LE-OTHER)
☐ Wet Method - Continuous Drip (WM-CD)
☐ Wet Method - Continuous Spray (WM-CS)
☐ Wet Method - Non-continuous Drip (WM-NCD) Frequency: _____
☐ Wet Method - Non-continuous Spray (WM-NCS) Frequency: _____

EXAMPLE

ARCADIS Design & Consultancy for natural and built assets

Scheduled Monitoring Sampling Form for Silica

Filter/Cassette #_____

Project Numberr	Date	Project Name

Silica controls maintenance plan in effect? ☐ Yes ☐ No
Controls checked during sampling period? ☐ Yes ☐ No
Employee trained and familiar with operation of controls? ☐ Yes ☐ No

Weather Conditions

☐ Sunny ☐ Overcast ☐ Rain ☐ Snow

Environment	Air/Wind Currents	Temperature
☐ Outdoors ☐ Open Sided(Free Flow) ☐ Enclosed 1Side (Limited Flow) ☐ Enclosed All Sides (No Flow)	☐ None ☐ < 5mph ☐ 5-10 mph ☐ > 10 mph	☐ < 40°F (<40) ☐ 40°F < x < 90°F (40-90) ☐ > 90° F (>90)

Nearby Visible Dust Sources	midi
☐ None ☐ Other workers doing same task ☐ Partial from Other tasks and sources ☐ Continuous from Other tasks and source	☐ < 20% (<20 20% < x < 40% (20-40) % < x < % (-60) 60 < x < % (80) < 80 (<8

Sampling Equipment

☐ Respirable Silica (RS)

Sampling Type

☐ Personal (P) ☐ Area (A - Distance to Activity) ☐ Bulk (B)

Pump Identification	Analytical Method
Make/Model	NIOSH 7500; OSHA ID-142

Filter	Pre-Calibration	Post- Calibration	Flow Rates
	Date	Date	Pre Rate
Cyclone Type			
	Sampling Times		Post Rate
Agent	Start / Stop	Time	
Respirable Silica			
	Start / Stop	Time	Average Flow rate

Average Flow Rate X	Total Sampling Time	Total Volume

Laboratory Results (ug/m3)

Quartz	Cristobalite	Trydymite	RCS

Notations

Samplers Name (Print)

Samplers Signature

EXAMPLE

Exhibit 4 - Scheduled Monitoring Sampling Guidelines

Project Teams using the Scheduled Monitoring Option should collect and analyze samples using the procedures specified in one of the following analytical methods: OSHA ID-142 and/or NIOSH 7500. It is recommended that Project Teams use SKC PPI samplers in place of cyclone samplers. When collecting samples Project Teams should collect 1 field blank per 20 samples. For personal exposure monitoring sampling, devices should be placed in the breathing zone of the employee, often on the employee's lapel. Area samples should also be collected to help determine required exclusion zones, distance from the silica-containing dust source should be recorded on the Scheduled Monitoring Data Sampling Form for Silica (Exhibit 3).

Silica sampling kits can be rented from SGS Galson, which includes all the required equipment to complete the sampling:

- Gil-Air Pump with Charger
- Tubing and Clip
- Media for sample collection
    - Field blank – One field blank per 20 samples will be collected the Field blank will be carried to the sampling site, exposed to the sampling conditions during pump calibration, returned to the laboratory, treated as a sample, and carried through all steps of the analysis to evaluate possible effects attributable to shipping and field handling procedures.
- Instructions
- Calibrator (Rotameter)
- Packing Materials
- Test Report – Silica-containing dust (quartz, cristobalite & tridymite) with respirable dust

Personal exposure monitoring data will be collected using the Scheduled Monitoring Data Sampling Form for Silica (Exhibit 3). Completed Scheduled Monitoring Data Sampling Forms for Silica should be submitted along with a copy of the sample chain of custody (COC), photos and analytical data to 4-Sight-Support@arcadis-us.com.

Exhibit 5 – Silica Exposure Control Plan

ARCADIS

Silica Exposure Control Plan

Project Name: _____
Project Number: _____
Date: _____

Task Description:

1) *Arcadis Silica Competent Person:* _____
The above individual will ensure requirements stipulated in this plan are implemented and has the authority to take corrective measures and/or revise this plan to ensure employee, contractor and/or public exposure to silica dust remains below the respirable inhalation time weighted average action level of 25 µg/m3 over an 8-hour period.

2) *What material will the team be working with on this project?*
Select

3) *The following work activity will be performed on this project which have a potential for silica dust exposure:*
Select

The following controls will be utilized to mitigate exposure to silica dust hazards:
Based on the activities entered above, the following OSHA/Arcadis activity category is:
0

4) *The controls to be utilized include:*
#N/A

4a) *Respiratory Protection:*

	≤4 HRS	>4HRS		≤4 HRS	>4HRS
Indoors or Enclosed Area:	#N/A	#N/A	Outdoors:	#N/A	#N/A

#N/A
#N/A

EXAMPLE

Rev 2_13 November 2017

Additional Housekeeping Requirements:
Arcadis prohibits dry sweeping or dry brushing where such activity could contribute to employee exposure to respirable crystalline silica unless wet sweeping, HEPA-filtered vacuuming or other methods that minimize the likelihood of exposure are not feasible.

Arcadis prohibits use of compressed air to clean clothing or surfaces where such activity could contribute to employee exposure to respirable crystalline silica unless:
The compressed air is used in conjunction with a ventilation system that effectively captures the dust cloud created by the compressed air. No alternative method allowed.

5) Air Monitoring Requirements for Activities with an Assigned Respirator APF Listed in Section 4a.

- ☐ Real-time air monitoring for silica is not required for this project
- ☐ Real-time air monitoring will be conducted during work activities where employees contractors are exposed to or have the reasonable probability to be exposed to silica dust hazards. Silica air monitoring will include use of an aerosol monitor equipped with a 10mm Dorr-Oliver cyclone kit for respirable dust evaluation. Real time air monitoring for silica will be performed in the employee breathing zone (personal monitoring) and also performed at the perimeter of the work area (exclusion zone boundary). Air samples for laboratory analysis will also be required unless exempted from collection by a CI

Aerosol monitor selected for use on this project: _____
Frequency of air sample collection for laboratory analysis: _____
Air samples will be submitted to the following laboratory: _____

6) Medical Surveillance

Employees performing work activities where exposure to silica dust is known to be or has a reasonable probability to be above the OSHA 8 Hr. TWA action level of 25 µg/m3 will participate in silica medical surveillance in conjunction with their annual HAZWOPER physical. New entrants into the silica medical surveillance program at times when the HAZWOPER physical is not due will coordinate the required surveillance with WorkCare and then maintain the surveillance with their HAZWOPER physical going forward.

7) Additional Instructions

Signatures:

_____ _____
Preparer Name Printed Date

_____
Preparer Signature

_____ _____
Competent Person Name Printed Date

_____
Competent Person Signature

Rev 2_13 November 2017

EXAMPLE

Implementation Date 15 February 2010	Arcadis HS Standard Name Stop Work Authority	ARCADIS Design & Consultancy for natural and built assets
Revision Date 22 October 2015	Arcadis HS Standard No. ARC HSGE009	Revision Number 04

EXECUTIVE SUMMARY

This Health and Safety Standard (HSS) describes the authority, obligation and responsibility to stop potentially unsafe work at the earliest stage possible. Every Arcadis and subcontractor employee is responsible for prevention of unsafe acts, behaviors or conditions, consequently preventing harm to people, the environment or property.

Every Arcadis and subcontractor employee has the authority and obligation to stop work that he or she considers to be unsafe. The Arcadis leadership team is committed to support anyone who exercises his or her 'Stop Work' authority. There will be no negative consequences as a result of 'Stop Work' actions.

This standard applies to all activities performed by Arcadis or on behalf of Arcadis. A stop work process will include the participation of all Arcadis, Arcadis subcontractors and other involved personnel as appropriate.

Senior Leaders shall establish the clear expectation for Arcadis employees and subcontractors to exercise 'Stop Work Authority'.

Project managers and field supervisors are responsible for confirming that 'Stop Work' requirements and obligations are understood thoroughly by Arcadis and subcontractor employees.

'Stop Work' involves:

- Initiating a 'Stop Work.'
- Notifying affected employees, other personnel (including client staff) and supervision.
- Assessing hazards and associated risks.
- Identifying and implementing controls.
- Resuming work once a hazard assessment and controls implementation (if applicable) are approved by a competent person and are satisfactory to all parties involved.

The "Stop Work" process will be included in employee induction, and in ongoing company communications and during Tailgate meetings

Records will be maintained to include Tailgate Meeting forms and Incident Investigation reports

1. POLICY

It is Arcadis policy that during the conduct of their work, Arcadis and subcontractor employees have the authority and responsibility to Stop Work immediately in any situation when the Health, Safety, Security and Environment hazards and associated risks associated with work being performed is not clearly understood, established or controlled. This standard presents the requirements to be observed if and when this situation occurs.

2. PURPOSE AND SCOPE

2.1 Purpose

This standard describes the authority, obligation and responsibility to stop potentially unsafe work at the earliest stage possible. Every Arcadis and subcontractor employee is responsible for prevention of unsafe acts, behaviors or conditions, consequently preventing harm to people, the environment or property.

Every Arcadis and subcontractor employee has the authority and obligation to stop work that he or she considers to be unsafe. The Arcadis leadership team is committed to support anyone who exercises his or her 'Stop Work' authority. There will be no negative consequences as a result of 'Stop Work' actions.

2.2 Scope

This standard applies to all activities performed by Arcadis or on behalf of Arcadis. A stop work process will include the participation of all Arcadis, Arcadis subcontractors and other involved personnel as appropriate.

3. DEFINITIONS

Definitions relating to this HSS can be found in Exhibit 1.

4. RESPONSIBILITIES

4.1 Senior Leaders (including Account Managers and company leadership)

In the scope of this HSS, senior leaders shall establish the clear expectation for Arcadis employees and subcontractors to exercise 'Stop Work Authority', create a culture where 'Stop Work' is exercised freely, resolve 'Stop Work' conflicts when they arise, and hold those accountable who do not to comply with established 'Stop Work' policies.

4.2 Project Managers and Field Supervisors

In the scope of this standard, project managers and field supervisors are responsible for confirming that 'Stop Work' requirements and obligations are understood thoroughly by Arcadis and subcontractor employees, creating a culture where 'Stop Work' is exercised freely, honoring and responding promptly to requests to stop work, working to resolve issues to the satisfaction of all involved parties before operations resume, recognizing proactive participation and verifying that all 'Stop Work' actions are properly reported with required follow-up, as necessary.

4.3 Arcadis and Subcontractor Employees

In the scope of this standard, Arcadis and subcontractor employees are responsible for understanding their authority and obligations under 'Stop Work,' initiating a 'Stop Work' intervention when warranted, supporting the intervention of others and properly reporting all 'Stop Work' actions as described in this standard. Arcadis and subcontractor employees are responsible for understanding the hazards of their activities, implementing the controls for the hazards and using 'Stop Work' authority if they don't understand the hazards, their job tasks, or if they do not feel safe for any reason. In addition, employees will participate in determining and implementing the solutions for mitigating the unsafe issue.

5. PROCEDURE

5.1 General Requirements

Arcadis and subcontractor employees shall be made aware of their obligation to 'Stop Work' for issues that they consider to be unsafe.

Employees have the authority, obligation and responsibility to stop any task or operation where there are concerns or questions regarding the control of the hazards or risks associated with a task or operation that is being performed.

No work will resume until all 'Stop Work' concerns or questions have been adequately addressed and associated risks have been eliminated or mitigated to acceptable levels to the satisfaction of all parties involved.

All employees are made aware of the actions they shall take, including reporting, when stopping unsafe work.

All indications from personnel that the work is unsafe must be properly investigated as deemed appropriate for the situation. All instances of work being stopped for reasons of health and safety shall be recorded and appropriately investigated. This documentation may be completed using the Tailgate Meeting form or using the Arcadis Incident Investigation process.

Any form of retaliation or intimidation directed at any individual or company for exercising their authority as outlined in this standard will not be tolerated. Disregard for the requirements in this standard shall be addressed with disciplinary actions in accordance with Arcadis policy.

Before work begins, a responsible person shall be defined by the Project Manager for coordination of any 'Stop Work' activities, including hazard and risk assessment and mitigation actions following a 'Stop Work' intervention (refer to the Tailgate Meetings standard – ARC HSGE001).

5.2 Stop Work Process

In general terms, 'Stop Work' involves:

- Initiating a 'Stop Work.'

- Notifying affected employees, other personnel (including client staff) and supervision.
- Assessing hazards and associated risks.
- Identifying and implementing controls.
- Resuming work once a hazard assessment and controls implementation (if applicable) are approved by a competent person and are satisfactory to all parties involved.

5.2.1 Initiate a 'Stop Work'

When a person identifies a perceived or actual unsafe condition, act, error, omission, confusion or lack of understanding that could result in harm to persons, the environment or property, he or she shall immediately initiate a 'Stop Work' intervention.

This intervention shall:

- Be initiated in a positive manner.
- Result in a stop of associated work activities, if there is an immediate risk of injury or accident; removal of all person(s) (also persons not directly related to the Arcadis Work Team) from the area; as appropriate to the issue; stabilization of the situation and making the area as safe as possible, until more permanent solutions can be developed and implemented as appropriate to the situation.
- If there is no immediate risk, address the potentially unsafe issue with the person(s) potentially at risk and/or the person(s) causing the risk. This includes all affected employees of Arcadis, subcontractor, client and other parties.

5.2.2 Notifying the Affected Parties

All personnel affected by the 'Stop Work' situation shall be notified as soon as possible.

5.2.3 Assessing Hazards and Associated Risks

A competent person (e.g. task manager, field supervisor, task or job expert, H&S resource) shall guide the assessment for potential hazards and risks by involving the affected parties to determine the hazards and assess the associated risks, so that appropriate controls can be identified. This information will be documented on the Tailgate Meeting form or an incident investigation form in 4Sight.

5.2.4 Identifying Controls

To identify controls that eliminate risk or mitigate it to an acceptable level and to decide on an appropriate course of action, the following questions and others shall be considered:

- How can the risk be controlled or otherwise mitigated to an acceptable level and to the reasonable satisfaction of the parties involved?

- Is a competent person approving the hazard and risk assessment and the identified controls in order to prepare to re- start work?

All affected parties should be in agreement with the hazard and risk assessment and controls identification.

The results of the hazard and risk assessment and controls identification resulting from the 'Stop Work' shall be reported, documented and maintained on either Tailgate Meeting form or the incident investigation form as appropriate for the issue.

5.2.5 Qualifiers for Stopping/Resuming Work

The following should be considered when stopping or resuming work as the result of a 'Stop Work' intervention:

- If the 'Stop Work' intervention is based on a perceived (but not an actual) risk as determined from the hazard and risk assessment, the affected person(s), as appropriate, should:
    - Show appreciation to the initiator for his or her awareness and concern.
    - Proceed with work.
    - Share the learnings with the initiator and involved parties.
- If the 'Stop Work' intervention is based on an actual risk that cannot be immediately assessed and/or controlled on site by the present employees and available resources, work shall be suspended. If the identified controls that mitigate the risk in the 'Stop Work' situation are not within the original scope of work, the change will be managed appropriately, and the JSA and HASP should be reviewed to include a hazard and risk assessment and identify subsequent controls.
- If the work is in the scope of a permit, the permit issuer shall review/reissue the permit with the necessary changes or modifications.

Work can be resumed only once a competent person with the appropriate level of authority approves the hazard and risk assessment and the implemented controls and all parties are satisfied with the controls.

5.3 Stop Work ("If Not Me, Then Who?") Involving Parties Outside of Arcadis Control

The Arcadis H&S Vision and Policy and our culture of TRACK to 0 puts H&S first in all things. Yet, stopping work or intervening under the Arcadis "If Not Me, Then Who?" concepts when it involves parties outside of Arcadis control must be implemented in such a way to protect the health and safety of our staff members, but also to protect the company from any undue risk and liability. Consequently, a separate guidance document has been developed and included as Exhibit 2.

5.4 Reporting

All planned and unplanned 'Stop Work' interventions shall be documented on the Tailgate Meeting form, and/or in 4-Sight as a near miss report or incident investigation report, as appropriate to the issue.

Adequate descriptions shall be given of the act, behavior or condition that caused the 'Stop Work' intervention, its hazard and risk assessment and implemented risk mitigations.

Near miss and incident reports shall be reviewed by H&S personnel and reported to senior leaders to:

- Measure participation.
- Determine the quality of interventions and follow-up.
- Track common issues and identify trends and opportunities for improvement.
- Facilitate the sharing of learnings.
- Provide feedback from recognition programs.

The H&S team shall regularly communicate incident details reported by Business Line as well as details regarding common trends and learnings.

6. TRAINING

The "Stop Work" process will be included in H&S Orientation training, in ongoing company communications and reinforced during Tailgate meetings.

7. REFERENCES (regulation citation, technical links, publications, etc.)

Arcadis Health and Safety Plan standard – ARC HSFS010

Arcadis Incident Investigation Standard – ARC HSMS010

8. RECORDS - DATA RECORDING AND MANAGEMENT

Stop Work actions shall be documented in:

- Tailgate Meeting forms; and/or
- Incident Investigation reports

9. APPROVALS AND HISTORY OF CHANGE

Approved By:

Tony Tremblay, CSP – Corporate H&S, Director of Technical Programs



History of Change

Revision Date	Revision Number	Standard Developed/Reviewed By or Revised By	Reason for change
15 February 2010	01	Mike Thomas	Original document
17 April 2012	02	Camille Carollo/Tony Tremblay	Executive Summary added
16 January 2013	03	Pat Vollertsen/Tony Tremblay	Revised section 6.0 and Executive summary in regard to training
22 October 2015	04	Tony Tremblay/Julie Santaniello	Section 3 Definitions moved to Exhibit 1; Section 5.3 Stop Work ("If Not Me, Then Who?") Involving Parties Outside of Arcadis Control added and existing section 5.3 renumbered to Section 5.4; text updated in Section 5.4; Document template updated; Exhibit 2 If Not Me, Then Who guidance document added

Exhibit 1

Planned 'Stop Work' is a 'Stop Work' situation previously identified in a Job Loss Analysis, HASP or other standard (e.g., 'Stop Work' trigger)

'Stop Work' is the stopping of all activities associated with a task, condition, situation, action or activity (issue) that anyone views as potentially unsafe. 'Stop Work' can be applied to the single issue, a group of issues, or an entire job project or site as applicable.

Exhibit 2 – If Not Me, Then Who? Guidance Document

ARCADIS Design & Consultancy for natural and built assets

IF NOT ME, THEN WHO?

- H&S SITUATIONS WHERE NO ARCADIS EMPLOYEES ARE INVOLVED OR WHEN ARCADIS DOES NOT HAVE HEALTH & SAFETY RESPONSIBILITY-

Effective: 1 March 2013

This document addresses the "If Not Me, Then Who?" concept in perceived or actual H&S situations (unsafe acts or behaviors, unsafe conditions, etc.) which do not involve our employees or partners and where we are not contractually or statutorily responsible for H&S[1].

For example, what does an Arcadis employee do, when Arcadis has no construction site responsibility but they see that a fence that was erected by a general contractor and is supposed to be protecting this site, has a gap that may allow an unauthorized person to enter the site where they could be injured?

The Arcadis H&S Vision and Policy, and our culture using TRACK to 0 concept put H&S first in all things. Yet we also have the need to protect ourselves from injury and the company from undue risk and liability:

1. Take a minute to think through the situation, related risks, and risks that would result from corrective action (TRACK).
2. Act immediately to safe lives if in your best judgment delay would cost lives or severe injuries (imminent danger).
3. If we see unsafe acts/behavior or conditions that are not imminent dangers: speak up and promptly notify the appropriate party. In a project: liaise with project manager about best person to address (consider H&S responsible person - contractor and client). In other situations, attempt to identify the person with H&S or overall responsibility for the activities.
4. Re-confirm the formal H&S responsibilities (law & contract) with H&S and legal department before doing anything else, or, if action could not be postponed for risk of losing lives/severe injuries, immediately after the action.
5. When having pointed out, or about to point out, areas of concern outside of our scope of responsibilities, accompany with a specific disclaimer[2].
6. Refrain from taking H&S responsibility through further action (actual corrections, audits, reviews or other)[3].

It is noted that the above example actually occurred involving an Arcadis employee. Instead of notifying the appropriate parties of the situation, our employee attempted to fix the contractor fence and got seriously injured in doing so. This resulted in lost time to our employee and a recordable injury against the company.

Implementation Date 14 September 2009	Arcadis HS Standard Name Tailgate Health and Safety Meetings	ARCADIS
Revision Date 21 September 2015	Arcadis HS Standard No. ARC HSGE001	Revision Number 06

EXECUTIVE SUMMARY

This standard describes the requirements for implementing an incident- and injury-free workplace by providing guidance on tailgate safety meetings to be performed prior to all projects performed by Arcadis staff outside of an office-setting or environment.

This standard applies to all non-office related activities performed by Arcadis or on behalf of Arcadis. If the site and project is controlled by Arcadis, tailgate meetings will include the participation of all Arcadis staff, Arcadis subcontractors and other involved site personnel as appropriate.

The designated field supervisor will lead or designate an alternative leader to lead the tailgate meeting.

Project and Task Managers are responsible for ensuring that all appropriate hazard assessments have been completed, that all project requirements have been communicated to the field supervisor and other responsible parties.

Employees are responsible for actively participating in the tailgate meetings, acknowledging their presence at the tailgate meetings, and participating in hazard assessments for the activities in which they will be involved.

Tailgate meetings will be held, at a minimum, at the start of each work day, shift or task change.

The *Tailgate H&S Meeting Form* (Exhibit 1 or one of the Single Page versions located in the Standard Health & Safety Plan Template on the Health & Safety Plan page of the Source NA) will be used to document the conduct of the tailgate H&S meeting.

Tailgate Meeting forms are to be kept on-site and then in project files per Arcadis project recordkeeping requirements.

1. POLICY

It is Arcadis US policy that Arcadis staff will participate in tailgate meetings to be held at least once daily on Arcadis project sites that occur outside of an office environment to ensure that the health and safety issues of the day's activities are understood by all affected parties and that appropriate controls are in place.

2. PURPOSE AND SCOPE

2.1 Purpose

This standard describes the requirements for implementing an incident- and injury-free workplace by providing guidance on tailgate safety meetings to be performed prior to all projects performed by Arcadis staff outside of an office-setting or environment.

2.2 Scope

This standard applies to all non-office related activities performed by Arcadis or on behalf of Arcadis. If the site and project is controlled by Arcadis, tailgate meetings will include the participation of all Arcadis staff, Arcadis subcontractors and other involved site personnel as appropriate. If the site is controlled by another party (e.g., a construction site on which Arcadis is providing a resident engineer or owner's representative), then Arcadis staff should attend the tailgate meeting held by the controlling party, if one is held. If the tailgate meeting does not address Arcadis activities or is not deemed adequate, then the Arcadis staff will hold their own tailgate meeting following this standard.

If there is only one Arcadis staff on the site for the day, then the Project Manager (PM) and field staff will conduct the tailgate via phone as deemed appropriate.

It is also Arcadis U.S. policy that more than one tailgate meeting may be held as appropriate for the activities.

3. DEFINITIONS

Definitions applicable to this standard may be found in ARC HSMS000 – Health and Safety Management System.

4. RESPONSIBILITIES

4.1 Field Supervisor

In the scope of this practice, the designated field supervisor will lead or designate an alternative leader to lead the tailgate meeting. In addition, the field supervisor will verify that in the tailgate meeting, the following are clearly established, communicated and reinforced, and that the workforce understands them:

- A process for the transfer of control of work between work groups as appropriate and applicable
- Specific standards and policies that will be followed (e.g., Health and Safety Plan (HASP), Job Safety Analysis (JSA), H&S Standards, Field H&S Handbook, etc.)
- Assignment of other responsibilities based on the site activities and hazards to competent staff

4.2 Project and Task Managers

Project and Task Managers are responsible for ensuring that all appropriate hazard assessments have been completed, that all project requirements have been communicated to the field supervisor and other responsible parties, that competent personnel, based on the activities and hazards, have been assigned to the project, and

that all employees including Arcadis subcontractors and other site personnel know of their requirement and participation in tailgate meetings conducted for the project.

4.3 Health and Safety Staff and Project Site Safety Officers or Supervisors

Health and Safety Staff and Project Site Safety Officers or Supervisors shall assist with the completion of hazard identification and assessments as appropriate for the project. In addition, these staff will assist with determining the proper controls and provide information for the tailgate meetings that is relevant to the site activities and the hazards to be encountered by employees.

4.4 Employees

Employees are responsible for actively participating in the tailgate meetings, acknowledging their presence at the tailgate meetings, and participating in hazard assessments for the activities in which they will be involved. Employees are responsible for understanding the hazards of their activities, implementing the controls for the hazards and using Stop Work Authority if they don't understand the hazards, their job tasks, or if they do not feel safe.

5. PROCEDURE

5.1 Tailgate Meetings

Tailgate meetings will be held, at a minimum, at the start of each work day, shift or task change. It may be necessary to hold tailgate meetings at other times based on the site, activities, and personnel on the site. Tailgate meetings are usually conducted by the field supervisor, the site safety officer or both. At times, the Project Manager or Task Manager may lead the tailgate meeting.

Tailgate meetings may also be conducted by a subcontractor, other consultant or client.

Work crews that include a lone worker will hold a tailgate meeting by telephone with the Project or Task manager as appropriate. The lone worker or small workgroup will call in at the end of the day to complete the tailgate meeting form per this standard.

Tailgate meetings will review the planned work activities for the work period, discuss and resolve the risks and mitigations, discuss any health, safety, security and environment concerns and raise the consciousness of each worker before they start work. Utilizing the Tailgate Meeting form in Exhibit 1 or one of the Single Page versions located in the Standard Health & Safety Plan Template on the Health & Safety Plan page of the Source NA will ensure that relevant topics are addressed.

5.2 Tailgate Meeting Form

The *Tailgate H&S Meeting Form* (Exhibit 1 or one of the Single Page versions located in the Standard Health & Safety Plan Template on the Health & Safety Plan page of the Source NA) will be used to document the conduct of the tailgate H&S meeting. Copies of the completed form will be kept in the project files. It will be completed by the designated

leader of the meeting during the completion of the meeting and for post day activities review as indicated on the form.

5.3 Participation and Preparation

Effective tailgate meetings require participation. When selecting the location of the meetings, the meeting leader will ensure it is in a place free from distraction and that allows for interaction and participant comfort. This will help encourage participation.

6. TRAINING

No specific training or competence is required related to the conduct of the Tailgate Meeting.

7. REFERENCES (regulation citation, technical links, publications, etc.)

Arcadis Health and Safety Management System – ARC HSMS000

Arcadis Health and Safety Plan Standard – ARC HSFS010

8. RECORDS - DATA RECORDING AND MANAGEMENT

Tailgate Meeting forms to be kept on-site and then in project files per Arcadis project recordkeeping requirements.

9. APPROVALS AND HISTORY OF CHANGE

Approved By: Tony Tremblay, CSP – Corporate H&S, Director of Technical Programs



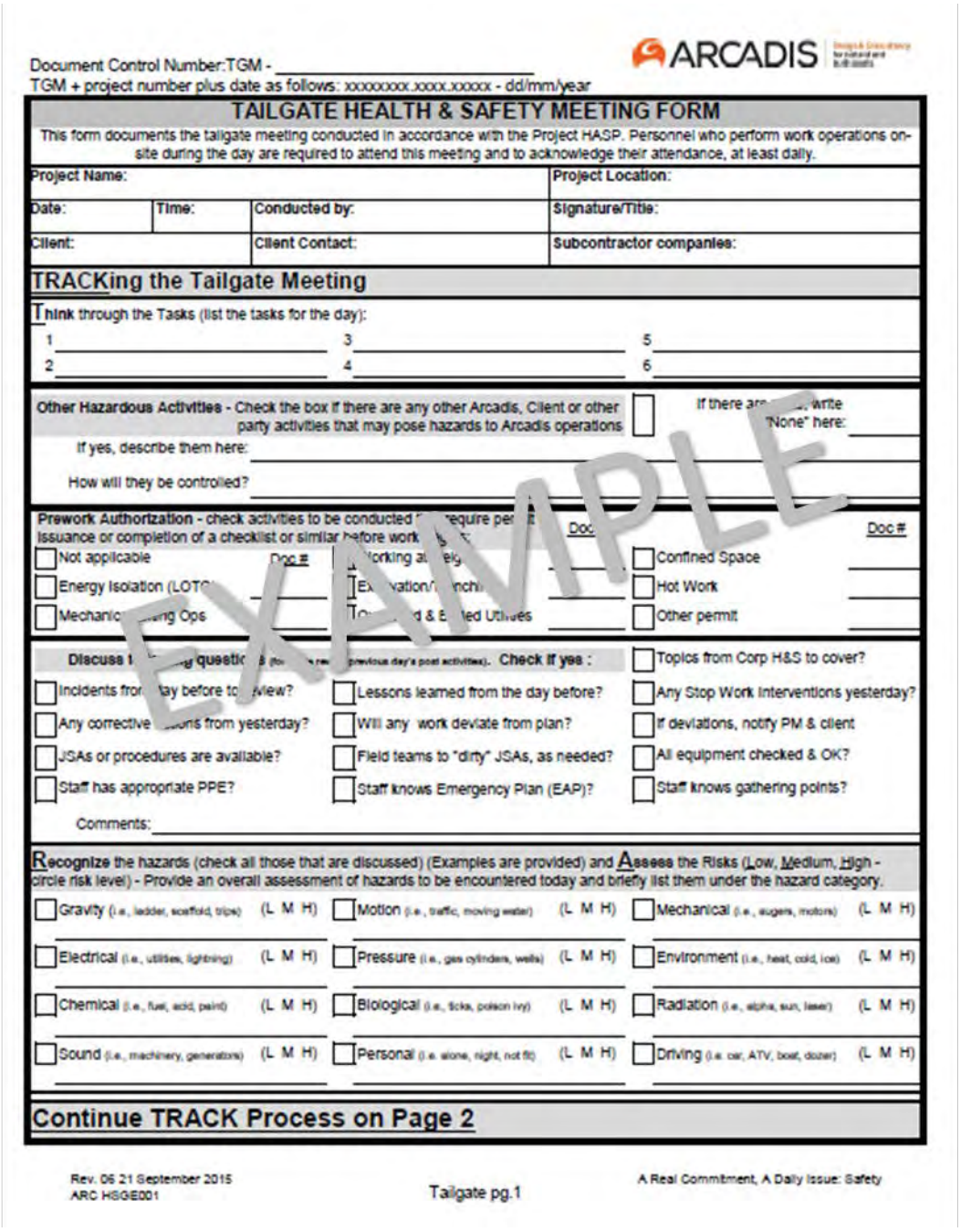
History of Change

Revision Date	Revision Number	Standard Developed/Reviewed By or Revised By	Reason for change
14 September 2009	01		Original document
1 February 2010	02		Made minor edits to text. Also, made modifications to Tailgate Meeting form. Changed JSA to JLA.
22 February 2010	03		Added tagline to the Tailgate meeting form

Implementation Date 14 September 2009	Arcadis HS Standard Name Tailgate Health and Safety Meetings	ARCADIS
Revision Date 21 September 2015	Arcadis HS Standard No. ARC HSGE001	Revision Number 06

Revision Date	Revision Number	Standard Developed/Reviewed By or Revised By	Reason for change
26 April 2013	04	Pat Vollertsen / Tony Tremblay	Added Executive Summary; changed JLA to JSA; updated Tailgate Meeting form to reflect new terminology; Added who else can lead a tailgate to section 5.1; Format Update
12 June 2015	05	Julie Santaniello	Updated contact phone numbers in Tailgate Meeting Form. Added text referencing additional acceptable single page Arcadis Tailgate Meeting Forms.
21 September 2015	06	Julie Santaniello	Updated HSS template and Tailgate Meeting Form brand. Added HSMS000 to references. Updated Exhibit 1 images.

Exhibit 1 – Tailgate Meeting Form



ARCADIS

Document Control Number:TGM - _____
TGM + project number plus date as follows: xxxxxxxx.xxxx.xxxxx - dd/mm/year

TAILGATE HEALTH & SAFETY MEETING FORM

This form documents the tailgate meeting conducted in accordance with the Project HASP. Personnel who perform work operations on-site during the day are required to attend this meeting and to acknowledge their attendance, at least daily.

Project Name:			Project Location:
Date:	Time:	Conducted by:	Signature/Title:
Client:		Client Contact:	Subcontractor companies:

TRACKing the Tailgate Meeting

Think through the Tasks (list the tasks for the day):

1 _____ 3 _____ 5 _____
2 _____ 4 _____ 6 _____

Other Hazardous Activities - Check the box if there are any other Arcadis, Client or other party activities that may pose hazards to Arcadis operations ☐ If there are [illegible], write "None" here: _____

If yes, describe them here: _____

How will they be controlled? _____

Prework Authorization - check activities to be conducted [illegible] require permit issuance or completion of a checklist or similar before work [illegible]:

	Doc #		Doc #		Doc #
☐ Not applicable		☐ Working alone		☐ Confined Space	
☐ Energy Isolation (LOTO)		☐ Excavation/trenching		☐ Hot Work	
☐ Mechanical Lifting Ops		☐ Overhead & Buried Utilities		☐ Other permit	

Discuss the following questions (for the previous day's post activities). **Check if yes :**

☐ Incidents from day before to review?	☐ Lessons learned from the day before?	☐ Any Stop Work Interventions yesterday?
☐ Any corrective actions from yesterday?	☐ Will any work deviate from plan?	☐ If deviations, notify PM & client
☐ JSAs or procedures are available?	☐ Field teams to "dirty" JSAs, as needed?	☐ All equipment checked & OK?
☐ Staff has appropriate PPE?	☐ Staff knows Emergency Plan (EAP)?	☐ Staff knows gathering points?

☐ Topics from Corp H&S to cover?

Comments: _____

Recognize the hazards (check all those that are discussed) (Examples are provided) and **A**ssess the Risks (Low, Medium, High - circle risk level) - Provide an overall assessment of hazards to be encountered today and briefly list them under the hazard category.

☐ Gravity (i.e., ladder, scaffold, trips) (L M H)	☐ Motion (i.e., traffic, moving water) (L M H)	☐ Mechanical (i.e., augers, motors) (L M H)
☐ Electrical (i.e., utilities, lightning) (L M H)	☐ Pressure (i.e., gas cylinders, wells) (L M H)	☐ Environment (i.e., heat, cold, ice) (L M H)
☐ Chemical (i.e., fuel, acid, paint) (L M H)	☐ Biological (i.e., ticks, poison ivy) (L M H)	☐ Radiation (i.e., alpha, sun, laser) (L M H)
☐ Sound (i.e., machinery, generators) (L M H)	☐ Personal (i.e. alone, night, not fit) (L M H)	☐ Driving (i.e. car, ATV, boat, dozer) (L M H)

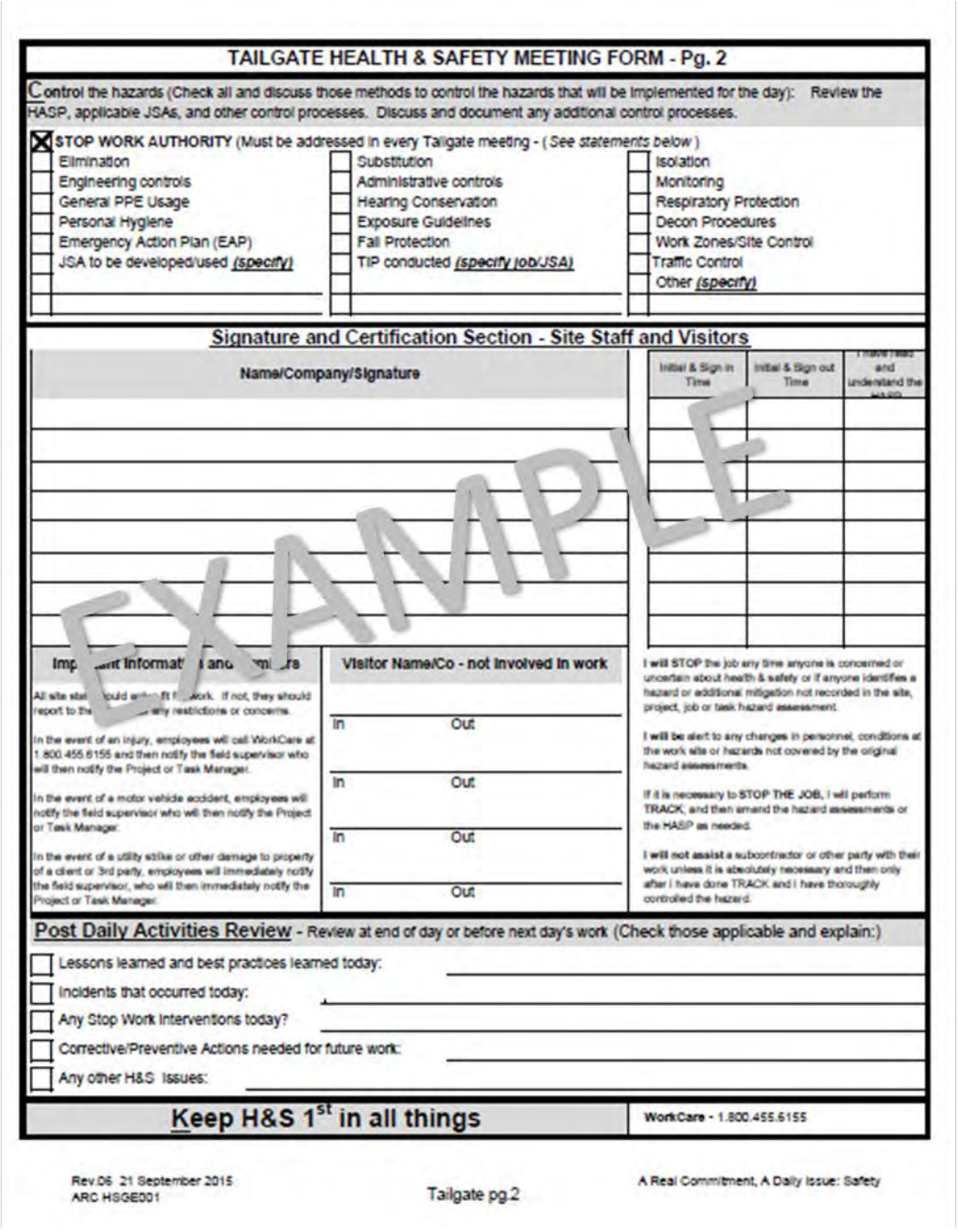
Continue TRACK Process on Page 2

Rev. 06 21 September 2015
ARC HSGE001

Tailgate pg.1

A Real Commitment, A Daily Issue: Safety

EXAMPLE



TAILGATE HEALTH & SAFETY MEETING FORM - Pg. 2

Control the hazards (Check all and discuss those methods to control the hazards that will be implemented for the day): Review the HASP, applicable JSAs, and other control processes. Discuss and document any additional control processes.

☒ **STOP WORK AUTHORITY** (Must be addressed in every Tailgate meeting - *(See statements below)*

☐ Elimination	☐ Substitution	☐ Isolation
☐ Engineering controls	☐ Administrative controls	☐ Monitoring
☐ General PPE Usage	☐ Hearing Conservation	☐ Respiratory Protection
☐ Personal Hygiene	☐ Exposure Guidelines	☐ Decon Procedures
☐ Emergency Action Plan (EAP)	☐ Fall Protection	☐ Work Zones/Site Control
☐ JSA to be developed/used *(specify)*	☐ TIP conducted *(specify job/JSA)*	☐ Traffic Control
		☐ Other *(specify)*

Signature and Certification Section - Site Staff and Visitors

Name/Company/Signature	Initial & Sign in Time	Initial & Sign out Time	I have read and understand the HASP

EXAMPLE

Important Information and Reminders

All site staff should arrive fit for work. If not, they should report to the ... any restrictions or concerns.

In the event of an injury, employees will call WorkCare at 1.800.455.6155 and then notify the field supervisor who will then notify the Project or Task Manager.

In the event of a motor vehicle accident, employees will notify the field supervisor who will then notify the Project or Task Manager.

In the event of a utility strike or other damage to property of a client or 3rd party, employees will immediately notify the field supervisor, who will then immediately notify the Project or Task Manager.

Visitor Name/Co - not involved in work

In	Out
In	Out
In	Out
In	Out

I will STOP the job any time anyone is concerned or uncertain about health & safety or if anyone identifies a hazard or additional mitigation not recorded in the site, project, job or task hazard assessment.

I will be alert to any changes in personnel, conditions at the work site or hazards not covered by the original hazard assessments.

If it is necessary to STOP THE JOB, I will perform TRACK, and then amend the hazard assessments or the HASP as needed.

I will not assist a subcontractor or other party with their work unless it is absolutely necessary and then only after I have done TRACK and I have thoroughly controlled the hazard.

Post Daily Activities Review - Review at end of day or before next day's work (Check those applicable and explain:)

- ☐ Lessons learned and best practices learned today:
- ☐ Incidents that occurred today:
- ☐ Any Stop Work Interventions today?
- ☐ Corrective/Preventive Actions needed for future work:
- ☐ Any other H&S Issues:

Keep H&S 1st in all things | **WorkCare - 1.800.455.6155**

Rev.06 21 September 2015
ARC HSGE001

Tailgate pg.2

A Real Commitment, A Daily Issue: Safety

Implementation Date	Arcadis HS Standard Name	ARCADIS Design & Consultancy for natural and built assets
13 December 2006	Utility Location and Clearance	
Revision Date	Arcadis HS Standard No.	Revision Number
17 March 2017	ARCHSFS019	16

EXECUTIVE SUMMARY

Damaging an underground or aboveground utility can result in serious injury and loss of life, disrupt essential services, and create significant liability to Arcadis, clients, and subcontractors. Therefore, it is Arcadis policy that the following steps be completed prior to beginning any subsurface intrusive work (i.e., any work or activity that breaks the plane of the ground surface):

- The presence of existing or known utilities will be investigated and cleared (to the extent feasible) by locating and marking before the start of any subsurface intrusive work and where appropriate, visually verifying through soft dig methods (referred to as potholing or daylighting) before the start of any subsurface intrusive activity.

- A minimum of **three (3) reliable lines** of evidence are required for an acceptable utility clearance. Each location of subsurface intrusive work must have at least 3 reliable lines of evidence. All lines of evidence used during the utility clearance procedure will be recorded on the Utility and Structures Checklist or equivalent client-provided checklist or permit. If a line of evidence is lost or not apparent, STOP WORK, and re-establish the line of evidence prior to resuming subsurface intrusive work.

- The lines of evidence used will be reasonable and appropriate for the conditions expected to be encountered (soil type, water table, etc.) and the type of utilities expected to be encountered (e.g., gas line versus an irrigation line).

- Contact the State One Call or equivalent service (Nationwide "811") as required by law. The State One Call or equivalent service (Nationwide "811") can only be used as a reliable line of evidence when working within the public right-of-way or easement.

- For point clearance (single intrusive point, used as 1 of the 3 required reliable lines of evidence), the borehole must be cleared to 110% of the diameter of the intrusive device (e.g., auger, drill head, etc.) or an additional 2 inches of overall diameter, whichever is greater.

- Utility clearance information will be documented on the Arcadis Utility and Structures Checklist (USC) or equivalent client-provided checklist or permit. The Utility Structures and Checklist is valid for 15 business days from the date of completion. A copy of the completed Utility and Structures Checklist will remain on-site during all subsurface intrusive work.

- Employees overseeing utility clearance activities will:

    - Be familiar with the contents of this standard and ARC HSFS-019 Supplement 2;
    - Have one year of field experience in the visual identification of utilities; and
    - If operating equipment, have training and six months of experience in the proper operation and results interpretation of any clearance equipment, including without limitation, magnetometers and ground penetrating radar.

- A utility strike is an unplanned contact of a utility during the course of work that results in damage requiring repairs, making a report to the utility owner, or requiring further assessment to evaluate the potential for damage. All utility strikes must be reported within 24 hours using the Utility Line Strike Investigation Form. **Do not enter the incident into 4-Sight until approved to do so by Corporate Legal. Refer to** ARC HSFS-019 Supplement 5**, Utility Strike Emergency Action Plan Guidelines.**

Report Utility Incident Now

1. POLICY

It is the practice of Arcadis and its affiliated companies to implement appropriate, reasonable, and practical standards within acceptable and customary industry practices to promote the health and safety of its employees and avoid and mitigate exposure of risk in the performance of their work. In furtherance of this policy, Arcadis promotes and encourages compliance by all employees with this policy and standards relating to work in the vicinity of subsurface, submerged, or aboveground utilities.

2. PURPOSE AND SCOPE

2.1 Purpose

This standard directs general safety standards and best practices associated with the identification and management of subsurface, submerged, and aboveground utilities on project sites. Utility location standard operating procedures (SOP) for submerged utilities can found in ARC HSFS-019 Supplement 6.

2.2 Scope

This standard assigns responsibilities and expectations for proper utility clearance by both Arcadis employees and Arcadis subcontractors at project sites.

3. DEFINITIONS

Definitions relating to Utility Clearance can be found in Exhibit 1.

4. RESPONSIBILITIES

4.1 Project Manager Responsibilities

For every project site having the potential to come into contact with utilities, Project Managers must ensure that:

- The requirements of this standard are followed.
- Local regulations governing utility clearance are followed. This includes ensuring local and/or state laws defining activities or depth of intrusive work/excavation requiring utility clearance are reviewed as they vary by location. For further information, refer to One Call and State Law Directory.
- Efforts are made to work with the client, project site representatives, public utility companies, and subcontractors to identify the nature of any utilities and to determine control processes that need to be implemented by Arcadis and the subcontractors to prevent damage to these utilities and to properly manage the effects in the event there is utility damage.
- Utility clearance activities are only delegated to a Task Manager or other individual meeting the requirements of Section 4.2 below, as appropriate. However, even if the Project Manager delegates certain responsibilities, the Project Manager maintains primary responsibility for a complete utility clearance.

For additional information on Project Manager responsibilities and best practices, refer to ARC HSFS-019 Supplement 1.

- Project Managers or designee must review the Utility and Structures Checklist with staff and Arcadis subcontractors conducting subsurface intrusive work (including "Sub-of-Subs" when conducting subsurface intrusive work) prior to staff beginning subsurface intrusive work. The Project Manager or designee review must be documented on the Utility and Structures Checklist prior to starting subsurface intrusive work.

4.2 Field Personnel Responsibilities

Arcadis field personnel conducting work on a project site having the potential to come into contact with utilities have the responsibility to:

- Read, understand, and follow this standard and ARC HSFS-019 Supplement 2 and complete the appropriate checklists during the on-site utility and structures locate and clearance process.

- Complete a minimum of one year of utility clearance-related experience before accepting responsibility for any utility clearance tasks. This requires on-site training led by another Arcadis employee with detailed knowledge and experience in identifying utilities and structures.

- Complete training and have 6 months of experience in operating and interpreting the results of remote sensing technologies, including without limitation, magnetometers and ground penetrating radar, before operating such technologies. Field staff should understand the technologies being utilized by a private utility locate contractor and how they are operating in comparison with the site conditions. Refer to ARC HSFS-019 Supplement 3 for more information.

- Prior to beginning subsurface intrusive work, the Utility and Structures Checklist must be completed and signed by the staff member completing or overseeing the clearance. Confirm that the Utility and Structures Checklist was reviewed by the Project Manager or designee as discussed in Section 4.1 above. Review the Utility and Structures Checklist daily prior to starting subsurface intrusive activities to ensure all utilities are identified and markings are present. A copy of the completed Utility and Structures Checklist will remain on-site during all subsurface intrusive work (i.e., any work or activity that breaks the plan of the ground surface).

- Use their STOP WORK Authority to eliminate any reasonable concern if utilities cannot be reasonably located and contact the Project Manager to review the STOP WORK situation and confirm the direction of action before moving forward.

- Ensure that Arcadis subcontractors conduct their own reasonable independent utility clearance efforts as required by Arcadis' standard subcontract and are aware of any Arcadis clearance standards used on-site.

- Be on-site and provide oversight during utility locate activities and any active subsurface intrusive work or activities involving contractor under contract to Arcadis.

- If a utility is damaged and repaired during the course of the field event, field staff must provide oversight and document that the repair appears competent and complete to prevent further damage to the site when the damaged utility is re-activated.

4.3 Arcadis Subcontractor Responsibilities

According to Arcadis' standard subcontract, subcontractors have agreed to take responsibility for any damages resulting from a utility impact caused by their work. Therefore, Arcadis subcontractors are expected to take reasonable time and diligence to conduct their own independent utility clearance using reasonable standards and processes. Subcontractors have the responsibility to stop their work if utility concerns are identified and will report those concerns to the Arcadis employee overseeing their work activities. Arcadis staff should reinforce these responsibilities with subcontractors during job safety briefings.

In jurisdictions where the actual contractor performing the subsurface intrusive work is required to perform utility clearance notifications, the contractor will perform the clearance notification and will provide evidence of the notification to Arcadis (ticket or ticket number, etc.). Refer to ARC HSFS-019 Supplement 4 for Best Practices for State One Call procedures.

- If overhead utilities are present in areas where heavy equipment will be operated, ensure adequate clearance is provided. For heavy equipment that is extendable or telescoping (e.g., excavators, dump trucks, extendable lift trucks), evaluate whether the use of a spotter is necessary prior to operating heavy equipment when in proximity to the overhead utility.

- If a utility is damaged and repaired during the course of the field event, the field subcontractor must verify that the repair is competent and complete to prevent further damage to the site when the damaged utility is re-activated.

5. PROCEDURE

5.1 General

Protocols to be followed during utility and structures location and clearance activities are outlined in:

- Best Practices for Project Managers (or Their Delegates) Concerning Utility Clearance (ARC HSFS-019 Supplement 1).

- Best Practices for Field Personnel Concerning Utility Clearance (ARC HSFS-019 Supplement 2).

- Use and Limitations of Common Underground Locating Technologies and Clearance Methods (ARC HSFS-019 Supplement 3).

- Best Practices for State One Call Procedures (ARC HSFS-019 Supplement 4).
- Emergency Action Plan guidelines for Utility Strikes (HSFS-019 Supplement 5).
- Utility Location Standard Operating Procedure for Aquatic Work Activities (ARC HSFS-019 Supplement 6).

5.2 Lines of Evidence

When locating underground utilities, three (3) reliable "lines of evidence" must be established to help determine where a subsurface utility may be located. A line of evidence may be a site drawing that shows where a utility is located, it could be anecdotal information obtained from owners or employees, it could be established using any number of non-intrusive geophysical methods [e.g., ground penetrating radar (GPR), electromagnetic survey (EM), radio-frequency methods (RF), etc.], or it could involve probing for or exposing the utility by soft dig technologies (i.e., daylighting or potholing). Some lines of evidence will identify utility locations with a high degree of certainty (e.g., direct connect radio-frequency technique, daylighting or potholing, sonde tracing, etc.). Other lines of evidence will identify utilities will less certainty (e.g., anecdotal reports, design drawings, etc.).

Effective utility locate practices must use multiple lines of evidence until there is a high degree of certainty that the underground services have been adequately located. Three (3) reliable lines of evidence are required for an appropriate utility clearance as defined in this standard. All reliable lines of evidence used during the utility clearance procedure will be recorded on the Utility and Structures Checklist or equivalent client-provided checklist or permit. If three (3) reliable lines of evidence have not established certainty in the location of a utility, STOP WORK and do not proceed. Additional reliable lines of evidence must be utilized until the presence or absence of the underground utility can be established. During work activities, if a line of evidence is lost or not apparent (e.g., paint markings have faded), STOP WORK, and re-establish the line of evidence prior to resuming subsurface intrusive work.

Generally, the following lines of evidence may be used to meet this minimum utility clearance requirement:

1. Contacting the State One Call or equivalent service (Nationwide "811") is REQUIRED BY LAW regardless if it will be used as a line of evidence. Contacting the State One Call or equivalent service (Nationwide "811") is an acceptable reliable line of evidence when working within the public right of way or easement. Note that the State One Call can provide valuable information regarding locations and types of utilities entering the private property.

   Note: For work on private property or in areas not served by State One Call or equivalent service, consider using a reputable private utility locating company to locate and mark the utilities. **Use of a reputable private utility locator is encouraged for all projects with subsurface or submerged utilities.** When working with a private locater, it is best practice to pre-plan clearance areas, review required clearance equipment and the re-clearing/confirmation of any public utility mark outs (State One Call or equivalent service Nationwide "811").

2. Use detailed, scaled site utility plans, preferably in the form of an "as-built" or "record" drawing, to identify and/or confirm utility locations. Document request and/or receipt of utility drawings from the property owner/client on the Utilities and Structures Checklist.

3. Interview(s) with knowledgeable site or client personnel. The following questions should be asked during the interview and answers documented on the Utility and Structures Checklist:

   o Employees(s) Name and Affiliation(s) with the site;

   o Types of utilities, including utility composition and location of utilities on-site;

   o Depths of known utilities; and

   o Any other pertinent information regarding utilities on the site.

View the Utilities and Structures Checklist

4. Conduct a detailed visual site inspection of areas around all planned subsurface intrusive work points or areas to identify and/or confirm utility locations. For underground utilities, conduct an inspection for structures that tend to indicate the presence and general location of such utilities, including, but not limited to manholes, vaults, valve covers, valve markers, telephone pedestals, transformer housings, fire hydrants, spigots, sprinkler heads, air relief valves, backflow preventers, meters, downspouts going into the subsurface, power poles with wiring going into the subsurface and line markers. Saw cut lines and concrete/asphalt repairs often yield valuable information regarding utility locations.

   Always discuss the presence of utilities with the site owner, operator, and/or occupant to identify any potential utilities that might not be readily identified by non-intrusive clearing methods or may be:

   o At depths > 5 feet below ground surface; or

   o At very shallow depths (< 2 feet below ground surface), such as communication lines, electrical conduits/wiring, irrigation lines, etc.

If one of the above lines of evidence cannot be utilized or if using the above lines of evidence does not adequately identify utilities with reasonable certainty, one or more additional lines of evidence must be utilized. Commonly used lines of evidence are listed on the Utility and Structures Checklist.

A discussion of use and limitations associated with common utility location and clearance methods is provided in ARC HSFS-019 Supplement 3.

Standard operating procedures for utility location in submerged settings are presented in ARC HSFS-019 Supplement 6.

The lines of evidence will be recorded on the Utility and Structures Checklist or equivalent client-provided checklist or permit.

Note: If a line of evidence is lost, utility markings are removed/worn, or area of previous clearance is not confirmed, STOP WORK and re-establish the

line(s) of evidence prior to resuming subsurface intrusive work. Each location of subsurface intrusive work must have 3 reliable lines of evidence. All lines of evidence used during the utility clearance procedure will be recorded on the Utility and Structures Checklist of equivalent client-provided checklist or permit. If a line of evidence is lost or not apparent, STOP WORK, and re-establish the line of evidence prior to resuming subsurface intrusive work. The Utility Structures and Checklist is valid for 15 business days from the date of completion.

If and when any line of evidence reveals that planned subsurface work will be located inside the 30-inch Tolerance Zone of known/marked/located/observed utilities, the project team must Stop Work and contact Corporate H&S as early as possible for pre-approval.

5.3 Color Codes used for Utility Markings

The following colors are used for marking utilities. Some government agencies or large industrial facilities may use additional colors not provided below. Arcadis policy is to assume any paint marking or pin flag color not provided below is a subsurface utility marking until proven otherwise.

If utilities or subsurface anomalies are identified but the utility type or anomalies are not classified, it is recommend that a pink (Temporary Survey Marking) marking be used. Once the type of utility is established, the pink marks should be repainted/remarked to represent the correct type of utility.

COLOR	Utility Line
WHITE	Proposed Excavation
PINK	Temporary Survey Markings
RED	Electrical Power Lines, Cables, Conduit and Lighting Cables
YELLOW	Gas, Oil, Steam, Petroleum or Gaseous Materials
ORANGE	Communication, Alarm or Signal Lines, Cables or Conduit
BLUE	Potable Water
PURPLE	Reclaimed Water, Irrigation and Slurry Lines
GREEN	Sewer and Drain Lines

APWA and ANSI standard Z-53.1

5.4 Locating Technologies

There are several types of locating technologies that can be used to identify and locate utilities in the subsurface. Project teams need to work closely with private utility locators (PUL) in order to best match locating technology with site conditions. To provide the best results, all possible locating technologies should be available for use and implementation at the project location. Any potential interferences should also be discussed up front and then at the project site during utility location activities. Potential interferences could be soil moisture, soil type, standing water on concrete/asphalt, rebar, fencing, and metal

structures that are in the subsurface. Employees overseeing locating technology activities should have an understanding of device operation and limitations. For further information, refer to ARC HSFS-019 Supplement 3, Use and Limitations of Common Utility Location Technologies and Clearance Methods.

5.5 Clearance Methods

In some cases, proposed subsurface intrusive locations may be pre-cleared using other intrusive methods. Determine the clearance or soft dig method based on-site conditions and utilize the least invasive method possible. The number of subsurface intrusive locations and soil type should be taken into consideration. The following clearance methods are listed from least invasive to most:

1. Vacuum Extraction/Potholing (air or water-based),
2. Air knifing,
3. Hydroknifing,
4. Probing,
5. Hand augering,
6. Hand digging, and
7. Posthole digging.

Single-Point clearance must be 110% of the proposed subsurface intrusive area or the diameter plus 2 inches, whichever is greater. Three-Point clearance must be installed in a triangular pattern around the proposed borehole and in a configuration not to allow for utilities to enter the borehole. Three-Point clearance must be 110% of the proposed intrusive area or the diameter of the intrusive area plus 2 inches, whichever is greater. Each method of clearance should be documented on the Utility and Structure Checklist.

Manual clearing methods, such as shoveling, using pick axes, digging bars and other hand tools, should be avoided completely or only used when absolutely necessary and used with caution. Excessive downward force, prying or use in poor/obstructed visibility conditions is prohibited as these tools can damage utilities.

Surface cover (e.g., asphalt) removal methods within the 30-inch Tolerance Zone that pose excessive downward force, such as jackhammering, should be used with extreme caution. Methods that only cut the surface cover (coring or saw cutting) present less risk due to the absence of the downward force, which could cause collateral damage to shallow subsurface utilities. Note that utilities are often present at the concrete or pavement/soil interface or encased within the concrete or pavement and are easily damaged during concrete coring or pavement removal. Always work slowly, methodically and frequently STOP WORK to evaluate conditions during these work activities.

For borings and excavations, if the utility is known to be at depths where hand clearing is not feasible or creates additional safety concerns, no work will be performed within the 30-inch Tolerance Zone vertically or horizontally of the utility unless manual clearing is performed under the oversight of an Excavation Competent Person as defined in ARC HSCS005 Arcadis Excavation and Trenching.

5.5.1 Temporary Backfilling of Pre-Cleared Boreholes

In some cases, it may be necessary to temporarily backfill a pre-cleared location until the remaining subsurface activities are performed. At these locations where subsurface intrusive work does not immediately follow pre-clearance, it is important to properly backfill and mark the pre-cleared location in order to relocate the pre-cleared location. In general, wooden stakes, survey markers, whiskers, paint marking or other surficial markings alone are inadequate because these markings can be easily removed, damaged or otherwise lost leading to uncertainty regarding the pre-cleared location. Although the specific steps for backfilling a pre-cleared location will depend on site-specific conditions, use the following additional steps to prevent loss of the pre-cleared location:

- Backfill a pre-cleared location with clean sand or other granular material that is significantly different than the surrounding subsurface native material. Native soil should not be used to backfill a pre-cleared location that may require further subsurface work.
- Backfill the top 2 feet of a pre-cleared location with dyed sand or gravel to facilitate re-location.
- Use hammered wooden stakes or delineators to mark locations as an additional measure, if practical.
- In the event that the pre-cleared borehole is located on asphalt or concrete and an asphalt cold patch is required, use white paint to mark the intrusive location with a circle over the asphalt cold patch.
- In some instances, such as projects potentially affected by unexploded ordinance (UXO), the pre-cleared borehole may require that a PVC of matching diameter pipe be inserted into the pre-cleared borehole, filled with clean sand and affixed with a matching cap. Contact the project manager to identify any client-specific requirements.
- Always use a physical subsurface marker such as described above to identify the pre-cleared borehole location. Never rely solely on field measurements or GPS coordinates.
- If a utility or anomaly/obstruction is encountered during the pre-clearing process, backfill the hole with the native soil and mark the location with a pink-painted X and/or NO.

In the event that a previously pre-cleared location cannot be located, the location must be re-cleared prior to performing subsurface intrusive work.

5.6 Clearance for Working in Vicinity of Subsurface Utilities

Prior to the start of subsurface intrusive activities (i.e., excavations, vertical drilling, installing grounding rod, and soil sampling), all utilities must be located and measures must be instituted to avoid subsurface utility hazards. See exemptions for subsurface intrusive work in Exhibit 1 (Definitions). Do not conduct subsurface work within 30 inches of a line marking in all directions. If the centerline of the utility is marked, the diameter of

the utility or utility bank (Exhibit 1) must be incorporated into the 30-inch Tolerance Zone, see Figure 1 located in Exhibit 2 for further instructions.

If and when any line of evidence reveals that planned subsurface work will be located inside the 30-inch Tolerance Zone of known/marked/located/observed utilities, the project team must Stop Work and contact Corporate H&S as early as possible for pre-approval.

If subsurface work must take place within the 30-inch Tolerance Zone of the line marking, the utility must be exposed (potholed) by soft dig/clearance methods prior to starting subsurface intrusive activities (see Section 5.5 for options); **no mechanized equipment is permitted for the exposing of the utility**.

Once the utility has been exposed, if mechanized equipment is planned for use within the 30-inch Tolerance Zone of the utility, such activity must receive pre-approval by Corporate H&S, as necessary, to mitigate or accept the risk associated with the planned work. Additional excavation safety procedures may have to be developed as part of the approval to proceed. It should be noted that any disturbance within the 30 inches or disruption of the bedding materials could affect the integrity of the utility.

For horizontal borings, to avoid striking a utility, damage from vibration, damage by pressure of the advancing boring, do not drill within 30 inches in all directions (3-Dimensional cylinder) of a line marking. Make sure to factor the diameter of the line or utility bank when computing 30-inch Tolerance Zone. When crossing a utility during horizontal drilling, it is recommend that the utility be exposed 30 inches in a 360°-direction. When exposing utilities for horizontal borings, the utility must be exposed (potholed) by soft dig/clearance methods. This recommendation applies even if the operating contractor has technology that places the location to within a few inches. Make sure to factor the diameter of the utility when determining the 30-inch Tolerance Zone. If subsurface work must take place within the 30-inch Tolerance Zone of the line marking, the utility must be exposed (potholed) by soft dig/clearance methods prior to starting subsurface intrusive work (see Section 5.5 for options); **no mechanized equipment is permitted for the exposing of the utility**. Once the utility has been exposed, if mechanized equipment is planned for use within the 30-inch Tolerance Zone of the utility, such activity must receive pre-approval by Corporate H&S, as necessary, to mitigate or accept the risk associated with the planned work. Additional excavation safety procedures may have to be developed as part of the approval to proceed. It should be noted that any disturbance within the 30 inches or disruption of the bedding materials could affect the integrity of the utility.

Additional cautions for horizontal borings include gravity utilities, such as sewers and storm drains, as the depth of these utilities will change (sometimes significantly) as they run across the project site. Always obtain the utility depth at the location where the boring will actually cross the line by collecting sewer depth inverts from identified manholes and interpolating those depths to the area of the subsurface intrusive work.

During well installations and well abandonment via mechanical equipment, the 30-inch Tolerance Zone rule applies outward from the outside edge of the largest diameter auger or tool to be used for installation and abandonment (over drilling). In cases where wells have been previously installed and the 30-inch rule has not been followed, work proposed using mechanized equipment to work within the 30-inch Tolerance Zone will

require approval from Corporate H&S. For more information, see Exhibit 2 for further instructions.

5.6.1 Aboveground Activities causing Subsurface Disturbance in the Vicinity of Underground Utilities

Aboveground activities can cause damage to shallow underground utilities or structures. Plan the intended path/mobilization/operation of Heavy Equipment is cleared to ensure that shallow utilities are not damaged. If Heavy Equipment must cross over shallow utilities, the utilities will be protected. Other subsurface disturbances may lead to damage such as clearing trees/shrubs/vegetation as roots may be entangled with underground piping or structures. For more information, see Best Practices for Field Personnel Concerning Utility Clearance (ARC HSFS-019 Supplement 2).

5.7 Acceptable Clearance for Working in Vicinity of Overhead Power Lines and Other Overhead Lines and Structures

No work will be performed by Arcadis or our subcontractor near overhead power lines where any Unqualified Person or equipment is within the limits specified below unless the power line has been properly covered or de-energized by the owner or operator of the power line. Qualified Person approach distances are defined in Exhibit 5A and 5B of ARC HSFS0006 Electrical Safety Standard.

Power Line Voltage Phase to phase (kV)	Minimum Safe Clearance (feet)
50 or below	10
Above 50 to 200	15
Above 200 to 350	20
Above 350 to 500	25
Above 500 to 750	35
Above 750 to 1,000	45

ANSI standard B30.5-1994, 5-3.4.5

5.7.1 Reducing Vehicle and Mechanical Equipment Clearance Requirements

Any vehicle or mechanical equipment capable of having parts of its structure elevated near energized overhead lines shall be operated so that a clearance of 10 feet (305 centimeters (cm)) is maintained. If the voltage is higher than 50 kilovolts (kV), the clearance shall be increased 4 inches (10 cm) for every 10 kV over that voltage. However, under any of the following conditions, the clearance may be reduced:

- If the vehicle is in transit with its structure lowered, the clearance may be reduced to 4 feet (122 cm). If the voltage is higher than 50 kV, the clearance shall be increased 4 inches (10 cm) for every 10 kV over that voltage.

- If insulating barriers are installed to prevent contact with the lines and if the barriers are rated for the voltage of the line being guarded and are not a part of or an attachment to the vehicle or its raised structure, the clearance may be reduced to a distance within the designed working dimensions of the insulating barrier.

- If the equipment is an aerial lift that is insulated for the voltage involved and if the work is performed by a qualified person, the clearance (between the uninsulated portion of the aerial lift and the power line) may be reduced to the distance given in OSHA 1910.333(c)(3)(ii)(C) Table S-5. Reference information from OSHA 1910.333 Table S-5 and NFPA 70E Table 130.4(C)(a) for alternating-current systems and 130.4(C)(b) for the distances associated with direct-current voltage systems is included as Exhibit 5 of ARC HSFS0006 Electrical Safety Standard.

Employees standing on the ground may not contact the vehicle or mechanical equipment or any of its attachments unless:

- The employee is using protective equipment rated for the voltage; or

- The equipment is located so that no uninsulated part of its structure (that portion of the structure that provides a conductive path to employees on the ground) can come closer to the line than permitted in this section of this standard.

If any vehicle or mechanical equipment capable of having parts of its structure elevated near energized overhead lines is intentionally grounded, employees working on the ground near the point of grounding may not stand at the grounding location whenever there is a possibility of overhead line contact. Additional precautions, such as the use of barricades or insulation, shall be taken to protect employees from hazardous ground potentials, depending on earth resistivity and fault currents, which can develop within the first few feet or more outward from the grounding point.

When a machine is in contact with an overhead power line, do not allow anyone to come near or touch the machine. Stay away from the machine and summon outside assistance.

5.7.2 Acceptable Clearance for Working in Vicinity of Non-Electrical Overhead Utilities and Structures

Arcadis field personnel will identify non-electrical overhead utilities and structures and where possible, work is not be conducted within the 30-inch Tolerance Zone of these overhead utilities and structures. It is recommended that if work will be completed in the vicinity of non-electric overhead utilities, the overhead utilities should be labeled with warning signs, protective barricades, and/or flags. Non-electrical overhead utilities and structures may include, but is not limited to, pipe chases, water lines, ceilings in buildings, etc. Arcadis field personnel will notify its site workers

(employees, subcontractors, vendors, etc.) of known overhead utilities and structures during the tailgate safety meeting. See Exhibit 2 for additional details.

5.8 Reporting Utility Incidents

Arcadis field personnel involved with any subsurface, submerged, and aboveground utility strikes should immediately STOP WORK and contact the Project Manager to discuss the incident unless there are injuries, then call 911 or the available emergency services number for the area and then the Project Manager. The utility strike must be reported to Corporate Health and Safety and Legal Departments immediately and no later than 24 hours. Use the Utility Line Strike Investigation Form as part of the notification process.

Selected utility strike incidents may also utilize a conference call with operations management to review findings and lessons learned. The Business Line Health and Safety Director will make the determination concerning the need to have the incident review call and will arrange the call, if deemed necessary.

5.9 Relationship of this standard to the Project Specific HASP

With the exception of the Utility and Structures Checklist, this standard, including most supplements, are not designed to be printed off and attached to project HASPs. During project health and safety planning, this standard will be reviewed and applicable clearance technologies and methods will be documented on the Utility and Structures Checklist.

Additionally, emergency action standards specific to utility strikes should be addressed. ARC HSFS-019 Supplement 5 provides general guidelines for emergency response to utility strikes. Applicable information may be attached to the Utility and Structures Checklist to facilitate communication of response expectations.

5.10 Required Contract Terms and Conditions

Arcadis' standard client and subcontractor contracts contain required terms and conditions defining responsibility for utility clearance and the allocation of risk associated with an impacted utility. These terms and conditions have prescribed language concerning subsurface work that is presented in Arcadis client contracts and Arcadis' subcontractor contracts, which can be found on the Legal Source site. If such provisions cannot be agreed upon, the reasons are documented and other risk-management actions should be identified, such as limits of liability, add additional physical investigations, additional lines of evidence or utility location, assignment of risk to subcontractors, etc. In addition, any changes to these terms and conditions require approval by Legal Services.

6. TRAINING

Employees responsible for coordinating or conducting utility clearance activities will be familiar with the requirements of this standard. Arcadis in-house 8-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) refresher may provide awareness-level training regarding this utility location and clearance standard.

7. REFERENCES (regulation citation, technical links, publications, etc.)

- Utility and Structures Checklist
- Utility Line Strike Investigation Form
- ARC HSFS-019 Supplement 1, Best Practices for Project Managers (or Their Delegates) Concerning Utility Clearance
- ARC HSFS-019 Supplement 2, Best Practices for Field Personnel Concerning Utility Clearance
- ARC HSFS-019 Supplement 3, Use and Limitations Associated with Location Technologies and Common Utility Clearance Methods
- ARC HSFS-019 Supplement 4, Best Practices for State One Call Procedures and Notifications
- ARC HSFS-019 Supplement 5, Emergency Action Plan guidelines for Utility Strikes
- ARC HSFS-019 Supplement 6, Utility Location SOP for Aquatic Work Activities
- Figure 1 – 30-Inch Tolerance Zone
- ARC HSCS005 Excavation and Trenching
- ARC HSFS0006 Electrical Safety Standard
- One Call and State Law Directory

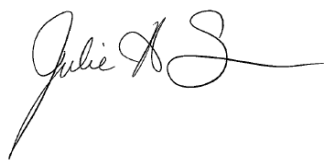
8. RECORDS - DATA RECORDING AND MANAGEMENT

8.1 Utility Clearance Records

All records (maps, checklists and documentation of communications) used to determine the location of utilities should be retained and kept in the project file.

9. APPROVALS AND HISTORY OF CHANGE

Approved By: Julie Santaniello, CSP – Corporate H&S, Manager of Technical Programs



Implementation Date 13 December 2006	Arcadis HS Standard Name Utility Location and Clearance	ARCADIS Design & Consultancy for natural and built assets
Revision Date 17 March 2017	Arcadis HS Standard No. ARCHSFS019	Revision Number 16

History of Change

Revision Date	Revision Number	Standard Developed/Reviewed By or Revised By	Reason for change
13 December 2006	01	Mike Thomas/Pat Vollertsen	Original document
26 March 2007	02	Mike Thomas/Pat Vollertsen	Put in new company format
15 May 2007	03	Mike Thomas/Pat Vollertsen	Added nation-wide 811 number
6 September 2007	04	Mike Thomas/Pat Vollertsen	Changing over to new template format
22 February 2008	05	Mija Coppola	Changing over to new template format
13 January 2009	06	Mija Coppola	Define lines of evidence
4 October 2010	07	Sam Moyers/Mija Coppola	Reformatting and addition of utility clearance information
13 February 2012	08	Sam Moyers/Mija Coppola	Modified link information for utility strike reporting, clarified local/state requirements in section 4.1 and 4.3
28 January 2013	09	Tony Tremblay	Utility and Structures Checklist revised; hyperlink updated
12 February 2013	10	Amanda Tine/Tony Tremblay	Clarified clearance boundaries for Unqualified staff in Section 5.7 and added information about vehicles and equipment being used near power lines in Section 5.7.1

Implementation Date 13 December 2006	Arcadis HS Standard Name Utility Location and Clearance	ARCADIS Design & Consultancy for natural and built assets
Revision Date 17 March 2017	Arcadis HS Standard No. ARCHSFS019	Revision Number 16

Revision Date	Revision Number	Standard Developed/Reviewed By or Revised By	Reason for change
15 March 2013	11	Kurt Merkle, Rebecca Lindeman / Tony Tremblay	Added additional text to standard for recent lessons learned, added section 5.4 (Locating Technologies) and 5.5 (Clearance Methodologies), added additional details to section 5.6 when working in close proximity to subsurface utilities, and added Supplement 6 - Utility Location SOP for Aquatic Work Activities.
07 July 2013	12	Andrew McDonald/ Tony Tremblay	Removed HSFS-019 Supplement 1, Utility Definitions. Added hyperlink for One Call and State Law Directory. Segregated evidence of sewer or storm drains in USC list. Removed Sam Moyers and added Andrew McDonald as author.
26 September 2014	13	Andrew McDonald/Tony Tremblay	Added Exhibit 1. Definitions and 30 inch tolerance zone. Clarified use of 811 or state one call as a reliable line of evidence. Added best practice to cover backfilling of pre-cleared boreholes. Updated USC list to cover soft dig termination depths and PM review.
23 February 2015	14	Tony Tremblay	Page number correction

Revision Date	Revision Number	Standard Developed/Reviewed By or Revised By	Reason for change
10 May 2016	15	Denis Balcer/Sharon Lingle/Alec MacAdam/Andrew McDonald/Tony Tremblay/Julie Santaniello	ES and Section 4.2 - define subsurface intrusive work; clarify employees providing oversight of utility contractors, Arcadis requirements of operating and interpreting results of utility clearance equipment, and utility clearance before all subsurface intrusive work. Sections 1 and 5.8- changed submarine to submerged. Section 4.1 – added contacting public utility companies to help clear utilities. Section 4.2 – Clarified requirement to complete one year of utility clearance-related experience. Section 4.2 and 4.3 - Added discussion on aboveground activities causing subsurface disturbances. Added responsibility to clear overhead utilities when heavy equipment will be used and to evaluate use of a spotter. Added that repairs to damaged utilities need to be verified as competent and complete. Section 5.2 – Clarified reliable lines of evidence for each subsurface intrusive work point and degrees of certainty. Added all work within 30-inch Tolerance Zone needs Corp H&S preapproval. Section 5.6 and Exhibit 1- Clarify subsurface intrusive work and activity and exemptions for subsurface intrusive work. Section 5.6.1 – Add requirement to evaluate aboveground activities that may lead to subsurface disturbances that may cause damage to shallow underground utilities or structures.

Implementation Date 13 December 2006	Arcadis HS Standard Name Utility Location and Clearance	ARCADIS Design & Consultancy for natural and built assets
Revision Date 17 March 2017	Arcadis HS Standard No. ARCHSFS019	Revision Number 16

Revision Date	Revision Number	Standard Developed/Reviewed By or Revised By	Reason for change
10 May 2016	15	Denis Balcer/Sharon Lingle/Alec MacAdam/Andrew McDonald/Tony Tremblay/Julie Santaniello	Section 5.7.2 – added non-electric overhead utilities and structures other than power lines need to be identified and marked if working in that area. Section 9 – Changed reviewer from Tony Tremblay to Julie Santaniello. Exhibit 1 – added definitions of Utility Strike, Daylighting, Potholing, Subsurface Intrusive Work, Subsurface Intrusive Activities, and Utility Bank. Standard and Supplements placed on new Arcadis headers. Updated Supplement revision numbers to be consistent with standard. Supplement 2 revised. Utility Clearance and Structures Checklist and Utility Strike Investigation Form revised.
17 March 2017	16	Alec MacAdam/Julie Santaniello	Hyperlink updates; minor formatting; Utility Clearance and Structures Checklist revised.

EXHIBIT 1 – DEFINITIONS

Aboveground Utilities - For the purpose of this procedure, aboveground utilities include, but are not limited to: any aboveground line, pipe, conduit, system, or facility used for producing, storing, conveying, transmitting or distributing communication or telecommunications signals, electricity, gas, liquid, petroleum and petroleum products, coal slurry, hazardous liquids or gases, water under pressure, steam, sanitary sewage, storm water, or other materials, liquids, or gases.

Daylighting – exposing underground utilities or structures through soft dig technology/clearance prior to completing subsurface intrusive activities.

Excavation - Any man-made cut, cavity, trench, or depression, in an earth surface formed by earth removal into which a person can bodily enter.

Overhead Utilities and Structures – Overhead water lines, overhead pipe chases, ceilings in buildings.

Potholing – exposing underground utilities or structures through soft dig technology/clearance prior to completing subsurface intrusive activities.

Subsurface Intrusive Activities – For the purposes of this procedure, subsurface intrusive activities include, but are not limited to: excavations, vertical drilling, installing grounding rod, soil sampling, etc,

Subsurface Intrusive Work – Is any work or activity that breaks the plane of the ground surface. Exemptions include soil sampling using a non-conductive sampling tool to a depth of 6 inches below ground surface (bgs), placement of survey flagging to a depth of 6 inches bgs, and placement of non-conductive survey stake(s) to a depth of 6 inches bgs).

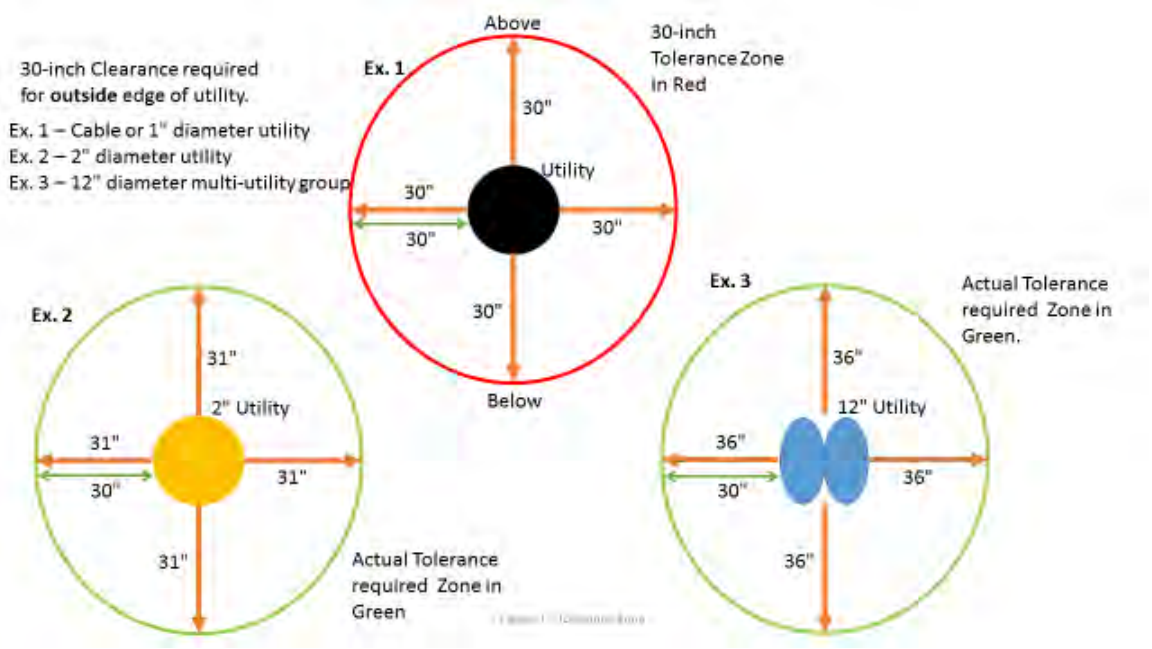
Subsurface Utilities - For the purposes of this procedure, subsurface utilities include, but are not limited to: any underground line, pipe, conduit, system, or facility used for producing, storing, conveying, transmitting or distributing communication or telecommunications signals, electricity, gas, liquid, petroleum and petroleum products, coal slurry, hazardous liquids or gases, water under pressure, steam, storm water, or sanitary sewage; underground storage tanks; tunnels and cisterns; and septic tanks and lines.

Tolerance Zone – The area within 30 inches in all directions from the outside diameter of a located/marked utility in which special care is to be taken. If the centerline of the utility is marked, the diameter of the utility or utility bank/trench must be incorporated into the 30 inches. This area must be hand cleared with non-mechanized equipment. Once the utility has been exposed, if mechanized equipment is planned for use within the 30-inch Tolerance Zone of the utility, such activity must receive pre-approval by Corporate H&S, to mitigate or accept the risk associated with the planned work. See Figure 1 – 30-inch Tolerance Zone.

Utility Bank – a structure containing two or more conduits. A conduit is a single enclosure containing one or more facilities.

Utility Strike – An unplanned contact of a utility (i.e., overhead and structures, aboveground, underground or submerged) during the course of work that results in damage requiring repairs, making a report to the utility owner or requiring further assessment to evaluate the potential for damage

EXHIBIT 2 – FIGURE 1 – TOLERANCE ZONE



Attachment F
Traffic Safety Plan

Traffic Safety Plan (TSP)

1.0 General

Plan type	Non-Right of Way (Non-ROW)
Project Name:	GTEOSI Seneca Falls
Project Number:	30245593
Developer Name:	Kaitlyn Fleming
Duration of Project (in hours or days):	≤ 8 Hours
Time Restrictions (Y/N, if Y describe below):	N
Not Applicable	
Not Applicable	
Not Applicable	NA
Not Applicable	
Not Applicable	NA

☐ Working on multiple roads?

Comments: Driveway and parking areas are private; number of cones will be sufficient to establish safe working zone.

2.0 Work Description

Provide a brief description of scope of work:

Groundwater, soil, and air sampling will be conducted. Construction oversight and site inspections will be conducted around buildings and near historical outfalls. A work van will be temporarily staged in private driveway to support sampling efforts.

3.0 Type and Duration

Work locations on this project will be: Intermediate work (1-8 hours per location)

Non-ROW work will be performed in: Active parking lot

Special traffic conditions may include (select most prevalent): Not applicable

4.0 Traffic Control Layout, Number of Devices Required, and Phasing

The following Non-ROW requirements in the Traffic Safety Handbook applies:

Section 7.3 Intermediate Duration Work in Parking Areas (1 to 8 Hours) (DOT Facts-302b)

The menu below will be blank and is not applicable.

The menu below will be blank and is not applicable.

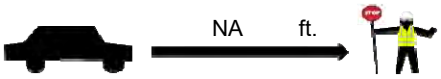
Non-ROW configuration:
An example non-ROW traffic control configuration for this project is illustrated below. The actual type and number of devices required are specified below. Don't leave vehicle doors open. Don't establish controls within 25 ft of the front or rear of parked large vehicles/rolling equipment without coordinating with the vehicle/equipment operator.



Intermediate Term (1-8 Hours)
Channelizing Cones with Caution Tape

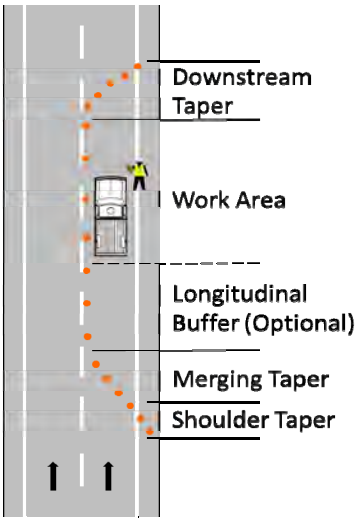


Short to Long Term
Truck as Barrier to Traffic Exposure

ROW minimum sign spacing distances for "A", "B" and "C" (as applicable) in referenced DOT Facts.	ROW oncoming traffic minimum site distance required to see Flagger and properly decelerate and stop.
A NA ft. B NA ft. C NA ft.	 NA ft.

ROW Cone Calculation (Values are default. Light grey fields may be modified based on actual road conditions)

	Active work area length (feet)	200
☐	Apply Optional Longitudinal Buffer (ft)?	0
	Lane width of offset (feet)	12
	Shoulder width of offset (feet)	8
	Posted speed limit	NA



☐ **Shoulder Taper**

Taper Length (feet)	NA
Cones Required	NA
Cones Spacing (max., ft)	NA

☐ **Merging Taper**

Taper Length (feet)	NA
Cones Required	NA
Cones Spacing (max., ft)	NA

☐ **Work Area**

Cone Spacing (max., ft)	NA
Cones Required	NA

☐ **Downstream Taper**

Taper Length (feet)	NA
Cones Required	NA
Cone Spacing (max., ft)	NA

Cones Required (minimum) NA

Note: Review taper configuration and cone spacing after ROW implementation to ensure traffic is moving efficiently without motorist confusion in the RWZ.

Select the traffic control devices to be used and enter number each required:				Non-ROW Phasing:
Check all that apply:		*Wording or Pictogram*	*Number:*	1) Position truck as shield, if practical
	Warning signs			
	Warning signs			2) Deploy traffic control devices
	Warning signs			
	Stop/Slow paddle			3) Affix flags, caution tape or fencing
	Red flag			
	Drums			4) Unload project equipment
X	Channelizer cone (42 inch height, 10 lb base)		8	
	Channelizer cone (42 inch height, 30 lb base)			5) Commence work
X	Traffic cones (≥ 18 inches tall)		6	
	Barricade:			6) SSO to maintain controls
	Flags for cones			
	Lights (for night work)			7) Remove controls in reverse order
	Plastic fencing (rolls)			
X	Caution tape (rolls)		1	
	Other (specify):			

Electronic Device Use Safety

Electronic devices (tablets, laptops and cell phones) used for data collection or work documentation are not anticipated to be used on this project. If these devices are used for data collection or work documentation, their use and distraction hazards must be addressed in the safety briefing.

Reviewed By:

HASP Reviewer: Chris Kassel

Traffic Safety Plan (TSP)

1.0 General

Plan type	Non-Right of Way (Non-ROW)
Project Name:	GTEOSI Seneca Falls
Project Number:	30245593
Developer Name:	Kaitlyn Fleming
Duration of Project (in hours or days):	≥ 2 weeks (8-10 hour days)
Time Restrictions (Y/N, if Y describe below):	N
Not Applicable	
Not Applicable	
Not Applicable	NA
Not Applicable	
Not Applicable	NA

☐ Working on multiple roads?

Comments: Driveway is private; access to driveway area where exclusion zone is established will be blocked off with appropriate signage and barricades (placed on private property).

2.0 Work Description

Provide a brief description of scope of work:

Soil excavation, staging and thermal system construction and OMM/decommissioning

3.0 Type and Duration

Work locations on this project will be: Long term work (>8 hours per location)

Non-ROW work will be performed in: Active parking lot

Special traffic conditions may include (select most prevalent): Construction equipment

4.0 Traffic Control Layout, Number of Devices Required, and Phasing

The following Non-ROW requirements in the Traffic Safety Handbook applies:

Section 7.4 Long Duration Work in Parking Areas (>8 Hours) (DOT Facts-302c)

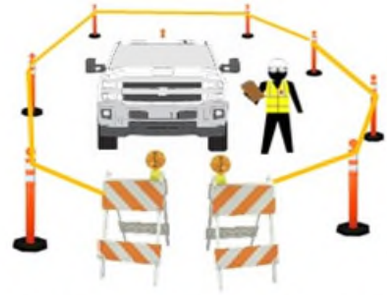
The menu below will be blank and is not applicable.

The menu below will be blank and is not applicable.

Non-ROW configuration:
An example non-ROW traffic control configuration for this project is illustrated below. The actual type and number of devices required are specified below. Don't leave vehicle doors open. Don't establish controls within 25 ft of the front or rear of parked large vehicles/rolling equipment without coordinating with the vehicle/equipment operator.



Long Term (>8 Hours)
Channelizing Cones with Flags and Safety Fencing



Intermediate Term (1-8 Hours)
Channelizing Cones, Caution Tape and Type II Barricades

ROW minimum sign spacing distances for "A", "B" and "C" (as applicable) in referenced DOT Facts.	ROW oncoming traffic minimum site distance required to see Flagger and properly decelerate and stop.
A NA ft. B NA ft. C NA ft.	NA ft.

ROW Cone Calculation (Values are default. Light grey fields may be modified based on actual road conditions)

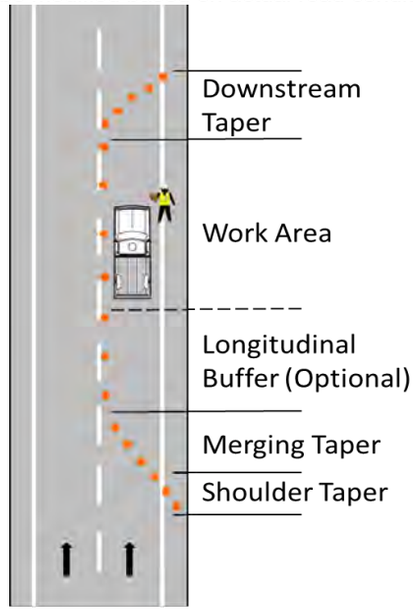
	Active work area length (feet)	400
☐	Apply Optional Longitudinal Buffer (ft)?	0
	Lane width of offset (feet)	12
	Shoulder width of offset (feet)	8
	Posted speed limit	15

☐ **Shoulder Taper**

Taper Length (feet)	40
Cones Required	0
Cones Spacing (max., ft)	NA

☐ **Merging Taper**

Taper Length (feet)	180
Cones Required	0
Cones Spacing (max., ft)	NA



☐ **Work Area**

Cone Spacing (max., ft)	NA
Cones Required	0

☐ **Downstream Taper**

Taper Length (feet)	NA
Cones Required	0
Cone Spacing (max., ft)	NA

Note: Review taper configuration and cone spacing after ROW implementation to ensure traffic is moving efficiently without motorist confusion in the RWZ.

Cones Required (minimum) 0

Select the traffic control devices to be used and enter number each required:

Check all that apply:		*Wording or Pictogram*	*Number:*
☐	Warning signs		
☐	Warning signs		
☐	Warning signs		
☐	Stop/Slow paddle		
☐	Red flag		
☐	Drums		
☐	Channelizer cone (42 inch height, 10 lb base)		
X	Channelizer cone (42 inch height, 30 lb base)		14
X	Traffic cones (≥ 18 inches tall)		4
X	Barricade:	Type II	2
X	Flags for cones		14
☐	Lights (for night work)		
X	Plastic fencing (rolls)		2
X	Caution tape (rolls)		2
☐	Other (specify):		

Non-ROW Phasing:

1) Position truck as shield, if practical
2) Deploy traffic control devices
3) Affix flags, caution tape or fencing
4) Unload project equipment
5) Commence work
6) SSO to maintain controls
7) Remove controls in reverse order

Electronic Device Use Safety
Electronic devices (tablets, laptops and cell phones) used for data collection or work documentation are not anticipated to be used on this project. If these devices are used for data collection or work documentation, their use and distraction hazards must be addressed in the safety briefing.

Reviewed By:

HASP Reviewer: Chris Kassel



Attachment G
LOTO Plan

GTEOSI Seneca Falls - Sub-Slab Depressurization System Lockout/Tagout Procedure

LOCKOUT / TAGOUT PROCEDURE

ARCADIS Office:	Albany, New York		
Written by (Name/Job Title):	Chris Kassel (Geologist II)	Date Written:	1/11/16
Revised By (Name/Job Title):	Quinn Carnahan (Engineer)	Date Revised:	7/27/18
Revised By (Name/Job Title):	Chris Davern (Engineer)	Date Revised:	6/4/19
Revised by (Name/Job Title)	Quinn Carnahan (Engineer)	Date Revised:	2/16/22
Revised by (Name/Job Title)	Chris Davern (Engineer)	Date Revised:	4/3/24

INTRODUCTION

Vapor intrusion mitigation systems at the GTE Operations Support Incorporated (GTEOSI) site in Seneca Falls, New York consist of:

- Building 1 – Four inline fan sub-slab depressurization (SSD) systems
- Building 1A – One inline fan SSD system
- Building 2 – One inline fan ventilation system
- Building 7 – One centralized blower system
- Building 8 – One inline fan SSD system
- Building 9 – One inline fan sub-membrane depressurization system
- Buildings 9/10/11 – One centralized blower system
- Building 10 – One centralized blower system (no longer in use)
- Building 11 – One centralized blower system (no longer in use)

Centralized systems consist of vacuum blower(s), instrumentation/controls, cellular modems, battery backup devices, HVAC, and lighting equipment. Inline fan systems consist of inline fans, as well as control panels for Buildings 1, 8, and 9. System process lines for each system are designed to transfer vapors. Electrical power for the systems includes 3-phase power with voltages ranging from 208 – 480 V and 1-phase 120 V power. A summary of vapor intrusion mitigation systems and control panels, and the corresponding electrical isolation devices, is included in **Table 1**.

Table 1: Isolation Devices for Each System, Fan and Control Panel

Device	Device Location	Power Type	Isolation Device
B1-EP-01 Fan F-101	Outside northern wall of 2nd story in Building 1	1-phase 120 V	Local disconnect switch on column next to extraction point
B1-EP-02 Fan F-102	Outside southern wall of Building 1A	1-phase 120 V	Breaker in lighting panel #4 in Building 1
B1-EP-03 Fan F-103	Outside northern wall of Building 1B	1-phase 120 V	Breaker in distribution panel on column B20 in Building 1
B1-EP-04 Fan F-104	Outside northern wall of Building 1B	1-phase 120 V	Breaker in distribution panel on column B20 in Building 1
B1A-EP-01 Fan F-101A	Outside southern wall of Building 1A	1-phase 120 V	Local disconnect switch at ground level next to fan
Building 1 Control Panel	Western side of Building 1B	1-phase 120 V	Breaker in distribution panel on column B20 in Building 1
B2-VS-01 Fan F-201	Outside southwestern wall of Building 2	1-phase 120 V	Bus plug on busway along column line 4 in Building 2
Building 7 System	Former trainshed south of Building 7	3-phase 208 V	Disconnect next to control panel directly outside system enclosure
B8-EP-02 Fan F-802	Outside southern wall of Building 8	1-phase 120 V	Breaker in distribution panel LV-PP-1 in Building 8 woodshop
Building 8 Control Panel	Building 8 Woodshop	1-phase 120 V	Breaker in distribution panel LV-PP-1 in Building 8 woodshop
B9-VS-01 Fan F-901	Outside southern wall of Building 9	1-phase 120 V	Breaker in distribution panel located in Building 9 office
Building 9/10/11 System	Building 9B	3-phase 480V	Disconnect outside western wall of Building 9B
Building 10 System	Outside northern wall of Building 10A	3-phase 480/ 277 V	Disconnect inside north wall of Building 10A adjacent to system enclosure
Building 11 System	Outside southern wall of Building 11	3-phase 230 V	Disconnect next to control panel inside system enclosure

This lockout/tagout (LOTO) procedure shall be implemented when any installation or maintenance activity is being performed for which unexpected energization or start up, or release of stored energy could cause injury to employees. Such activities include but are not limited to the following:

- Inlet air or dilution air filter inspection or replacement (all centralized systems and inline systems with make-up air filters; Building 1 and Building 8)
- Low-voltage instrumentation troubleshooting, testing, or replacement (all centralized systems and control panels)
- Resetting cellular modem (Buildings 1 and 8 control panels, and Buildings 7 and 9/10/11 Systems)

The circuits that energizes the equipment or machines will be locked with a personally assigned lock and a disposable tag per the ARCADIS Control of Hazardous Energy (Lockout/Tagout) Standard-ARC HSFS004. A complete site-specific lockout tagout kit is available in Building 9B.

PURPOSE

This procedure establishes the minimum requirements for the lockout of energy isolating devices whenever maintenance or servicing is performed on machines or equipment. It shall insure that the machine or equipment is stopped, isolated from all potentially hazardous energy sources, and locked out before any servicing or maintenance to avoid the unexpected energization or start-up of the machine or equipment, or releasing of stored energy could cause injury.

DE-ENERGIZATION AND CONFIRMATION

All employees are required to comply with the limitations and restrictions imposed on them during the use of this lockout/tagout procedure. Only lockout/tagout authorized employees are allowed to perform the lockout/tagout in accordance with this plan. Refer to Arcadis standard ARC HSFS004 for requirements for lockout/tagout authorized employees. Consult with the Arcadis Project Manager for a list of authorized employees for the site. It should be noted that only NFPA-70E Qualified Persons may work (including confirming de-energization) on electrical circuits. Authorized employees do not necessarily meet the requirements for NFPA-70E Qualified Persons. Refer to Arcadis standard ARC HSFS006 for NFPA-70E Qualified Person requirements.

All employees, upon observing a machine or piece of equipment which is locked/tagged out to perform servicing or maintenance, shall not attempt to use that machine or equipment. This standard is written in accordance with the Occupational Safety and Health Administration (OSHA) Standard 1910.147.

Any person who willfully violates this standard is subject to disciplinary action including termination.

Prior to removing a device from service, for servicing, or maintenance, the following steps shall be taken:

1. Notify all affected employees that service or maintenance is required on a machine or piece of equipment, and that machine or equipment must be shut down and locked/tagged out to perform the servicing or maintenance.
2. The authorized employees shall refer to the manufacturer's manual to identify the type and magnitude of the energy source (see **Table 1**) that the machine or equipment utilizes, shall understand the hazards of the energy source (electrocution, arc flash, direct and indirect injury from energized motors, blowers or other equipment) and shall know how to control the energy. Electrical isolation devices for the existing systems are indicated in **Table 1** and **Figure E-2**.
3. If the machine or equipment is operating, initiate a system shutdown following the system specific shutdown procedure, including placement of all hand-off-auto switches to off.
4. Electrically isolate the system(s) via switching off the isolation device indicated in **Table 1**.

5. Lock/tag out the energy isolating device with an assigned individual lock and disposable red tag. The field lead will place the first lock followed by field support staff who will work on the equipment while it is locked and tagged out.

6. If electrical work is being conducted, or work where employees are exposed to potentially live circuits without having been confirmed de-energized, then confirmation of a safe electrical work environment must be done **by NFPA-70E Qualified Persons ONLY**. Refer to ARC HSFS006 for Qualified Person requirements. This will be done by:

    a) Confirm motors will not run using normal controls (e.g., hand-off-auto switch). **CAUTION**: The operating controls must be returned to the neutral or "off" position after verification of isolation.

    b) Confirm zero voltage. **CRITICAL!!** To do this, the NFPA-70E Qualified Person must wear Arc Flash PPE in accordance with Arcadis Health and Safety Standard ARC HSFS006. The NFPA-70E Qualified Person shall assume electrical energy is still present until zero voltage is confirmed using a voltmeter. Arc Flash PPE in accordance with ARC HSFS006 must be worn while panel door(s) opened and within Arc Flash Boundary (required to utilize voltmeter). For blower motors, a voltmeter rated for the specific electrical service should be used to confirm 0 volts at the blower motor starter located inside the control panel.

7. If mechanical work is being conducted, confirmation of a safe mechanical work environment will be done by a lockout/tagout authorized employee by:

    a) Confirming motors will not run using normal controls (e.g., hand-off-auto switch). **CAUTION**: The operating controls must be returned to the neutral or "off" position after verification of isolation.

8. Any stored or residual pressure or vacuum in process lines shall be confirmed zero using existing pressure and vacuum gauges.

9. The device is now locked/tagged out and servicing or maintenance can proceed.

RESTORING EQUIPMENT TO SERVICE

After servicing or maintenance is completed and the device is ready to be returned to normal operation, the following steps shall be taken.

1. Check the device and the area immediately around it to ensure that non-essential items have been removed and the components are operationally intact, this includes ensuring that all guards and covers have been replaced.

2. Check the area to ensure that all non-essential personnel are in a safe place or are well clear of the area.

3. Verify that all operating controls are in the "off" position or are in neutral.

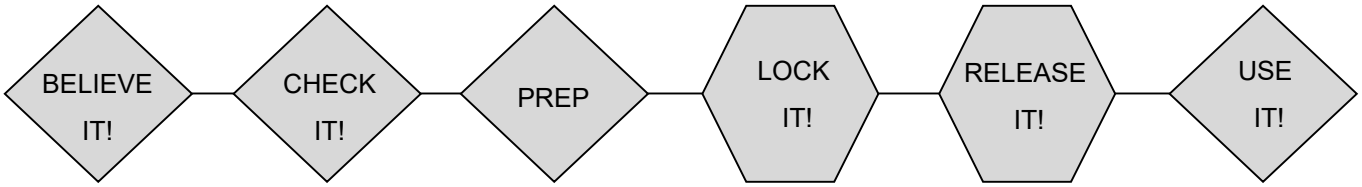
4. Remove the lock/tag out devices. The field support staff will remove his lock first followed by field lead.

5. Notify affected employees that the servicing or maintenance has been completed and that the device is ready for use.

6. Re-energize the device(s) via the isolation device indicated in **Table 1.**

7. Follow the device-specific startup procedures for restarting the device.

Lockout / Tagout Equipment-Specific Energy Control Procedure



Hazardous Energy Source		Isolation Device		Means of Verification of Lockout
Type and Magnitude	**Function**	**Type**	**Location**	
Building 1, 1A, 2, 8 and 9 inline fans				
Electrical (120 V)	System power	Main disconnect/breaker	See Step 2	Confirm zero voltage at motor starter
Mechanical (rotating parts)	Fan Motor	Main disconnect/breaker	See Step 2	Confirm zero voltage at motor starter
Building 7 System Blower				
Electrical (208 V)	System Power	Main disconnect/breaker	See Step 2	Confirm zero voltage at motor starter
Mechanical (rotating parts)	Blower motor	Main disconnect/breaker	See Step 2	Attempt start with HOA switch in "HAND"
Building 10/11 System Blowers				
Electrical (480 V)	System Power	Main disconnect/breaker	See Step 2	Confirm zero voltage at motor starter
Mechanical (rotating parts)	Blower Motor	Main disconnect/breaker	See Step 2	Attempt start with HOA switch in "HAND"
Area: **GETOSI Seneca Falls**		**Date of Last Review: April 3, 2024**		**Authorized by:** **Chris Davern**

Project Name:		**Project Location:**	
Project Number:		**Project Manager:**	
Developed By:		**Reviewed By:**	
Origin Date:	**Revision #:**	**Revision Date:**	**Revised By:**
Equipment #:		**Equipment Manufacture:**	
Equipment Description:		**Equipment Location:**	

Warning: Only Authorized Employees who have been Trained and Authorized can perform the LOTO procedures below

Equipment Diagram

Insert photos of equipment or schematic showing location of equipment to be locked out

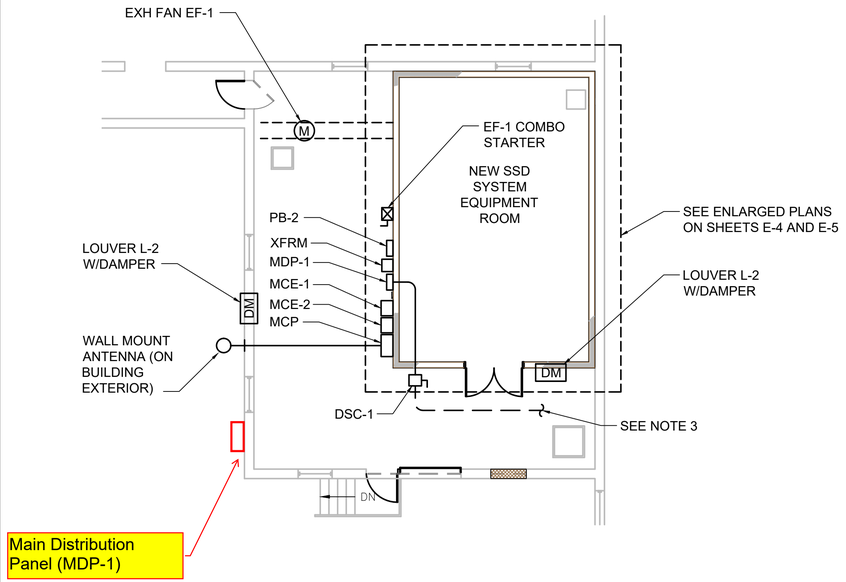
Adjacent & Associated Equipment

Adjacent & Associated Equipment	Location of Adjacent & Associated Equipment and Action to be Taken

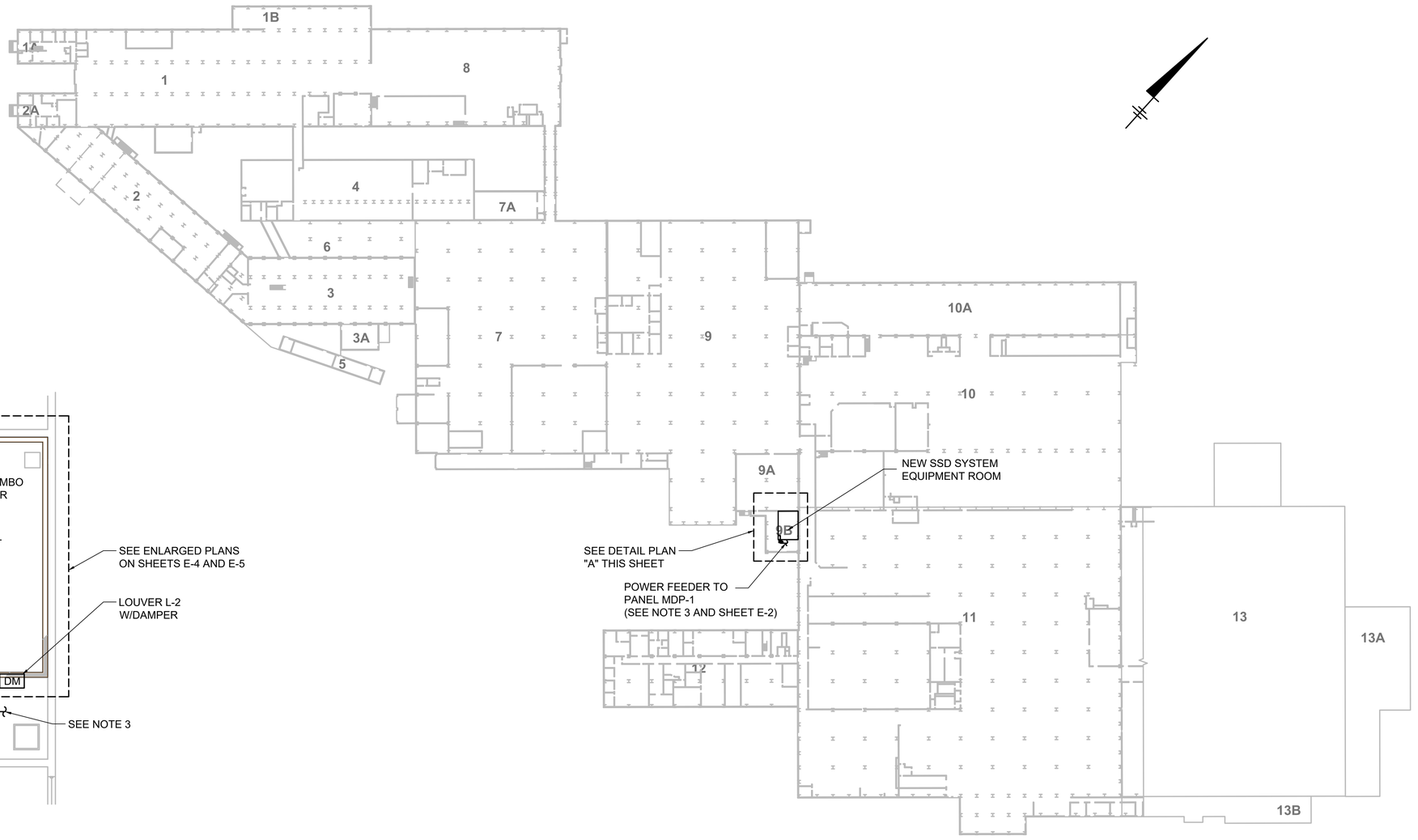
Lockout Tagout (LOTO) Procedure

Energy Source	Lockout Device	Isolation Location	Lockout Method	Zero Energy Check, Verification & Testing

CITY:(NOVI-MI) SYRACUSE-NY DIV/GROUP: ENVCAD DB: LD: PIC: PM: TM: LYR:ON=*;OFF=*REF*
C:\ENVCAD\SYRACUSE\ACT\04563003\0001\0001\DWG\CONTRACT\C1\SF-SUBMITTALS\20170320\ELEC\C1-E01.dwg LAYOUT: E-1 SAVED: 3/20/2017 11:32 AM ACADVER: 19.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: BLACKGRAY.CTB PLOTTED: 3/20/2017 11:35 AM BY:
STEINBERGER, GEORGE



DETAIL PLAN "A"



SITE ELECTRICAL PLAN

NOTES:

1. ELECTRICAL CONDUIT SHALL BE INSTALLED FROM EXISTING 480V SERVICE, 3 PHASE SUPPLY TO EQUIPMENT ROOM MDP-1 PANEL. (BY OTHERS)
2. CONDUIT AND WIRE SIZE INFORMATION CAN BE FOUND IN THE CONDUIT AND CONDUCTOR SCHEDULE SHEET E-2.
3. POWER FEEDER TO NEW EQUIPMENT SHALL BE INSTALLED BY OTHERS. MAKE PROVISIONS AS SHOWN.

SCALE(S) AS INDICATED

THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING: _____ USE TO VERIFY FIGURE REPRODUCTION SCALE

No.	Date	Revisions	By	Ckd

NO ALTERATIONS PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK STATE EDUCATION LAW

Professional Engineer's Name

Professional Engineer's No.

State	Date Signed	Project Mgr.
NY		
Designed by	Drawn by	Checked by

ARCADIS Design & Consultancy for natural and built assets

ARCADIS OF NEW YORK, INC.

FORMER PHILIPS DISPLAY COMPONENTS FACILITY ● SENECA FALLS, NEW YORK

PACKAGE 1 - SUB-SLAB DEPRESSURIZATION SYSTEM - BUILDINGS 10 AND 11

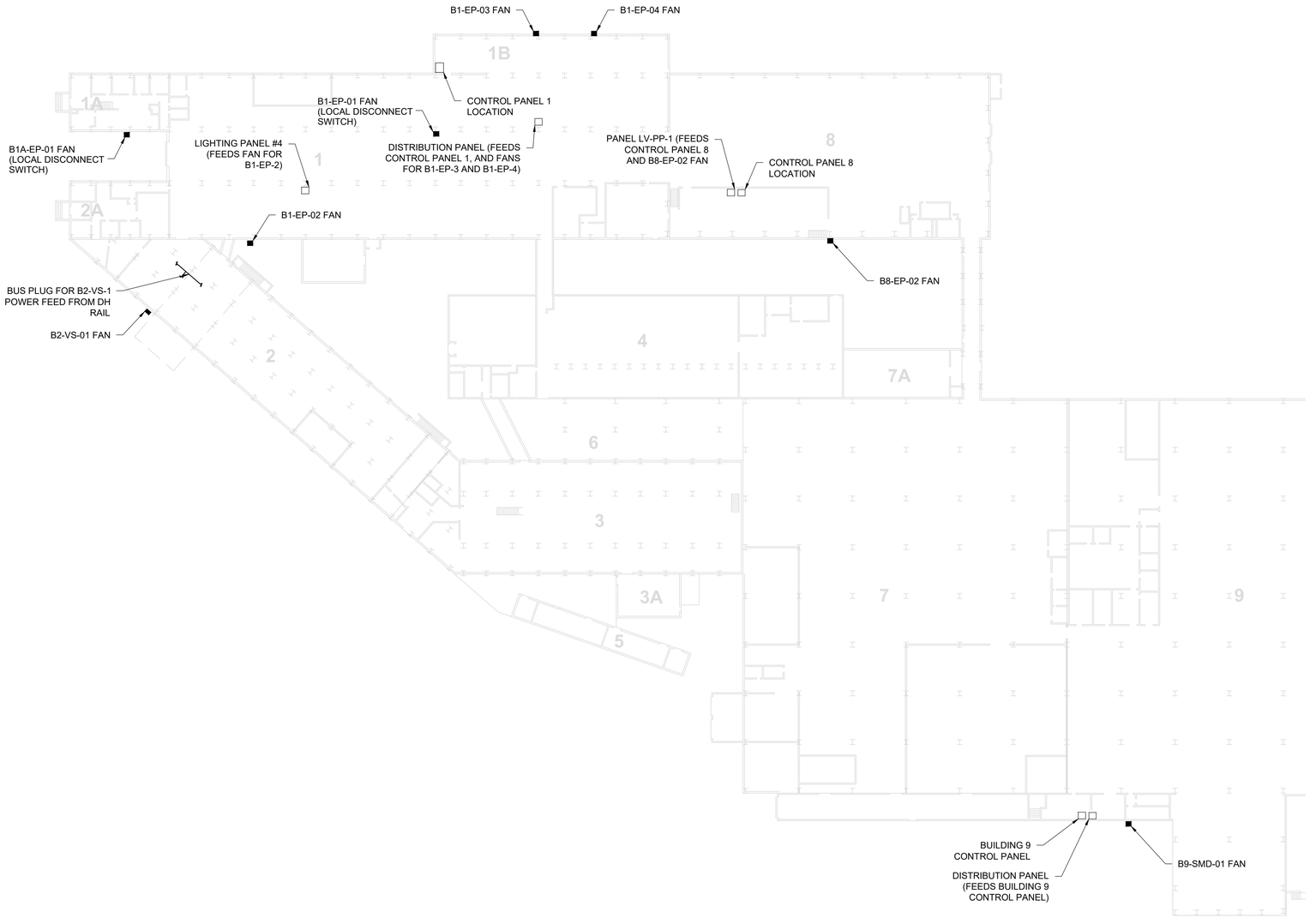
SITE ELECTRICAL PLAN

ARCADIS Project No.
04563003.0001.00011

Date
MARCH 2017

ARCADIS
855 Route 146, Suite 210
Clifton Park, NY 12065
T: 518.250.7300

E-1



C:\Users\gsteinberger\OneDrive - ARCADIS\BIM 360 Docs\GTE OPERATIONS SUPPORT INC\GTE-Former Philips Seneca Falls\2018\04563003.0001.00011101-DWG\SSD-RECORD-C2-DR-E01-E04-ELEC.dwg

SCALE(S) AS INDICATED

THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING: _____ USE TO VERIFY FIGURE REPRODUCTION SCALE

No.	Date	Revisions	By	Ckd
	APR 2024	REVISIONS FOR LOCKOUT/TAGOUT PLAN		
-	-	RECORD DRAWINGS		

NO ALTERATIONS PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK STATE EDUCATION LAW

Professional Engineer's Name

Professional Engineer's No.

State	Date Signed	Project Mgr.
NY		
Designed by	Drawn by	Checked by

ARCADIS Design & Consultancy for natural and built assets

ARCADIS OF NEW YORK, INC.

FORMER PHILIPS DISPLAY COMPONENTS FACILITY ● SENECA FALLS, NEW YORK

PACKAGE 2 - SOIL VAPOR INTRUSION MITIGATION SYSTEMS - BUILDINGS 1, 2, 7, 8, AND 9

ELECTRICAL BUILDING LAYOUT

ARCADIS Project No.
04563003.0001.00028

Date
AUGUST 2017

ARCADIS
855 Route 146, Suite 210
Clifton Park, NY 12065
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E-2

Appendix E

Community Air Monitoring Plan

GTE Operations Support Incorporated

Community Air Monitoring Plan

Former Philips Display Components Facility
Seneca Falls, New York
USEPA ID No. NYD002246015
NYSDEC Site No. 850003 – G.T.E. Products Corporation

October 2, 2025

Community Air Monitoring Plan

Former Philips Display Components Facility
Seneca Falls, New York
USEPA ID No. NYD002246015
NYSDEC Site No. 850003 – G.T.E. Products Corporation

October 2, 2025

Prepared By:
Arcadis of New York, Inc.
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Clifton Park
New York 12065
Phone: 518 250 7300

Prepared For:
GTE Operations Support Incorporated

Our Ref:
30245593

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Contents

Acronyms and Abbreviations ii

1 Introduction 1

1.1 Project Responsibilities 1

1.2 Site Location and Description 2

1.3 Potential Air Emissions Related to Remedial Activities 2

1.4 Air Emission Control Measures 3

2 Site Monitoring 3

2.1 Community Air Monitoring Procedures 3

2.1.1 Monitoring Location Selection and Deployment 4

2.1.2 Volatile Organic Compounds Monitoring 4

2.1.3 Particulate Monitoring 4

2.1.4 Special Requirements for Work within 20 Feet of Potentially Exposed Individuals or Structures 5

2.2 Action Levels 5

2.2.1 Volatile Organic Compound Action Levels 6

2.2.2 Particulate Action Levels 6

2.3 Reporting 6

Tables (in-text)

Table 1 – CAMP Contact List 7

Attachments

Attachment 1 NYSDOH Generic CAMP

Acronyms and Abbreviations

Arcadis	Arcadis of New York, Inc.
CAMP	Community Air Monitoring Plan
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
OU-1	Operable Unit 1
OU-2	Operable Unit 2
particulates	total suspended particulates
PID	photoionization detector
ppm	parts per million
µg/m^3	micrograms per cubic meter
VOC	volatile organic compound

1 Introduction

This Community Air Monitoring Plan (CAMP) has been prepared to support the implementation of remedial activities at the G.T.E. Products Corporation site (Former Philips Display Components Facility), New York State Department of Environmental Conservation (NYSDEC) Site #850003, at 50 Johnston Street in the Town of Seneca Falls, Seneca County, New York (Site). Details related to the remedial activities are presented in the 100% Remedial Design Report.

The purpose of this CAMP is to describe the monitoring activities that will be conducted to monitor for potential airborne releases of constituents of potential concern during the implementation of the following remedial activities, which are described in detail in the 100% Remedial Design Report:

- Operable Unit 1 (OU-1):
  - In situ thermal remediation (ISTR) to remove dense non-aqueous phase liquids from the subsurface in Areas of Concern (AOC) 1 and 3; and
  - Excavation and off-Site disposal of unsaturated soils within AOC 1 with concentrations that exceed commercial soil cleanup objectives (SCO) for volatile organic compounds (VOC). Excavation may be phased to occur after ISTR is completed and post-ISTR soil concentrations have been evaluated.
- Operable Unit 2 (OU-2):
  - Excavation and off-Site disposal of soils within historical outfall (HO) ditches 2, 4, 5, 6, and 7, and within the 100-year floodplain, with concentrations of cadmium that exceed the applicable SCO for cadmium; and
  - Capping of soil within HO ditch 3 with concentrations of cadmium that exceed applicable SCO for cadmium.

This CAMP specifies the air emission action levels, air monitoring procedures, monitoring schedule and data collection, reporting, and air emissions control measures to be performed during remedial construction. This plan is to be implemented during ground intrusive work, as well as certain non-intrusive activities described in Section 1.4, that may occur as part of Site remedial activities.

This CAMP has been prepared in accordance with the 2010 NYSDEC Program Policy DER-10: Technical Guidance for Site Investigation and Remediation. Additional details regarding Site monitoring and work practices referenced in this CAMP are presented in the 100% Remedial Design Report.

1.1 Project Responsibilities

Responsibilities of Remedial Party, Contractor, and Engineer (or its subcontractor), as they relate to the implementation of this CAMP, are as follows:

- Remedial Party – GTE Operations Support Incorporated is the Remedial Party. Primary responsibility of the Remedial Party is to coordinate with Contractor and Arcadis of New York, Inc. (Arcadis) to implement the required work activities in conformance with the Remedial Design. Remedial Party is responsible for administration of the work required and specified within the Contract Documents as well as contracting with Contractor and/or Engineer.
- Contractor – Two separate contractors are anticipated to fill the role of Contractor during implementation of the remedial program at the Site; one contractor for Operable Unit 1 (OU-1) activities and another contractor

for Operable Unit 2 (OU-2) activities. Contractor is responsible for implementing the required work activities in conformance with the Remedial Design. Contractor is responsible for employing control measures described in Section 1.4 and the specification 01 57 05 – Temporary Controls, which is in Appendix G of the 100% Remedial Design Report. Contractor is not responsible for conducting community air monitoring unless community air monitoring is included in its contract.

- Engineer – Arcadis is the Engineer. Responsibility of the Engineer is to provide staff to observe, document, monitor, and direct implementation (as needed) of the remedial activities. Engineer (or its subcontractor) is responsible for conducting community air monitoring unless community air monitoring is included in others' contract. The Engineer has sole responsibility to ensure the CAMP is implemented.

1.2 Site Location and Description

The Site is located along the northern side of Van Cleef Lake and the Cayuga-Seneca Canal in the Town of Seneca Falls, New York. Residential and undeveloped properties surround the Site to the west, north and east. The buildings on the Site cover approximately 13 acres. The Site was last operated as a manufacturing facility in 1986 closing out a four-decade period when television picture tubes and component parts were manufactured first by Sylvania Electric Products Corporation and then by North American Philips Corporation. The revitalization of the Site began in 1989 when the property was purchased by the Seneca County Industrial Development Agency. Seneca Falls Specialties & Logistics now owns the Site and occupies a majority of the building complex for warehousing and leases portions of the building space to several commercial tenants.

1.3 Potential Air Emissions Related to Remedial Activities

As defined in the New York State Department of Health (NYSDOH) Generic CAMP (included as Attachment 1), intrusive remedial activities to be performed at the Site have the potential to generate localized impacts to air quality. As stated in the NYSDOH Generic CAMP, ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells. Remedial components that have the potential to generate air emissions include, but may not be limited to, the following:

- Subsurface ground intrusive activities (e.g., utility installation, pole installation);
- Excavation of soil;
- Trenching;
- Backfilling;
- Material handling (e.g., stockpiling waste materials, loading waste materials for transport to the off-Site treatment/disposal facility);
- Installation of soil borings and monitoring wells;
- Subsurface heating during thermal remediation activities; and
- Other ancillary intrusive activities.

1.4 Air Emission Control Measures

The CAMP will be implemented during handling/management of any soil/fill material, and vapor suppression materials and dust suppression materials will be stored on-Site and available for use. Air emissions control and fugitive dust suppression measures will be implemented concurrently with the activities identified above (as needed) to limit the potential for organic vapor and dust emissions from the Site. Air emissions associated with ground intrusive activities, such as excavation/removal, backfilling, material handling, and stockpiling, and soil boring advancement, and certain non-intrusive activities, such as mobilization and transportation activities, will be controlled as described below. The following vapor and dust control measures may be used during these activities, depending upon specific circumstances, visual observations, and air monitoring results:

- Spraying water on ground surfaces to reduce dust;
- Covering materials with polyethylene sheeting (e.g., material stockpiles);
- Minimizing the exposed surface area of excavations;
- Restricting construction vehicle/equipment travel speeds through the Site; and
- Using vapor suppression foam.

The Contractor is required to mobilize water and vapor-suppressant foam (including application equipment) to the remediation work area prior to initiating intrusive activities. The Contractor must maintain an adequate supply of such materials for the duration of intrusive activities. If required, a dedicated Contractor worker shall be available for application of dust suppression water or vapor-suppressant foam.

Potential air emissions resulting from subsurface heating during thermal remediation activities will be mitigated by installing a cellular concrete vapor cap at ground surface covering the thermal treatment areas, and by operating a series of multi-phase extraction wells, horizontal soil vapor extraction (SVE) wells, and shallow SVE wells within and around the thermal treatment areas to prevent fugitive emissions of vapors.

2 Site Monitoring

This section presents a summary of the air monitoring activities that will be conducted during implementation of the remedial activities. The CAMP will be implemented to protect the downwind community, including on-Site employees, utility workers, visitors, and residents, from potential airborne contaminant releases generated during intrusive and non-intrusive work activities at the Site.

2.1 Community Air Monitoring Procedures

The CAMP is intended to be utilized in conjunction with the Site-Specific Health and Safety Plan (Appendix D of the 100% Remedial Design Report).

The Engineer will ensure continuous real-time community air monitoring during all ground intrusive remedial construction activities and the handling/management of Site soils. Community air monitoring activities will document measurements of total VOCs and total suspended particulates (particulates) in air downwind of work areas. Community air monitoring will only be discontinued due to weather related issues with the approval of the NYSDOH project manager, and, as discussed in section 2.1.2, VOC monitoring will not occur during OU-2 activities because VOCs are not constituents of concern in OU-2 soils. An exception to the requirement to obtain

approval of the NYSDOH project manager to discontinue community air monitoring is during a consistent rain or if the weather poses a hazard to the CAMP equipment, although NYSDEC will be notified. Additional information regarding the monitoring locations, equipment, and action levels is presented below.

Community air monitoring will be conducted during ground-intrusive activities and potential dust-generating activities (e.g., soil excavation, backfilling, material handling, and drilling). Detailed requirements for air monitoring procedures are presented herein and in the 100% Remedial Design Report Specification Section 01 57 05, Temporary Controls. Air monitoring procedures will be completed in accordance with the May 2010 NYSDOH Generic CAMP and generally consist of monitoring for VOCs and particulates (PM10) at one background (upwind) and one downwind location to establish Site background conditions and to evaluate air quality at the downwind perimeter of the active work areas.

Exceedances of VOC and/or particulate action levels will require that emission controls and/or dust-suppression measures be implemented. Control measures to be implemented by the Contractor are presented in Appendix G (Specification Section 01 57 05) of the 100% Remedial Design Report.

2.1.1 Monitoring Location Selection and Deployment

Community air monitoring station locations will be determined daily based on the predominant wind direction and the nature of the anticipated remediation activities. An upwind location and one downwind location will be selected at the start of each workday based on predominant wind direction. The community air monitoring stations will be deployed each day before the start of work activities. If the predominant wind direction changes significantly (i.e., if wind direction changes from North to West) or if the area of active work shifts during the workday, the monitoring stations will be relocated so that the upwind and downwind locations are maintained. Community air monitoring location changes will be documented on a site figure each day.

2.1.2 Volatile Organic Compounds Monitoring

As required by the NYSDOH Generic CAMP in Appendix 1 of NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation, VOCs will be monitored continuously during intrusive OU-1 remedial activities (as defined in Section 1.3) using instrumentation equipped with electronic data-logging capabilities. A real-time VOC monitor (RAE MiniRAE 3000 or equivalent), also referred to as a photoionization detector (PID), will be calibrated to 100 parts per million (ppm) isobutylene. Each PID will be set to produce an audible alarm if the time weighted average value exceeds the total VOC action level as summarized in Section 2.1.4.2. PID readings will be calculated for continuous 15-minute time weighted averages and reported in increments (e.g., 08:00 to 08:15, 08:15 to 08:30). In addition to VOC monitoring during intrusive activities, a PID will be used to periodically (minimally twice a month) screen the breathing zone around the perimeter of the in-situ thermal treatment area during subsurface heating or whenever a PID reading within the in-situ thermal treatment area breathing space exceeds 5 ppm above background (i.e., upwind location). VOC monitoring will not be conducted during OU-2 activities because VOCs are not constituents of potential concern in soils to be excavated during the OU-2 remedial action.

2.1.3 Particulate Monitoring

Real-time monitoring for particulates will be conducted during intrusive remedial activities. As required by the NYSDOH Generic CAMP, real-time airborne particulate levels will be monitored continuously during ground

intrusive activities (as defined in Section 1.3) using instrumentation equipped with electronic data-logging capabilities. Real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size and capable of integrating over a period of 15 minutes (TSI 8530 DustTrak II or equivalent) will be used for the particulate monitoring. Each dust monitor will be set to produce an audible alarm if the time weighted average value exceeds the particulate concentration action level as summarized in Section 2.2.2. All logged particulate concentration data will be calculated as continuous 15-minute running averages.

The presence of visible dust is not permitted during remedial activities. Dust migration will be visually assessed during all work activities. Visible dust resulting from remedial activities will not be allowed; work will be stopped, and corrective actions taken, if visible dust resulting from the remedial activities is identified.

2.1.4 Special Requirements for Work within 20 Feet of Potentially Exposed Individuals or Structures

When work areas are within 20 feet of potentially exposed populations or occupied structures, the continuous monitoring locations for VOCs and particulates must include the nearest potentially exposed individuals and the location of ventilation system intakes for nearby structures. The use of engineering controls such as vapor/dust barriers, temporary negative-pressure enclosures, or special ventilation devices will be evaluated to prevent exposures related to the work activities and to control dust and odors. Consideration will be given to implementing the planned activities when the potential for exposure to populations is at a minimum, such as during weekends or evening hours in non-residential settings.

- If total VOC concentrations measured with a real-time VOC monitor opposite the walls of occupied structures or next to intake vents exceed 1 ppm greater than background, real-time VOC monitor screening will occur within the occupied structure(s). Background readings in the occupied spaces must be taken prior to commencement of the planned work. Any unusual background readings will be discussed with NYSDOH prior to commencement of the work.
- If total particulate concentrations opposite the walls of occupied structures or next to intake vents exceed 150 micrograms per cubic meter (µg/m^3), work activities will be suspended until controls are implemented and are successful in reducing the total particulate concentration to 150 µg/m^3 or less at the monitoring point.

In addition to monthly indoor air sampling described in Section 4.1.13 of the 100% Remedial Design Report, PID screening of indoor air will be conducted on a weekly basis in Buildings 2, 3, and 11. Indoor air PID screening will be conducted both within and outside the extents of the respective Exclusion Zones. If PID results are greater than 5 ppm above background, then indoor air sampling (United States Environmental Protection Agency Analytical Method TO-15) will immediately be scheduled and conducted at the location with the exceedance. If the NYSDOH immediate action level is level for trichloroethene is exceeded, additional measures will be implemented as described in the 100% Remedial Design Report.

2.2 Action Levels

The action levels provided below will be used to initiate corrective actions, if necessary, based on real-time monitoring. Each piece of monitoring equipment will have alarm capabilities (audible and/or visual) to indicate exceedances of the action levels specified below.

2.2.1 Volatile Organic Compound Action Levels

As outlined in the NYSDOH Generic CAMP, if the PID reading for total VOCs downwind perimeter of the work area or the exclusion zone exceeds 5 ppm above background (i.e., upwind location) for the 15-minute average, work activities will be temporarily halted while monitoring continues. If the PID reading for total VOCs readily decreases (through observation of instantaneous readings) to below 5 ppm above background, then work activities can resume with continuous monitoring.

If PID readings for total VOCs at the downwind perimeter of the work area or exclusion zone persist at levels greater than 5 ppm but less than 25 ppm above background, work activities will be halted, the source of the elevated VOC readings will be identified, and corrective actions will be implemented to abate the emissions and monitoring will be continued. Work activities can then resume provided that the total VOCs at a location 200 feet downwind of the work area or exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure (whichever is less but in no case less than 20 feet) is less than 5 ppm above background for the 15-minute average.

All 15-minute average PID readings for total VOCs will be electronically logged and provided to NYSDEC and NYSDOH project managers for review. Instantaneous readings, if any, used for decision purposes will also be recorded. Exceedance of a CAMP action level and the corrective actions implemented will be reported to the NYSDEC and NYSDOH project managers within 12 hours of occurrence.

2.2.2 Particulate Action Levels

Particulates will be monitored continuously at the upwind and downwind perimeters of the work area or exclusion zone. As specified in NYSDOH's Generic CAMP, if the 15-minute average air particulate concentration at the downwind perimeter location is greater than 100 µg/m^3 above the 15-minute average background concentration), or if airborne dust is visually observed leaving the work area, then dust suppression measures will be implemented, and air monitoring will continue. Work activities may continue following the implementation of dust suppression measures, provided that the downwind air particulate concentration is not greater than 150 µg/m^3 above the upwind level and no visible dust is observed. If the air particulate concentration is greater than 150 µg/m^3 above the upwind concentration, work activities must be stopped and re-evaluated. Work activities may resume only if dust suppression measures and other corrective actions (e.g., implementation of controls) are successful in reducing the downwind air particulate concentration to less than 150 µg/m^3 above the upwind air particulate concentration and preventing visible dust migration. All air particulate concentration data will be logged and recorded as stated in Section 2.1.3 and will be made available to NYSDEC and NYSDOH project managers for review. Exceedance of a CAMP action level and the corrective actions implemented will be reported to the NYSDEC and NYSDOH project managers within 12 hours of occurrence.

2.3 Reporting

The Contractor or Arcadis shall prepare a daily summary of the 15-minute average community air monitoring results for particulates, and for VOCs if applicable. The summary shall also include, but not be limited to, a description of community air monitoring exceedances (if any), work activities associated with the exceedances, and corrective actions implemented to address the exceedance. Exceedance of a CAMP action level and the corrective actions implemented will be reported to the NYSDEC and NYSDOH project managers within 12 hours of occurrence.

The daily summaries will be submitted weekly in an electronic format to the following:

Table 1 – CAMP Contact List

Name	Affiliation	Contact Information
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Attachment 1

NYSDOH Generic CAMP

Appendix 1A
New York State Department of Health
Generic Community Air Monitoring Plan

Overview

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical- specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for VOCs and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate DEC/NYSDOH staff.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. “Periodic” monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or

overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

1. If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

2. If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

3. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

4. All 15-minute readings must be recorded and be available for State (DEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

2. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

3. All readings must be recorded and be available for State (DEC and NYSDOH) and County Health personnel to review.

December 2009

Appendix 1B
Fugitive Dust and Particulate Monitoring

A program for suppressing fugitive dust and particulate matter monitoring at hazardous waste sites is a responsibility on the remedial party performing the work. These procedures must be incorporated into appropriate intrusive work plans. The following fugitive dust suppression and particulate monitoring program should be employed at sites during construction and other intrusive activities which warrant its use:

1. Reasonable fugitive dust suppression techniques must be employed during all site activities which may generate fugitive dust.

2. Particulate monitoring must be employed during the handling of waste or contaminated soil or when activities on site may generate fugitive dust from exposed waste or contaminated soil. Remedial activities may also include the excavation, grading, or placement of clean fill. These control measures should not be considered necessary for these activities.

3. Particulate monitoring must be performed using real-time particulate monitors and shall monitor particulate matter less than ten microns (PM10) with the following minimum performance standards:

(a) Objects to be measured: Dust, mists or aerosols;
(b) Measurement Ranges: 0.001 to 400 mg/m3 (1 to 400,000 :ug/m3);
(c) Precision (2-sigma) at constant temperature: +/- 10 :g/m3 for one second averaging; and +/- 1.5 g/m3 for sixty second averaging;
(d) Accuracy: +/- 5% of reading +/- precision (Referred to gravimetric calibration with SAE fine test dust (mmd= 2 to 3 :m, g= 2.5, as aerosolized);
(e) Resolution: 0.1% of reading or 1g/m3, whichever is larger;
(f) Particle Size Range of Maximum Response: 0.1-10;
(g) Total Number of Data Points in Memory: 10,000;
(h) Logged Data: Each data point with average concentration, time/date and data point number
(i) Run Summary: overall average, maximum concentrations, time/date of maximum, total number of logged points, start time/date, total elapsed time (run duration), STEL concentration and time/date occurrence, averaging (logging) period, calibration factor, and tag number;
(j) Alarm Averaging Time (user selectable): real-time (1-60 seconds) or STEL (15 minutes), alarms required;
(k) Operating Time: 48 hours (fully charged NiCd battery); continuously with charger;
(l) Operating Temperature: -10 to 50^{o} C (14 to 122^{o} F);
(m) Particulate levels will be monitored upwind and immediately downwind at the working site and integrated over a period not to exceed 15 minutes.

4. In order to ensure the validity of the fugitive dust measurements performed, there must be appropriate Quality Assurance/Quality Control (QA/QC). It is the responsibility of the remedial party to adequately supplement QA/QC Plans to include the following critical features: periodic instrument calibration, operator training, daily instrument performance (span) checks, and a record keeping plan.

5. The action level will be established at 150 ug/m3 (15 minutes average). While conservative,

this short-term interval will provide a real-time assessment of on-site air quality to assure both health and safety. If particulate levels are detected in excess of 150 ug/m3, the upwind background level must be confirmed immediately. If the working site particulate measurement is greater than 100 ug/m3 above the background level, additional dust suppression techniques must be implemented to reduce the generation of fugitive dust and corrective action taken to protect site personnel and reduce the potential for contaminant migration. Corrective measures may include increasing the level of personal protection for on-site personnel and implementing additional dust suppression techniques (see paragraph 7). Should the action level of 150 ug/m3 continue to be exceeded work must stop and DER must be notified as provided in the site design or remedial work plan. The notification shall include a description of the control measures implemented to prevent further exceedances.

6. It must be recognized that the generation of dust from waste or contaminated soil that migrates off-site, has the potential for transporting contaminants off-site. There may be situations when dust is being generated and leaving the site and the monitoring equipment does not measure PM10 at or above the action level. Since this situation has the potential to allow for the migration of contaminants off-site, it is unacceptable. While it is not practical to quantify total suspended particulates on a real-time basis, it is appropriate to rely on visual observation. If dust is observed leaving the working site, additional dust suppression techniques must be employed. Activities that have a high dusting potential--such as solidification and treatment involving materials like kiln dust and lime--will require the need for special measures to be considered.

7. The following techniques have been shown to be effective for the controlling of the generation and migration of dust during construction activities:

(a) Applying water on haul roads;
(b) Wetting equipment and excavation faces;
(c) Spraying water on buckets during excavation and dumping;
(d) Hauling materials in properly tarped or watertight containers;
(e) Restricting vehicle speeds to 10 mph;
(f) Covering excavated areas and material after excavation activity ceases; and
(g) Reducing the excavation size and/or number of excavations.

Experience has shown that the chance of exceeding the 150ug/m3 action level is remote when the above-mentioned techniques are used. When techniques involving water application are used, care must be taken not to use excess water, which can result in unacceptably wet conditions. Using atomizing sprays will prevent overly wet conditions, conserve water, and provide an effective means of suppressing the fugitive dust.

8. The evaluation of weather conditions is necessary for proper fugitive dust control. When extreme wind conditions make dust control ineffective, as a last resort remedial actions may need to be suspended. There may be situations that require fugitive dust suppression and particulate monitoring requirements with action levels more stringent than those provided above. Under some circumstances, the contaminant concentration and/or toxicity may require additional monitoring to protect site personnel and the public. Additional integrated sampling and chemical analysis of the dust may also be in order. This must be evaluated when a health and safety plan is developed and when appropriate suppression and monitoring requirements are established for protection of health and the environment.

Appendix F

In Situ Thermal Remediation System Design Report

PREPARED FOR:

ARCADIS

In-Situ Thermal Remediation System Design Report – Draft Final

G.T.E Products Corporation, NYSDEC Site No. 850003

Former Philips Display Components Facility
Seneca Falls, New York

Mc²

In-Situ Thermal Remediation System Design – Draft Final

G.T.E Products Corporation, NYSDEC Site No. 850003

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Mc² McMillan-McGee

PREPARED FOR:

ARCADIS

September 4th, 2025

Engineering Certification

This document, *In-Situ Thermal Remediation System Design Report for the Former Philips Display Components Facility*, has been prepared under the supervision and control of the undersigned licensed Professional Engineer. The work and professional opinions rendered in this report were conducted or developed in accordance with commonly accepted protocols and procedures. If conditions are discovered that differ from those described, the undersigned engineer should be notified to evaluate the effects of any additional information on the assessment and recommendations in this document. This document was prepared to provide information for the former Philips Display Components facility in Seneca Falls, New York, and should not be construed to apply to any other site. Please note that the Alberta engineering certification below is provided in order to satisfy the requirements of the Province of Alberta, and in no way should be construed to infringe upon engineering law and regulations of any other jurisdiction.

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Through the engineering business of McMillan-McGee Corporation, APEGA Permit to Practice P09178

Executive Summary

McMillan-McGee Corporation (Mc²) has prepared this In-Situ Thermal Remediation System Design Report to present the details of an Electro-Thermal Dynamic Stripping Process (ET-DSP™) application for in-situ thermal remediation (ISTR) at the former Philips Display Components Facility in Seneca Falls, New York. The areas that were delineated for ISTR have an overall approximate extent of 6,350 square feet (ft²), across two areas of concern (AOC). The treatment depth extends from ground surface to bedrock, which is located approximately 35 feet below ground surface (ft BGS). The total estimated heated volume is approximately 11,900 cubic yards (yd³). The primary goal of the ISTR application is to remove residual trichloroethylene (TCE) dense nonaqueous phase liquids (DNAPL) and reduce the concentration of TCE in soil below 200 mg/kg within the TTZ.

During ISTR, 100 ET-DSP™ electrodes in 50 borings will be used to heat the TTZ to approximately 90 degrees Celsius (°C). The total energy input to the electrodes is expected to be approximately 2,250 megawatt-hours (MWh) over an estimated 180 days of operation, based on the supporting numerical simulation study. The average total rate of water injection to the electrodes is estimated to be 7.5 gallons per minute (gpm) during operation, which will maintain liquid contact at electrode surfaces and facilitate convective heat transfer within the TTZ.

Vaporized volatile organic compounds (VOCs) and steam generated due to elevated subsurface temperatures will be captured with a network of 23 deep multiphase extraction (MPE) wells, complete with downhole compressed air-assisted vacuum groundwater recovery tubes (i.e., slurper tubes) for multiphase extraction. A total vapor extraction rate of ~77 standard cubic feet per minute (scfm) under an applied vacuum of approximately 3 to 8 inches of mercury (inHg) will be targeted in order to maintain pneumatic control. The treatment system will be capable of up to 500 scfm to make adjustments to the total flow as required. An estimated total liquid extraction rate of 7.7 gpm will be targeted in order to provide hydraulic control. Extracted fluids will be processed and treated in an aboveground treatment system before discharge to atmosphere, discharge to storm sewer, and/or reinjection through the electrodes.

Performance monitoring during the ET-DSP™ application will include the deployment of 7 digital Temperature Acquisition Modules (digiTAM) temperature sensors strings, for measurements at 84 individual points in the subsurface. In addition, measurements of fluid flow, extracted VOC concentrations, and electrical power will be collected throughout operations. All data will be available on a secure webpage and project database for remote monitoring. Cumulative mass removal in the extracted fluids will be monitored, and after shutdown, confirmation sampling will be performed to ensure that performance goals are achieved.

Table of Contents

Engineering Certification i
Executive Summary ii
Table of Contents iii
List of Tables iv
Nomenclature vi

1. Introduction 1
1.1 Treatment Site and Location 1
1.2 Site Geology and Hydrology 1
1.3 Contaminant Distribution and Remedial Objectives 1
1.3.1 Contaminant Distribution 1
1.3.2 Thermal Treatment Objectives 2
1.4 Project Organization 3

2. Treatment Technology 6
2.1 ET-DSP™ Heat Transfer Mechanisms 6
2.2 ET-DSP™ Mass Removal Mechanisms 6
2.3 ET-DSP™ Subsurface Vapor Generation 8
2.4 ET-DSP™ Conceptual Design 9

3. Remedial Approach 11
3.1 Remedial Components 11
3.2 Supporting Design Studies 11
3.3 Technical Design Summary 12
3.4 Subsurface design 13
3.4.1 Target Zones 13
3.4.2 Electrodes 13
3.4.3 Extraction Wells 13
3.4.4 Sensor Wells 14
3.5 Aboveground Design 15
3.5.1 Extraction System 15
3.5.2 Treatment System 15
3.5.2.1 Liquid Treatment 15
3.5.2.2 Vapor Treatment 16
3.5.3 Chemical Compatibility 17
3.5.4 VOC Releases and Removal Efficiency 17
3.5.5 Injection System 17
3.5.6 Utility Requirements 18
3.6 Controls and System Monitoring 19
3.7 Sampling and Analysis 19

4. Construction Activities 22
4.1 Staging Equipment & Supplies 22
4.2 Subsurface Construction 22
4.2.1 Drilling Program Details 22
4.2.2 Underground Utilities 23
4.2.3 Aboveground Utilities and Infrastructure 24
4.2.4 Electrode Wells 24
4.2.5 Multiphase Extraction Wells 24
4.2.6 Horizontal Soil Vapor Extraction Wells 25

4.2.7 Sensor Wells 25
4.2.8 Vacuum Monitoring Wells 26
4.2.9 Shallow Vapor Extraction Wells 26
4.3 Above Ground Construction 26
4.3.1 Vapor Cap 26
4.3.2 Piping Systems 27
4.3.3 Power Supply and Electrical Connections 28
4.3.4 ET-DSP™ Neutral Connections 29
4.3.5 Treatment System 29
4.3.6 Site Security and Safety 29
4.3.7 Traffic Control 30
4.4 System Shutdown and Site Restoration 32

5. Operational Strategy 33
5.1 Pneumatic and Hydraulic Control 33
5.2 Aggressive Heating and Extraction 33
5.3 Performance Evaluation and Shutdown 33

6. Performance Monitoring 34
6.1 Subsurface Monitoring 34
6.2 Treatment System Monitoring 35
6.3 Vapor Temperature and Vacuum Monitoring 35
6.4 Confirmation Soil Sampling 35
6.5 Data Collection & Management 35
6.6 ET-DSP™ Control Systems 36

7. Summary and Conclusions 37

8. References 38

Appendix A – Design Drawings 40

Appendix B – Project Schedule 41

Appendix C – ET-DSP™ Numerical Simulation Report 42

Appendix D – Resistivity Testing Results 43

Appendix E – Equipment Cut Sheets 44

Appendix F – Equipment Cleaning/Changeout Checklists 45

Appendix G – Procedures 46

List of Tables

Table 1: Project organization 4
Table 2: Impact of increased temperatures on partitioning and fate of VOCs in the subsurface (adapted from United States Environmental Protection Agency (USEPA), 2004, and others) 7
Table 3: Project technical design summary 12
Table 4: Monitoring summary 20
Table 5: Drilling program 23

List of Figures

Figure 1: Selected temperature dependent properties of several chlorinated VOCs (data from Chen et al., 2012; NIST, 2016; Haynes et al., 2014) 7
Figure 2: General subsurface approach using ET-DSP™ (not to scale) 9
Figure 3 - Example Lift Station 28
Figure 4: Traffic Control Around AOC-1 31
Figure 5: Traffic Control at Process Corridor 31
Figure 6: Sample Subsurface Temperature Distribution Map 34

Nomenclature

Abbreviations

AOC	Area of Concern
AS	Air Stripper
BGS	Below Ground Surface
Biweekly	Once every two weeks
Cat5e	Category 5e
cis-1,2-DCE	cis-1,2-Dichloroethene
COC	Constituent of Concern
DNAPL	Dense Non-Aqueous Phase Liquid
digiTAM	Digital Temperature Acquisition Module
e.g.	Exempli Gratia (for example)
ESL	Electrical Single Line
ET-DSP™	Electro Thermal Dynamic Stripping Process
EQL	Equipment Layout
HDPE	High Density Polyethylene
IDS	Iminodisuccinic Acid
IDW	Investigation Derived Waste
i.e.	Id Est (that is)
IPS	Interphase Synchronization
ISTR	In-Situ Thermal Remediation
KCl	Potassium Chloride
LAN	Local Area Network
LGAC	Liquid-Phase Granular Activated Carbon
Mc²	McMillan-McGee Corp.
MPE	Multiphase Extraction
NAPL	Non-Aqueous Phase Liquid
Neat Cement Grout	Portland Type 1 or Type 2 Grout
NIST	National Institute of Standards and Technology
NPT	National Pipe Thread
NYSDEC	New York state Department of Environmental Conservation
O&M	Operations and Maintenance
OD	Outside Diameter
PCE	Tetrachloroethene
PDP	Power Distribution Panel
PDS	Power Delivery System
PEX	Cross-Linked Polyethylene
PFD	Process Flow Diagram
P&ID	Piping and Instrumentation Diagram
PID	Photoionization Detector
PIL	Piping Layout
POTW	Publicly Owned Treatment Work
PP	Polypropylene
PTFE	Polytetrafluoroethene

PVC	Polyvinyl Chloride
Semiweekly	Twice a week
SRGT	Silicone Rubber Glass Fiber Tube
SS	Stainless Steel
SVE	Soil Vapor Extraction
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
TBD	To Be Determined
TCE	Trichloroethene
TDCM	Time-Distributed Control Mechanism
the Site	Former Philips Display Components Facility
™	Trademark
TTZ	Target Treatment Zone
VC	Vinyl Chloride, Chloroethene
VGAC	Vapor-Phase Granular Activated Carbon
VOC	Volatile Organic Compound
WCD	Well Construction Diagram
WCS	Water Circulation System
WFL	Well Field Layout
WHD	Well Head Diagram

Units of Measurement

BTU	British Thermal Units
°C	Degrees Celsius
cm/s	Centimeter per second
°F	Degrees Fahrenheit
ft	Foot
ft²	Square Foot
ft³	Cubic Foot
ft/yr	Foot per Year
hr	Hour
in	Inch
inHg	Inches of Mercury
kVA	Kilovolt-Ampere
kW	Kilowatt
lbs	Pounds
MWh	Megawatt-Hour
scfm	Standard Cubic Feet per Minute
mg/kg	Milligrams per Kilogram
Ω·m	Ohm-meter

1. Introduction

McMillan-McGee Corporation (Mc²) has prepared this In-Situ Thermal Remediation (ISTR) System Design Report, at the request of Arcadis of New York, Inc. (Arcadis), to present the activities proposed for ISTR using an Electro-Thermal Dynamic Stripping Process (ET-DSP™) at the former Philips Display Components Facility in Seneca Falls (G.T.E Products Corporation, NYSDEC Site No. 850003), New York, hereinafter referred to as the "Site". The purpose of the ISTR application is to remove Trichloroethylene (TCE) and its breakdown products, along with other Contaminants of Concern (COCs), which is associated with a dense non-aqueous phase liquid (DNAPL), from the source zone delineated by Arcadis. The thermodynamic properties of the COCs present, as well as results from site-specific soil resistivity testing and numerical modeling, suggest that a combination of ET-DSP™ and Multiphase Extraction (MPE) is a viable approach for in-situ treatment at the Site.

1.1 Treatment Site and Location

The Site is located at 50 Johnston Street, Village of Seneca Falls, New York, and is approximately 64.2 acres in size. The Site is bordered to the south by the Cayuga Seneca Canal and otherwise surrounded by residential and undeveloped properties. The Site is zoned for light industrial use.

ISTR will be conducted across two areas of concern (AOC 1 and AOC 3). A detailed layout of treatment areas can be found in drawing **WFL-01 in Appendix A**.

1.2 Site Geology and Hydrology

Based on available information, the Site has unconsolidated soil throughout, with segments of urban fill typically 1 foot (ft) thick but can be as thick as 8 ft. Beneath the urban fill is a low permeability till layer up to 45 ft thick, which historical boring logs indicate is comprised of clay, fine gravel, and fine sand. The average measured hydraulic conductivity in this layer is approximately 4.8 x 10^{-4} and 6.6 x 10^{-5} centimeters per second (cm/s) for AOC 1 and 3 respectively. Limestone bedrock is found between approximately 30 to 35 ft below ground surface (BGS) within both AOCs.

The groundwater table at the Site is encountered at approximately 3 to 5 ft BGS. In general, groundwater flows towards the Caguya-Seneca Canal in a south-southwest direction.

1.3 Contaminant Distribution and Remedial Objectives

1.3.1 Contaminant Distribution

Soil, groundwater, and DNAPL samples were collected during the pre-design investigation. Sample results indicated that TCE and its breakdown products are the primary COCs driving the removal action at the Site.

As discussed in the Statement of Basis (NYSDEC. 2018), the primary COCs that will be targeted with ISTR are TCE and its breakdown products, including

cis-1,2- dichloroethene (cis-1,2-DCE).Based on observations of DNAPL a TCE concentration of 256 milligrams per kilogram (mg/kg) was used, the approximate volume that will be targeted for thermal remediation was delineated **(Drawing WFL-01, WFL-02 and WFL-03; Appendix A)**. The target treatment zones (TTZs) have an overall areal extent of approximately 6,350 square feet (ft^2): 3,750 ft^2 and 2,599 ft^2 for AOC 1 and 3 respectively. The vertical interval of the TTZ is to extend from surface to an average depth of 35 ft BGS at both AOCs. The total volume of the subsurface that will be heated is estimated to be 11,900 cubic yards (yd^3) across both AOCs. **(Drawing WFL-01, WFL-02 and WFL-03; Appendix A)**.

Available information indicated that another 20 VOCs had been detected at the Site, including chlorinated ethenes, chlorinated ethanes, chlorinated propanes, monocyclic aromatic hydrocarbons, and ketones, although at lower concentrations. To assist with the design of the ISTR system and associated extraction and treatment system components, Arcadis conservatively estimated that approximately 10,000 pounds (lbs.) of non-aqueous phase liquid (NAPL) could be present in designated ISTR areas. However, it is noted that this mass estimate may vary substantially from field conditions.

1.3.2 Thermal Treatment Objectives

1. The overall objective of the ISTR application at the Site is to remove DNAPL within AOCs 1 and 3, except that below remaining buildings (NYSDEC, 2018). Specific operational goals of the ISTR application are: Mc^2 will operate the ISTR system with the goal of achieving a minimum target temperature of 90°C or higher within 120 days of initiating ISTR operations (as measured by the in-situ temperature sensors).
2. After achieving the temperature goal, Mc^2 will operate the ISTR system with the goal of maintaining 90% of temperature sensors in the AOCs above 90°C for approximately 30 days and/or until asymptotic conditions in the CVOC mass removal rate are reached (average daily mass removal rate below 10% of peak for 10 days).
3. Mc^2 will operate the extraction and treatment system with the goal of maintaining greater than 95% uptime over the duration of ISTR operations. Scheduled well field sampling activities that result in less than 8 hours downtime will not be considered in the uptime calculation.
4. Mc^2 will operate the vapor treatment system with the goal of achieving 95% or better destruction and removal efficiency (DRE) throughout the duration of ISTR operations.
5. Mc^2 will operate the liquid treatment system with the goal of reducing COC concentrations in the liquid-phase discharge to levels that meet the applicable surface water discharge requirements.
6. The ISTR extraction and treatment system will maintain pressure gradients for pneumatic and hydraulic control within the AOCs.

Confirmation soil sampling will be conducted to verify that TCE concentrations are reduced below the site-specific treatment goal of 200 mg/kg within the ISTR treatment area.

1.4 Project Organization

GTE Operations Support Incorporated (GTEOSI) is the remediating party for the Site. Implementation of the ISTR work will be conducted by Mc2 under contract to GTEOSI. Mc2 and GTEOSI will also be supported by Arcadis during project implementation. **Arcadis is GTEOSI's engineering consultant. T**he general organization and roles of the parties involved are outlined in Table 1.Project Schedule

The preliminary baseline schedule for the ISTR application is presented in **Appendix B**.

Table 1: Project organization

Organization	Role	Contact	Role	Contact Information
NYSDEC	Regulatory Lead	Charlotte Theobald	Project Manager	585-226-5354 charlotte.theobald @dec.ny.gov
NYSDOH	Regulatory Lead	Julia Kenney	Project Manager	Julia.kenney@health.ny.gov
GTEOSI	Remediating Party	Matthew Walsh	Project Manager	908-559-3691 matthew.walsh@verizon.com
Arcadis	Engineering Consultant	Mark Flusche	Project Manager & Technical Lead	(W) +1 518-250-7322 mark.flusche@arcadis.com
		David Rodriguez	Associate PM & Technical Support for ISTR	david.rodriguez@arcadis.com
		Christopher Davern	Technical Support for Overall Remedy	Christopher.Davern @arcadis.com
		Chris Kalinowski	Technical Support for ISTR	Chris.Kalinowski@ arcadis.com
		Paul Hegele	Technical Support for ISTR	Paul.Hegele@arcadis.com
McMillan-McGee Corp. (Mc²)	ET-DSP™ Thermal Contractor	Brent Winder	Vice President	(W) +1 403-569-5100 (M) +1 403-589-8726 bwinder@mcmillan-mcgee.com
		David Rountree	Chief Engineer	(W) +1 403-569-5116 (M) +1 403-921-0848 drountree@mcmillan-mcgee.com
		Clayton Campbell	V.P of engineering	(W) +1 403-569-5104 (M) +1 403-869-7645 ccampbell@mcmillan-mcgee.com
		Danielle Parks	Project Engineer	(M) +1 403-988-3325 dparks@mcmillan-mcgee.com
		Wayne Robella	Operations Manager	(W) +1 403-569-106 (M) +1 403-461-1669 wrobella@mcmillan-mcgee.com

Organization	Role	Contact	Role	Contact Information
		Teresa Tang	Corporate Accountant	(W) +1 403-569-5105 ttang@mcmillan-mcgee.com
Terra Testing	Drilling Contractor	Eric Hajek	President	(W) ehajek@terratestinginc.com
To Be Determined (TBD)	Electrical Contractor	TBD	Project Manager	TBD
Mc^2 USA or Partner	System Operations	TBD	Operator	TBD

2. Treatment Technology

A full-scale ET-DSP™ application is proposed to be implemented for ISTR at the Site. VOC vapors produced in the subsurface will be captured with MPE and horizontal vapor extraction wells and processed in an aboveground treatment system before discharge. ET-DSP™ is a patented electrothermal technology (United States patent number 6,596,142; Canadian patent number 2,341,937) where the power input to individual electrodes is controlled and water recirculation is used to facilitate convective heat transfer. These processes can result in a more uniform temperature distribution earlier into an application than other ISTR technologies (McGee and Donaldson, 2009).

2.1 ET-DSP™ Heat Transfer Mechanisms

Field applications of ET-DSP™ use a Power Delivery System (PDS) to direct low frequency (60 Hertz) three-phase electrical power to a network of subsurface electrodes. Adjacent electrodes are 120° out of phase such that gradients in electric potential are induced, which causes current conduction and resistive heat dissipation throughout the TTZ. The power dissipated by electrical resistance heating is proportional to the inverse of the radius squared from each electrode (McGee and Donaldson, 2009). Water injection at the electrodes during ET-DSP™ compensates for this non-uniform power distribution by increasing convective heat transfer, which propagates heat further from the electrodes into the subsurface. Conductive heat transfer also occurs as a result of the temperature gradients induced during heating. The transient temperature distribution during ISTR is dictated by the conservation of energy, which can include conduction, convection, electrothermal, phase change and heat accumulation terms (McGee and Vermeulen, 2007).

2.2 ET-DSP™ Mass Removal Mechanisms

At elevated temperatures, vaporization, volatilization, dissolution and desorption are enhanced, such that conditions are more favorable for the removal of VOCs from the subsurface (e.g., USACE, 2009; Triplett Kingston et al., 2014). These mechanisms are described by the temperature dependence of the vapor pressures, Henry's law constants, solubilities and soil-water partition coefficients for the fluids in question, respectively (e.g., **Figure 1; Table 2**). In addition, liquid viscosities, NAPL-water interfacial tensions and densities decrease at elevated temperatures, which can make NAPLs more mobile for extraction.

Vaporization (i.e., boiling of immiscible VOCs and groundwater) and volatilization (i.e., partitioning of VOCs from the liquid phase to the gas phase) are the most dominant mass removal mechanisms during ET-DSP™. For example, the vapor pressures and Henry's law constants of tetrachloroethene (PCE), TCE, cis-1,2-DCE, and VC increase approximately 10- to 30-fold from ambient to near-boiling temperatures **(Figure 1)**. MPE and horizontal vapor extraction wells (referred to collectively herein as "extraction wells") are used to capture the gas that is produced for ex-situ processing and treatment. The

accurate development of a detailed geological and hydrogeological site conceptual model informs this design.

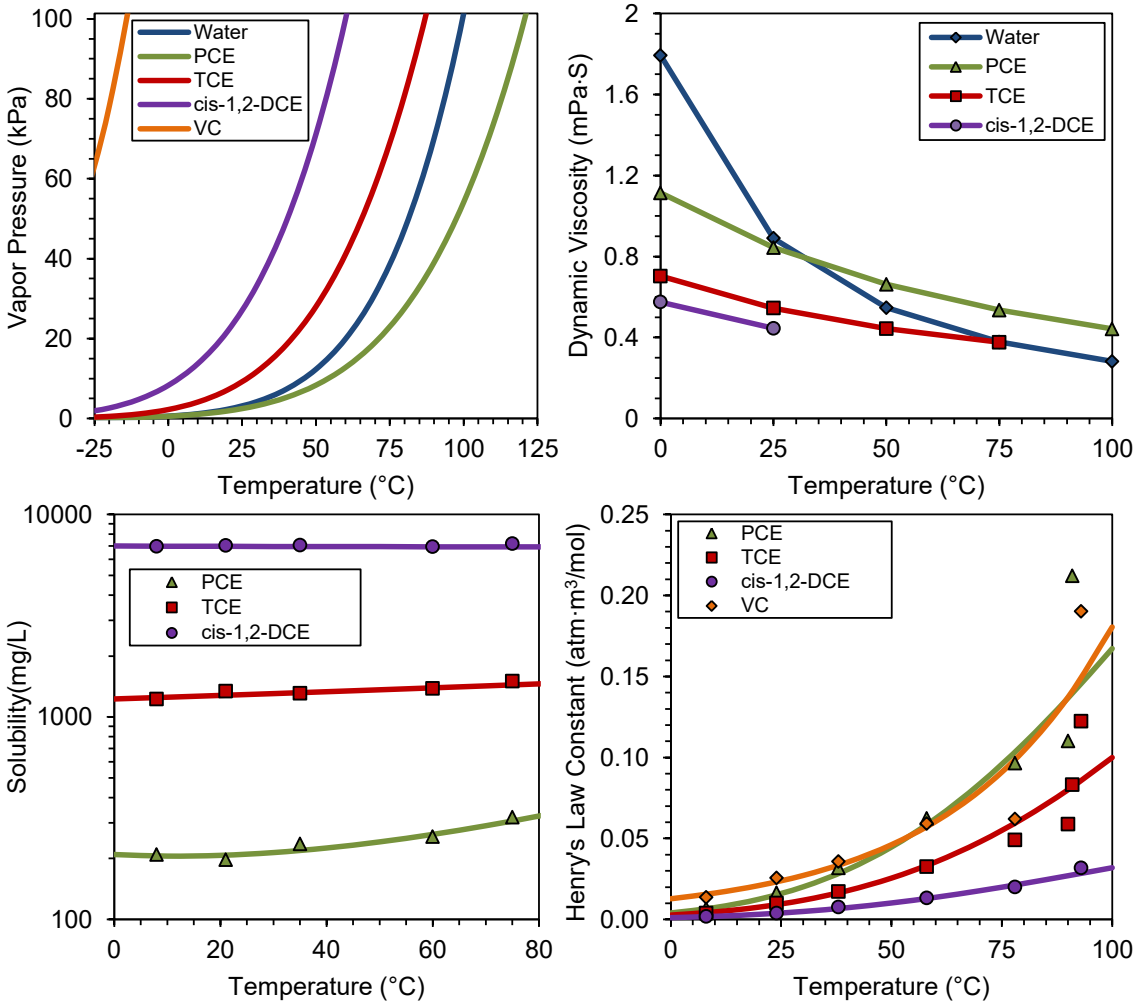


Figure 1: Selected temperature dependent properties of several chlorinated VOCs (data from Chen et al., 2012; NIST, 2016; Haynes et al., 2014)

Table 2: Impact of increased temperatures on partitioning and fate of VOCs in the subsurface (adapted from United States Environmental Protection Agency (USEPA), 2004, and others)

Item	At Increased Temperature	Impact on Partitioning or Transport
Vapor Pressure	Increases	Increased vaporization of water and NAPL
Henry's law constant	Increases	Increased volatilization of dissolved VOCs
Solubility in water	Increases	Increased dissolution of NAPL
Soil-water partition coeff.	Decreases	Decreased sorption of VOCs to soils
Liquid density	Decreases	Upwards transport of dissolved VOCs
Liquid viscosity	Decreases	Increased mobility of continuous NAPL
Interfacial tension	Decreases	Increased mobility of discontinuous NAPL

Item	At Increased Temperature	Impact on Partitioning or Transport
Gas diffusivity	Increases	Increased diffusion of VOC vapors
Liquid diffusivity	Increases	Increased diffusion of dissolved VOCs

2.3 ET-DSP™ Subsurface Vapor Generation

The placement and operation of ET-DSP™ electrodes and extraction wells are designed such that sufficient temperatures will be achieved to vaporize COCs in the source zone. Vaporization occurs when the total gas pressure, given as the sum of the partial vapor and dissolved gas pressures, exceeds the sum of the ambient atmospheric, hydrostatic and capillary pressures. Consequently, boiling points increase with depth below the water table and vary with lithology.

When NAPL is present, gas production first occurs at the co-boiling (i.e., steam distillation, heteroazeotrope) temperature, as vapor pressures are additive at immiscible fluid interfaces (e.g., Dalton's Law). Fractional distillation theory governs the composition of the vapor phase. Co-boiling continues until all of the NAPL vaporizes, and capture of the resulting vapors can represent a significant amount of the total VOC mass extracted. For multicomponent NAPL mixtures, the more volatile components vaporize preferentially (e.g., Raoult's Law), and both the composition of the NAPL and the co-boiling temperature change over time (e.g., Zhao et al., 2014). Gas bubbles are generated at NAPL-water interfaces during co-boiling and propagate upwards as buoyancy forces overcome capillary trapping forces. Subsurface heterogeneities in permeability (e.g., Munholland et al., 2016), resistivity (e.g., Martin et al., 2016), and transient temperature distribution (e.g., Hegele and Mumford, 2014) will influence the path of co-boiled vapor bubbles towards extraction points below the water table.

Continued temperature increase to the groundwater boiling point generates a significant amount of steam throughout the subsurface, which facilitates the transport of any remaining VOC vapors towards extraction wells. In addition, steam generation allows for increased volatilization and dynamic stripping of dissolved constituents, which can be an important mechanism to reduce VOC concentrations in the source zone.

Gas transport during ET-DSP™ is influenced by pressure gradients resulting from the vacuum applied at subsurface extraction wells. A proper vapor cap provides a no-flow boundary condition at the top of the treatment zone, which assists with vapor flow through the vadose zone towards extraction wells. In lower permeability media, steam has the potential to enhance the secondary porosity of the formation for bubble flow as an additional transport mechanism for VOC mass towards extraction wells (e.g., McGee et al., 2004; Liu et al., 2014).

In the final stages of operation, pulsed operations can be performed as a strategy to create new gas pathways and remove mass in regions where vapors might be trapped. This technique involves varying individual electrode power inputs and applied vacuums such that regions of the subsurface are repeatedly pressurized and depressurized.

Subsurface temperatures are monitored in real time during an ET-DSP™ application in order to identify the vapor generation response (i.e., changes in the rate of temperature increase, indicating regions of sensible or latent heat absorption), as well as to inform the operation of the electrodes and Water Circulation System (WCS) units.

2.4 ET-DSP™ Conceptual Design

The conceptual schematic shown in **Figure 2** illustrates the main subsurface processes that are involved in an ET-DSP™ application.

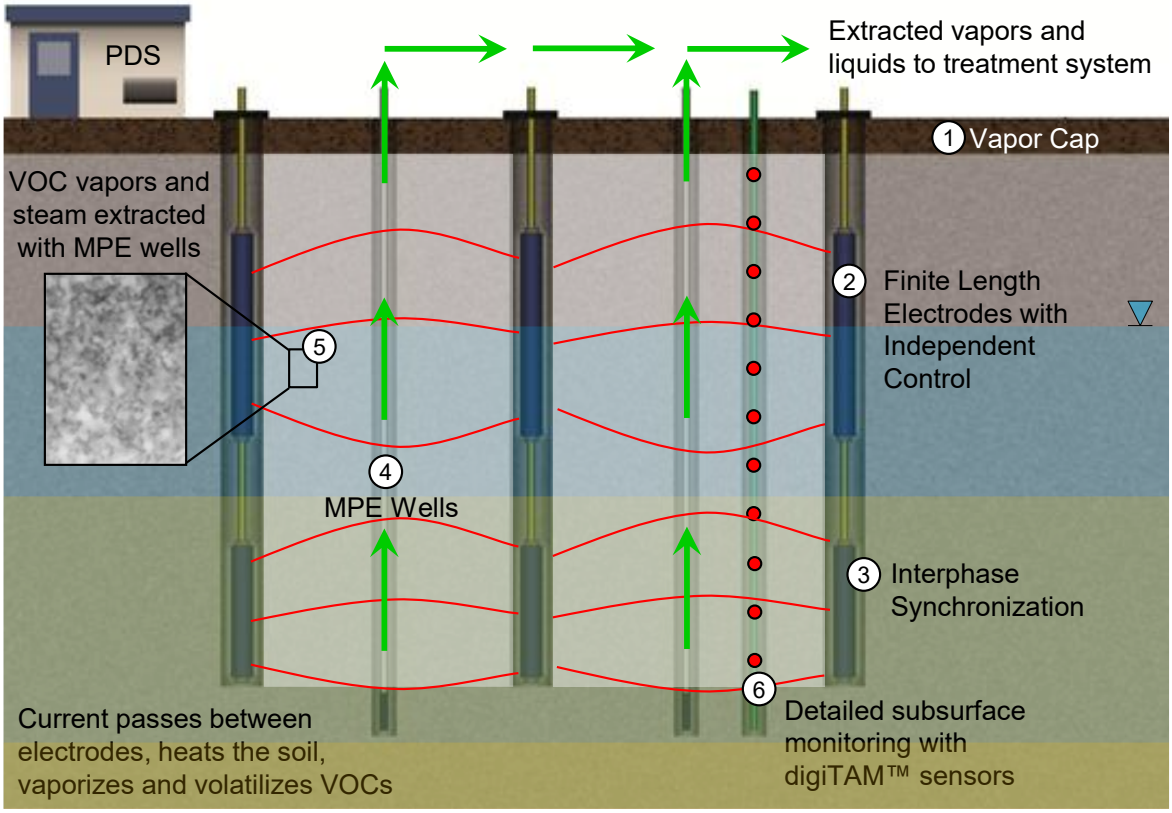


Figure 2: General subsurface approach using ET-DSP™ (not to scale)

Element 1: The treatment area is covered with a vapor cap that may consist of concrete, asphalt, cellular concrete, insulation, geomembrane, and/or geotextile surfaces. The combination of materials selected depends on site-specific considerations (e.g., the target R-value). The vapor cap is critical for maximizing vapor capture and minimizing heat losses in the vadose zone. It also limits infiltration and short-circuiting during soil vapor extraction.

Element 2: Finite length electrodes with independent control are stacked in vertical boreholes to conduct electric current throughout the vertical extent of the TTZ. The applied electric field accelerates charge carriers in the pore water, which results in the kinetic energy transfer that causes resistive heat dissipation. The use of stacked electrodes can improve performance

associated with the preferential flow of current through more conductive lithologies.

An important element of ET-DSP™ involves the injection of water at the ends of the electrodes, which facilitates convective heat transfer, mitigates the dipole effect, and maintains liquid contact at the electrode surface to avoid decreased power input associated with resistive conditions during gas production. Injected water that vaporizes also enhances the dynamic stripping process. This approach can result in a more uniform temperature distribution throughout the TTZ and enable fluid transport towards the extraction wells.

Element 3: The electric field and current path between electrodes can be controlled using Interphase Synchronization (IPS) and the electric power input to the electrodes can be varied by operators using Time-Distributed Control Mechanism (TDCM). These tools can help promote the development of a more uniform temperature distribution during ET-DSP™ operations, especially when spatial differences in electrical, thermal and hydraulic properties are encountered within a heterogeneous TTZ.

Element 4: Multiphase extraction wells are used to capture fluids for aboveground treatment and discharge. Downhole slurper tubes are operated at sufficient extraction rates to provide a degree of hydraulic control, and also function as a mechanism to capture both continuous NAPL and dissolved VOCs. At this project, horizontal vapor extraction wells will be installed in order to help ensure adequate pore volume exchanges are achieved. These are not represented in the conceptual subsurface model above.

Element 5: VOC vapors and steam are created at elevated temperatures in the TTZ. Sufficient local and macroscopic connection of nucleated vapor causes bubble and/or channel flow upwards towards the vadose zone and towards extraction wells for capture. Continuous operation of the extraction wells at sufficient vacuums will capture vaporized VOCs and steam for pneumatic control.

Element 6: Continuous remote data monitoring of temperature using digiTAM sensors will allow operators to respond in real time to transient subsurface conditions. Live data will be available on a dedicated web page and project database.

3. Remedial Approach

The TTZ delineated at the Site is proposed to be targeted with a combination of ET-DSP™, MPE, and horizontal vapor extraction. This design is based on fundamental thermodynamic principles, the results of the numerical simulation, the results of the soil resistivity tests, lessons learned from previous projects, and the remedial objectives outlined in **Section 1.3**.

3.1 Remedial Components

The design elements for the thermal remediation of the Site are presented in **Table 3**. Key features are summarized as follows:

1. Fifty (50) electrode locations, each with 2 electrodes deployed, for a total of 100 electrodes;
2. Twenty-three (23) MPE wells;
3. Approximately 410 ft of horizontal soil vapor extraction (SVE) wells; and,
4. Seven (7) temperature sensor well locations, each with a digiTAM sensor string deployed. Each digiTAM string will have individual temperature sensors set at 3.28 ft intervals, for a total of 84 sensors.

Extracted COCs in the vapor, liquid, and dissolved phases will be directed towards an aboveground treatment system, which is specifically designed for the COCs, emissions requirements, and flow rates anticipated for ISTR at the Site. The treatment system will include air stripper(s) (AS), liquid granular activated carbon (LGAC), sacrificial vapor granular activated carbon (VGAC), blower, pump, air compressor, holding tank, cooling, chiller, and heat exchanger units.

3.2 Supporting Design Studies

A numerical simulation study **(Appendix C)** was performed to finalize specific ET-DSP™ design and operational parameters, such as:

1. Electrode sizes, depth intervals, and spacing;
2. Average and peak power input requirements;
3. Energy and water budgets;
4. Liquid injection and extraction rates; and,
5. Expected rates of temperature increase.

Results from the numerical modeling study inform the technical design parameters that are summarized herein.

Soil resistivity testing **(Appendix D)** was performed to generate input parameters for the numerical model. Soil resistivity is important as it is inversely proportional to electrical heating power density, and it can vary spatially and temporally within a heated domain (e.g., McGee and Vermeulen, 2007). Results from static and dynamic temperature testing, on soil samples collected just outside of the target treatment area by Building 11, indicated soil resistivities that range from 14.2 to 92.1 ohm·meters (Ω·m) at ambient

temperature, which decrease by a factor of 1.89 when heated to near-boiling temperatures.

3.3 Technical Design Summary

A summary of the proposed technical design is presented in **Table 3**.

Table 3: Project technical design summary

Item	Description	Comments
Site Characteristics		
Treatment Area	3,750 + 2,599 ft^2	AOC 1 and AOC 3 respectively. Based on Well Field Layout (**Appendix A**).
Heated Volume	~11,900 yd^3	
Vertical Extent of Heating	0 to 35 ft BGS	Averages 33.2 ft BGS and ranges from 31.6 to 35.0 ft BGS
Depth to Groundwater	3 to 5 ft BGS	Based on available information
Constituents of Concern	CVOCs	Primarily TCE, others present in small quantities
Remedial Goals	200 mg/kg DNAPL Removal	TCE concentration
Soil Resistivity	14.2 – 92.1 Ω·m	Expected range based on soil testing at the Site
Remedial Approach		
Power Delivery Systems	2 × 1,330 kilovolt-ampere (kVA)	ET-DSP™ internet power control, 480 V primary, multi-tap secondary
ET-DSP™ Electrodes	100	12 ft length × 8 in diameter; ET-DSP™ design; 2 per boring
Electrode Spacing	18.0 ft	Field tolerance of ±1.5 ft deviation
Top of Shallow Electrode	3.0 ft BGS	Conductive heat transfer from deeper zone will heat from 0 to 3.0 ft BGS.
Bottom of Deep Electrode	35.0 ft BGS	Dependent on encountered bedrock depth
Cumulative Electrode Input Energy (total for both treatment areas)	2,251 MWh	Based on numerical simulation; does not include ancillary energy
Average Power Input	520 kilowatts (kW)	Based on numerical simulation; peak power input of approximately 800 kW
Target Temperature	90°C	
digiTAM Sensors	84	7 locations, 12 individual sensors spaced vertically at 3.28 ft intervals at each well
Vapor Cap	12,675 ft^2	~10” cellular concrete with hard wearing surface, 450kg/m3, >R10, combined areas
MPE Wells	23	4” SS304 cont. wire wrap well screen, 0.006” slot size, C/W slurp tubes, screen interval is approximately35-3’ BGS but depends on the bedrock depth
Horizontal Vapor Extraction Wells	~410 linear ft	2” fiberglass well screen set ~2.0’ BGS, 0.020” slot
Vapor Recovery Air Flow	77 scfm	Assumes 5’ vadose and >10 PVX/day

Liquid Extraction Rate	7.7 gpm	Combined liquid and condensate.
Vapor Treatment	VGAC	Vapor granular activated carbon
Liquid Treatment	AS/LGAC	Air stripper and liquid granular activated carbon

3.4 Subsurface design

3.4.1 Target Zones

The areal extent of heating will correspond to the horizontal placement of the ET-DSP™ electrodes shown in the well field layout details **(WFL-02 and WFL-03, Appendix A)**. This areal extent will encompass the TTZ. The vertical extent of the full-performance heating will extend from the immediate surface, to top of bedrock, ranging from approximately 30 to 35 ft BGS, in both the AOC 1 and 3 TTZs. The depth interval informs the vertical placement of the ET-DSP™ electrodes, shown in the well construction details **(Drawing WCD-01 and WCD-04, Appendix A)**. Substantial heat transfer generally extends approximately 3 ft above and just below the ends of each electrode. The top of the uppermost electrode in each borehole will be set at a minimum depth of 3.0 ft BGS.

3.4.2 Electrodes

A total of 100 electrodes will be installed in 50 borehole locations to depths of between 3.0 and 35.0 ft BGS, depending on the depth of the bedrock. The electrodes will be configured as shown in the well field layout details **(Drawing WFL-02 and WFL-03, Appendix A)** and constructed as shown in the electrode well construction details **(Drawing WCD-01 and WCD-04, Appendix A)**. Twelve ft long by 8-inch (in) diameter electrodes will be used. The electrodes will be installed approximately 18 ft apart in a triangular pattern, with a field tolerance of ±1.5 ft deviation from the grid pattern. All vertical wells constructed out of conductive material (e.g., steel) will be at least 7 ft from any electrode location, and all horizontal vapor extraction wells will be constructed out of non-conductive material (e.g., fiberglass) to minimize interference with the electrodes.The average electrode power input during ET-DSP™ operations is expected to be approximately 520 kW (5.21 kW per electrode) over the 180 days estimated for remediation, with a peak electrode power input of approximately 800 kW (7.98 kW per electrode) during the initial stages of the project. Electrode power input will be optimized throughout operations based on the observed rate of temperature increase in the subsurface. Once the target temperature is achieved within all depth intervals, electrodes can be placed into a maintenance mode, during which the electrode power input is reduced while maintaining target temperatures.

3.4.3 Extraction Wells

A total of 23 deep MPE wells, complete with compressed air assisted vacuum-lift groundwater recovery (i.e., slurper) tubes, will be installed throughout the TTZ **(Drawing WFL-01, WFL-02 and WFL-03, Appendix A)**. These MPE wells will have the top-of-screen at 3.0 ft BGS, and will have the bottom-of-

screen at 35.0 ft BGS, to provide a means to capture vaporized VOCs and steam from both the saturated and vadose zones **(Drawing WCD-01 and WCD-04, Appendix A)**. MPE wells will be completed with a 1.5 ft bottom sump for silt management. In order to optimize convective heat transfer and maximize VOC capture throughout the TTZ, MPE wells will be located in areas where electrical resistance heating power densities are lowest (i.e., furthest from the electrodes). ISTR wells within Johnston Street in AOC 1 will be completed below ground surface in vaults, and connection lines will be trenched back to the north of the perimeter fence line before transitioning above grade. Specific configurations are detailed in drawings (**WCD-03 and WCD-04, Appendix A**).

When the water table is relatively shallow, the maximum vacuum that may be applied in the vadose zone is often limited due to upwelling of the groundwater table. Excessive groundwater production, either (i) due to upwelling under the applied vacuum or (ii) as a result of increased liquid extraction to compensate for upwelling, can result in significant thermal losses outside of the assumptions inherent to the numerical simulation. To help minimize the impact of groundwater upwelling, 410 linear feet of shallow horizontal vapor extraction well screen will be installed above the water table within the treatment areas **(Drawing WFL-02 and WFL-03, Appendix A)**. Horizontal vapor extraction well construction details can be found in **(Drawing WCD-02, Appendix A)**. Horizontal vapor extraction wells of this arrangement maximize vapor flow in the vadose zone while limiting groundwater production.

The total vapor recovery airflow in the vadose zone is estimated to be approximately 77 scfm, or ~3 scfm per MPE well, in order to target a minimum of ten volumes of soil vapor exchange per day. The proposed horizontal vapor extraction wells and SVE wells are expected to increase the overall vapor extraction rate. The overall vapor extraction rate from the well field, and from individual extraction wells, will be controlled to prevent excessive heat loss.

The existing concrete surface and cellular concrete additions will serve as a vapor barrier to mitigate short-circuiting of ambient air into the MPE wells, fugitive VOC emissions, and heat losses due to thermal conduction and infiltration.

3.4.4 Sensor Wells

A total of 7 sensor well locations, with digiTAM strings deployed downhole, will be used to monitor subsurface temperatures within the TTZ. The sensor wells will be configured as shown in the well field layout details **(Drawing WFL-02 and WFL-03, Appendix A)** and constructed as shown in the well construction details **(Drawing WCD-01, WCD-03 and WCD-04, Appendix A)**.

The digiTAM sensors will acquire point measurements of temperature at depth intervals of 3.28 ft in each sensor well, for a total of 84-point measurements throughout the Site. Temperature contour maps will be generated from these data to assess the relative magnitude of the various subsurface heat transfer processes, which in turn can inform operators of potential adjustments to the ET-DSP™ system.

These electronic sensors use a digital communications protocol and have a maximum working temperature rating of 127°C. The digiTAM strings have temperature sensors spaced at 1m vertical intervals. Equipment cutsheets are presented in **Appendix E**.

DigiTAM are integrated with Mc2's onsite local area network (LAN). The data acquired from these sensors will be monitored as part of the overall data acquisition strategy for the thermal project.

3.5 Aboveground Design

3.5.1 Extraction System

Compressed air assisted vacuum-lift groundwater recovery slurper tubes will be used for the extraction of groundwater and DNAPL. The liquid extraction rate will be managed to maintain an extraction/injection ratio of approximately 1.025. Assuming that water will be injected at the electrodes at a cumulative rate of approximately 7.5 gpm, the target liquid extraction rate will be approximately 7.7 gpm. The treatment system will be sized to accommodate a substantially larger flow (i.e., with a safety factor of 1.5 or greater) as contingency. Individual liquid extraction rates from the slurper tubes will be assessed and adjusted by modifying the applied vacuum, compressed air assist supply frequency, compressed air assist pressure (20 to 30 PSI), compressed air assist channel configurations, tube intake depth below the groundwater table, and/or dilution air at each MPE well. The slurper tubes will be grouped and controlled in zones, typically 7 slurper tubes per zone. Extraction rates at individual MPE wells will vary over the course of ISTR, in particular as the water table elevation varies, as phase change occurs, or if the secondary porosity of lower permeability media is enhanced.

The extraction system will use a vacuum pump (blower) to provide the driving force for vapor extraction and conveyance of extracted vapors and liquids through the piping network to the treatment system. This blower will be capable of providing a high vacuum of 3 to 8 in. Hg at the design flow rate of around 77 SCFM. The vapor recovery line will connect to liquid/vapor separators and heat exchangers to capture entrained liquids and condensate before being processed through the vapor side of the treatment system.

3.5.2 Treatment System

3.5.2.1 Liquid Treatment

Groundwater and mobile NAPLs will be extracted at the MPE wells using 23 slurper tube assemblies, providing comprehensive well field control. The slurper tubes will collect liquids entrained as droplets in the vapor stream. These will be removed in the first liquid/vapor separator. Vaporized water, extracted as steam, will also be collected as condensate in the piping network and treatment system. Additional slurper tubes in horizontal extraction wells will keep them clear of groundwater and condensate for unimpeded vapor extraction.

Recovered liquids will be treated through a silt separator to settle solids, then through a three-phase coalescing separator to separate light NAPL, water, and DNAPL at elevated temperatures. NAPLS will be skimmed off, and water will be air stripped and polished through filters and activated carbon to reduce VOC concentrations below that required of NYSDEC Class A Surface Water Standards. The treated water will be temporarily containerized in a 10,000-gallon double-walled holding tank prior to the initial re-injection of this treated water to the electrodes or discharge of this treated water to the storm sewer. The initial batch of water will be tested to ensure the treatment system produces water that meets the required standards. To the extent practical the treated water will be re-injected to the electrodes to maximize energy efficiency of the ET-DSP process.

Silt sludge will settle and dewater before being containerized for disposal. Water from the settling tank will be processed through the liquid treatment system prior to discharge or re-injection. Off-gas from the air-stripper will be processed through the vapor treatment system prior to discharge to atmosphere.

The groundwater process stream may require chemical additives to prevent excessive scale formation and/or biogrowth. Typical additives include glutaraldehyde for preventing biogrowth and iminodisuccinic acid (IDS) for iron and calcium sequestration (scale formation prevention). This system will have the equipment to handle any chemical additives determined necessary for use during operations. Accordingly, regulatory pre-approval for these or similar additives will be obtained from USEPA Region 2 (notification to NYSDEC as well) to avoid delays in implementing these additive regimes, if necessary, as biogrowth or scaling can greatly complicate groundwater process stream treatment.

3.5.2.2 Vapor Treatment

Contaminant- and steam-laden vapors will be removed from the subsurface using a network of MPE and horizontal vapor extraction wells. The hot vapors will be routed from the wells to schedule 10/20 steel lateral piping via high-temperature, contaminant-resistant cross linked polyethene (PEX) hose, connecting to a steel trunk conveyance line that leads to the treatment system.

The extracted vapors will go through liquid/vapor separators, heat exchangers to cool and remove moisture, and another separator to remove additional liquids. A variable speed vacuum blower equipped with an air filter will provide the required vacuum and flow.

After the vacuum pump discharge, the vapors will be near 90°C and then cooled through a second heat exchanger to reach 25°C and <50% relative humidity. This process optimizes the vapor stream for contaminant absorption by the activated carbon system, allowing for efficient treatment.

The vapors will be treated via two sacrificial vapor phase granulated activated carbon (VGAC) before being discharged to atmosphere, and a third standby VGAC vessel will be available in case a rapid changeout is needed. The

sacrificial carbon units will be installed such that they can be easily swapped out as necessary to maintain treatment efficiency.

3.5.3 Chemical Compatibility

Materials that will be used in the extraction and treatment system include carbon steel (well riser and piping), stainless steel (SS) (well screen and selected treatment system parts), bronze, aluminum and fiberglass (green thread), polytetrafluoroethene (e.g., PTFE, Teflon™) and Viton™. These materials are specified because of their resistance to a wide variety of chemicals at elevated temperature, and have been successfully used at previous ET-DSP™ projects.

Vapors that have been cooled, dried, and/or treated may be conveyed by high density polyethylene (HDPE) and/or polypropylene (PP) pipe. In the state and concentrations anticipated, the contaminants will have no practical effect on these materials. Similarly, treated groundwater may be stored in polyethylene tanks, again with no practical deleterious effect.

3.5.4 VOC Releases and Removal Efficiency

It is estimated that greater than 90% of the total VOC mass removed from the subsurface will be mixed with soil gas in the vapor phase, which will be treated with the VGAC before discharge. It is estimated that less than 10% of the total VOC mass removed from the subsurface will be in the condensate, dissolved, or NAPL phases, which will be treated with the oil/water liquid phase separator, air stripper and LGAC units before discharge. Any recovered NAPL will be containerized for disposal. Samples will be collected for analysis of VOCs on a bi-weekly (or more frequent) basis from the influent and effluent of the vapor and liquid treatment systems to assist with evaluating treatment efficacy. Daily (weekday) photoionization detector (PID) readings will also be collected from the vapor treatment system components to further support the evaluation of the vapor treatment system efficacy.

All tanks containing VOCs or untreated water will be held under vacuum to control fugitive emissions. Lines from various treatment tanks will be connected to the inlet silt knockout tank, and vacuum will be applied to scavenge accumulated liquid as required. All tanks will also have individual vacuum relief valves as a safety precaution. Additionally, all valves, flanges, and pipe joints shall be monitored periodically via use of a handheld PID during routine inspections to monitor for fugitive VOC emissions. Furthermore, any liquid process vessels will have secondary containment.

3.5.5 Injection System

Treated water will be injected at each electrode to enhance convective heat transfer within the TTZ, mitigate the dipole effect, and maintain liquid contact at each electrode surface in order to avoid breaking the electrical circuit. Each electrode will be equipped with both top and bottom water injection lines, which will deliver water from the WCS units to the subsurface through laser-cut injection slots, as shown in the electrode well construction details **(Drawing WCD-01, Appendix A)**. The shallowest electrode in each borehole will be

equipped with a water return line – which has a spring check valve to prevent back flow – to prevent overpressure conditions as needed. The average total injection rate into the electrodes will be 7.5 gpm (average 0.075 gpm per electrode) but is expected to be variable during operations. Potable water and/or recirculated water from the treatment system will be used to supply the WCS units and ET-DSP™ electrodes. WCS cutsheets are presented in **Appendix E**.

In the event that resistive conditions are encountered in the subsurface, a potassium chloride (KCl) or equivalent electrolyte solution can be injected via a bag filter assembly placed in line with the WCS units. This will increase the electrical conductivity of the subsurface (e.g., as described by Archie's Law), which in turn increases the power density of electrical resistance heating dissipated in the subsurface (e.g., McGee and Vermeulen, 2007). Note that electrical conductivities are also temperature dependent and can increase approximately threefold over an approximate 100°C temperature increase, such that the benefits of KCl injection are most dramatic during the early stages of operations. If injected, KCL concentrations throughout the Site will be maintained at levels below drinking water standards. Pre-approval to inject the KCL solution will also be obtained from USEPA Region 2.

3.5.6 Utility Requirements

3.5.6.1 Electrical

The electrical usage requirement for this ET-DSP™ application is expected to be approximately 2,250 MWh for the electrodes, and approximately 200 MWh for the aboveground equipment, over an estimated 180 days of operations based on the numerical simulation study. The power requirement for the Site is expected to be satisfied by an 1,800 kilovolt-ampere kVA service. A detailed description of the electrical service, grounding plan and cable network can be found in the electrical single line diagram **(Drawing ESL-01, Appendix A)**. PDS cutsheets are presented in **Appendix E**.

A 160-kW backup generator with an automatic transfer will also be installed to ensure that the extraction and treatment system can continue to operate for emissions compliance in the event of a temporary power outage. In such a scenario, the electrodes would remain off until the utility power supply is restored.

3.5.6.2 Water

The water usage requirement is expected to be approximately 7.5 gpm, or 0.075 gpm per electrode, over an estimated 180 days of operations assumed in the numerical simulation study. This results in a total water injection requirement of 1.94×10^6 gallons (gal) and a liquid extraction total of 1.99×10^6 gal. As previously discussed, the majority of the extracted/treated groundwater will be used for the injection water; therefore, it is anticipated that less than 60,000 gallons of treated water will be discharged to the storm sewer system.

Estimated water budget values and will be controlled and modified during operations based on the behavior observed in the subsurface.

In addition to the treated groundwater, during system operations, approximately 2 gpm of blowdown water from the colling tower/chiller will be routed directly to the on-Site stormwater system. This will eventually be discharged to the canal via the ITO. This water, which will be obtained from an on-site supply hydrant, will not come into contact with contaminated media and will not be processed through the treatment system prior to discharge.

3.5.6.3 Telecommunications

The telecommunications system that will be used includes a local area network in the field for data communications. An Internet connection for offsite data transfer and Mc² remote control of the system will be installed. A minimum of 300 kilobits per second download and upload speeds will be required. A landline or mobile wireless router with a static internet protocol address is preferred. Operators will have mobile smartphones to communicate with Mc² and receive alarms.

3.6 Controls and System Monitoring

Monitoring of the treatment system will be accomplished through automated and manual system checks. The treatment system will be equipped with liquid level sensors to activate pumps and trigger alarms in the event of high and low liquid level conditions. Each liquid tank along the treatment train will be equipped with vacuum relief valves, as well as low-low, low, high and high-high level switches to control the transfer pumps and prevent overflow conditions in each liquid tank. The vacuum blowers will also be outfitted with high-pressure and high-temperature sensors at their outlets. All applicable treatment equipment will be constructed with and/or placed within secondary containment, equipped with high-high sensors, to shut down the system in the case of a leak or mechanical failure during normal operations.

In the event of an alarm and treatment system shutdown, operations personnel will be alerted via automated call-out, email, or internet-based text service message to their smartphones.

3.7 Sampling and Analysis

Vapor samples will be screened daily using a PID at specific locations along the treatment train (e.g., influent, midpoint, and effluent of the VGAC vessels) to help evaluate the treatment system performance. In addition, vapor samples will be collected at bi-weekly intervals using a Tedlar bag or vacuum canister for analysis by USEPA Method Total Organics 15 (TO-15), or another comparable method, by a laboratory certified under the NYSDOH Environmental Laboratory Approval Program (ELAP). The PID measurements will be calibrated to the analytical vapor measurements from the same aliquot of fluid, and both data sets will be used for the quantification of mass removal, carbon loading, and discharge.

Liquid samples will be collected at bi-weekly intervals at the inlet of the air stripper, between each LGAC unit, and at the outlet of the treatment system, for analysis by USEPA Method 8260 by a laboratory certified under the NYSDOH Environmental Laboratory Approval Program (ELAP)." Data will be used to ensure compliance with discharge requirements, for the quantification of mass removal, and to assess carbon bed loading.

NAPLs drained periodically from the phase separator and knockout tanks and other treatment system components will also be tracked by manually measuring liquid levels in double-contained holding drums or vessels. These measurements will be used to complete or verify the mass balance of extracted COCs within the treatment and process equipment.

Screening will also be performed periodically at the extraction wells as a screening tool to inform system optimization. Sampling will be done using a PID. Extracted vapors will be collected by filling a Tedlar bag with an in-line pump or lung sampler that is connected to the ¼" hose barb on the well head. If a significant amount of moisture is generated, condensate knockouts can be added to the sampling apparatus. In some cases, the applied vacuum will be reduced to allow for sample collection, depending on the apparatus. Extracted liquids will be collected by (i) deploying a ¼" PTFE tube through the ¾" NPT sample ports on the well head top plates to below the water table, or (ii) temporarily disconnecting the ¼" PTFE compressed air line (internal to the PEX tube) and extracting the sample using a peristaltic pump. To maintain the integrity of the sample, the PTFE tube will be connected to a coiled stainless-steel tube and run through an ice bath, prior to discharging into the sample container.

A number of other processes and well field parameters will be monitored during system operations. A summary of the data collected, and the proposed frequency of that collection is presented in **Table 4**. The actual monitoring schedule may be varied from this proposed schedule as operating conditions warrant, as agreed upon by GTEOSI, Mc² and Arcadis, and in consultation with NYSDEC and NYSDOH..

Table 4: Monitoring summary

Item	Media	Location	Method	Frequency
Power, current, voltage	Subsurface	Electrodes	PDS (automatic)	Minutely (averaged daily)
Temperature	Subsurface	Sensor wells	DigiTAM (automatic)	Hourly (averaged daily)
Temperature	Extracted vapor	Extraction wells, treatment system	Temperature gauge or gun (manual)	Weekly
Vacuum	Vapor extracted	Extraction wells	Vacuum gauge (manual)	Weekly
Vacuum	-	Vacuum Monitoring Wells	Vacuum gauge (manual)	Weekly

Item	Media	Location	Method	Frequency
Flow Rate	Vapor extracted	Treatment influent	Averaging pitot tube (manual)	Daily
Flow Rate	Vapor discharged	Treatment effluent	Averaging pitot tube (manual)	Daily
Flow Rate	Vapor extracted	Extraction wells	Averaging pitot tube (manual)	Monthly
Volume	Water extracted	Treatment influent	Flow totalizer (manual)	Daily
Volume	Water discharged	Treatment effluent	Flow totalizer (manual)	Daily
Volume	Water injected	Treatment reinjection	Flow totalizer (manual)	Daily
Volume	Water injected	Electrodes	WCS (automatic)	Hourly (averaged daily)
Vapor VOCs	Vapor extracted	Extraction wells	PID (manual)	Monthly
Vapor VOCs	Vapors treated	Treatment system influent, midpoint, and effluent	PID (manual)	Daily
Vapor VOCs[1] (Analytical)	Vapors treated	Treatment system influent, midpoint, and effluent	USEPA TO-15 modified (Tedlar bag) (manual)	Once every two weeks
Liquid VOCs[1] (Analytical)	Liquids treated	Treatment system influent, midpoint, and effluent	USEPA 8260 Pump or valve (manual)	Once every two weeks
Measuring Water Levels	Subsurface	Select Well Locations	Manual	As Needed
Vapor VOCs	Breathing Space	Treatment Equipment and well field	PID (manual)	Daily

[1]And other analytes required for discharge compliance.

4. Construction Activities

Field construction will include the installation and/or performance of:

1. ET-DSP™ electrodes;
2. MPE wells;
3. Shallow SVE wells
4. Horizontal vapor extraction wells
5. Vacuum monitoring wells
6. DigiTAM temperature sensor wells;
7. Installation of the vapor cap addition;
8. Treatment system piping and hoses;
9. Electrode lead wire, hose and communication cable;
10. Connection of the treatment system equipment;
11. Power connections to the PDS and WCS equipment;
12. Power connections to the treatment and ET-DSP™ equipment;
13. System acceptance testing; and,
14. Wet testing the treatment system prior to start-up.

Mc² personnel will oversee these subcontracted construction activities and provide both oversight and construction management services.

4.1 Staging Equipment & Supplies

All equipment and supplies used during the construction of the ET-DSP™ and treatment systems will be staged within secured fenced areas. The PDS units, WCS units, and treatment system will also be located within secured fenced areas. A lifting plan will be prepared to describe the details of safely lifting the ET-DSP™ equipment.

The approximate layout of the PDS, WCS, and treatment system units are detailed in **Drawings EQL-01 to EQL-04, (Appendix A)**. The most efficient layout of the PDS and WCS units, such that wire and hose material usage is minimized, will be confirmed in the field during the equipment offload. Treatment equipment will be electrically isolated from the electrodes, either by maintaining a minimum separation distance of at least 25 ft, or by placing the equipment on wood dunnage. Equipment cutsheets are presented in **Appendix E**.

4.2 Subsurface Construction

4.2.1 Drilling Program Details

Sonic drilling technologies are the preferred method for electrode, MPE well and sensor well installation, as they have proven results for the rapid and accurate installation of extensive well fields on other thermal projects, and minimize investigation derived waste (IDW).

The following drilling technologies will be utilized for the installation of the thermal remediation components:

i. sonic drilling for electrodes,

ii. sonic, auger, or rotary methods for MPE wells, and
iii. sonic or auger methods for sensor wells, vacuum monitoring wells, and shallow SVE wells.

The proposed drilling program is detailed in **Table 5**, assuming borehole diameters are drilled as indicated using sonic rigs. For the purpose of estimating investigation derived waste generation during the drilling program, a conservative contingency factor of 1.3 has been applied to the soil cutting volume calculations. All drilling and construction waste will be containerized for onsite storage prior to offsite disposal. GTEOSI/Arcadis are responsible for hazardous waste disposal (e.g., drill cuttings, IDW).

Table 5: Drilling program

Item	Qty	Depth	Diameter	Volume	Wet Soil Weight	Notes
Electrode locations	50	35.5 ft	11.5 in	48 yd^3	86 tons	Electrodes 2/boring, 12 ft length × 8 in dia.
MPE locations	23	36.5 ft	8 in	11 yd^3	20 tons	Extraction
Sensor locations	7	35.5 ft	4 in	1 yd^3	2 tons	Sensor wells
Horizontal locations[1]	410 ft	2.5 ft	18 in width	60 yd^3	108 tons	Horizontal wells
Shallow SVE wells	7	5	4 in	16 yd^3	29 tons	SVE wells
Vacuum Monitoring Wells	10	3	1 in	1 yd^3	2 tons	Monitoring wells
Contingency Factor				**1.3**		
Total	**-**	**-**	**-**	**~178 yd^3**	**~229 tons**	**Total esti-mated IDW**

[1]Rectangular trench of 18 in ×18 in × 20.0 ft assumed per location.

4.2.2 Underground Utilities

Approximate locations of the existing subsurface utility infrastructure are illustrated in **Drawing WFL-01 (Appendix A)**. A one-call utility markout and private locate will be performed prior to drilling and construction. Subsurface utilities that are identified within the vicinity of the work areas will be protected, relocated, or abandoned as required. If utilities cannot be abandoned, temperature and electrical isolation requirements will be coordinated with the relevant utility providers.

4.2.3 Aboveground Utilities and Infrastructure

All drill rigs and other equipment (including cranes) will remain at least 10 ft or greater from overhead lines, depending on the voltage of the lines, or as specified by the local jurisdiction. If necessary, the local utilities will be requested to provide insulating jackets, which will be draped over overhead wires during relevant construction activities.

4.2.4 Electrode Wells

Electrode boreholes will be drilled using a minimum 10-in inner diameter tooling and drilled using sonic. 12 ft length by 8 in diameter electrodes will be installed, with 2 ET-DSP™ electrodes in each borehole. The boring depth will extend 0.5 ft below the bottom of the deepest electrode in each borehole. Coarse silica sand (e.g., 10/20) will be used to fill the annulus of the borehole around each electrode. The boring plug will consist of a fine sand seal (e.g., 40/60) underlying a neat cement grout finished to ground surface. Bentonite will not be used at the electrodes, as it can desiccate at steam temperatures. Each electrode weighs approximately 80 to 120 lbs., depending on its dimensions. Additional electrode construction details are presented in **Drawing WCD-01 (Appendix A)**.

The electrodes are manufactured with #1/0 silicone rubber glass fiber tube (SRGT) lead cable. These will be connected to aboveground #1/0 cables that run from the PDS units to the electrode locations under the extraction piping network. The connections will be performed in a weatherproof junction box mounted on a polyvinyl chloride (PVC) stickup at each location. The electrodes will also each be equipped with a bottom and top water injection hose. These hoses will be connected through a tee at ground surface to a 3/8 in general purpose water conveyance hose from the WCS units. The southern portion of AOC-1 contains an area where all surface completions are to be completed below grade. The wires and hoses at these electrode wells will extend below grade and daylight north of the boundary fence. **Drawing WCD-04 (Appendix A).** Daylighting locations of the electrode cables and hoses can be seen in **Drawing PIL-02 (Appendix A).**

4.2.5 Multiphase Extraction Wells

The MPE well boreholes will be a minimum of 8-in in diameter and drilled using sonic, auger, or rotary methods. MPE wells will have a 4 in diameter continuous wire wrap 0.006-in slotted 304L SS screen from 3 ft BGS to 35 ft BGS in both AOCs. A filter pack consisting of 40/60 silica sand will be installed in the annular space around the well screen. The boring will be completed with 1.5 ft of bentonite below the screen interval. Bentonite will be used to fill the annular spaces surrounding the sumps in the bottom 12 inches of the MPE wells to prevent DNAPL pooling and manage the potential accumulation of fines during heating operations. The sumps of the MPE wells will extend below the zone of elevated temperatures created by the ERH electrodes and, therefore, the bentonite surrounding the MPE well sumps will remain hydrated.

A 1.5 ft sump will be installed below the screen of each MPE well in order to manage the potential accumulation of fines. A seal consisting of 40/60 silica

sand will sit below each carbon steel riser pipe and the top of each riser pipe will be completed with a 4 in male national pipe thread (NPT) taper thread. Each MPE well will be completed with a wellhead, which in turn will be connected to a pipe network for conveyance to the treatment system. The southern portion of AOC-1 contains an area where all surface completions are to be completed below grade. The MPE well in this location will be completed in a below grade vault that will be accessible during operations. MPE well design is detailed in **Drawings WCD-01, 03, and 04.**

The MPE wells will each be equipped with a 1-in nominal diameter (OD) crossed-link polyethylene (PEX) downhole compressed air-assisted vacuum groundwater recovery tubes (i.e., slurper tube). The compressed air line will be a 1/4 in OD polytetrafluoroethene (PTFE) tube internal to the PEX tube. The slurper tube will extract water from the wells while under vacuum. Additionally, the MPE wells will each be equipped with a 1.5-in chemical suction hose for extracted vapors. Vacuum will be applied to the well head from the main vacuum blower at the aboveground treatment system. Each wellhead will be equipped with a temperature gauge, a vacuum gauge, and a sample port/bleeder valve. MPE wellhead and slurper tube details are presented in **Drawing WHD-01 (Appendix A)**.

4.2.6 Horizontal Soil Vapor Extraction Wells

The proposed horizontal SVE wells will be installed in extraction trenches throughout the ISTR area and will have an approximate depth of 3 ft and will be 1 - 1.5 ft wide. Each well will be comprised of two 10 ft sections of 2 in diameter green thread fiberglass 0.020-in slotted well screens, which will be coupled with a fiberglass tee that connects to a fiberglass riser pipe. Pea gravel, clean coarse sand, or an equivalent fill material will be added around the extraction piping. Backfill is native and to be tamped down in no more than 1 ft lifts. All SVE wells will be connected to the main extraction piping via 1 in nominal diameter PEX tubing for vapor extraction. Additionally, each horizontal SVE well will be installed with a 1 ft sump that will house a separate slurper tube to ensure that water does not blind the screen. The horizontal SVE well design is detailed in **Drawing WCD-02 (Appendix A)** with slurper details being shown in **Drawings WHD-01** and **WHD-02 (Appendix A).**

4.2.7 Sensor Wells

The temperature sensor well boreholes will be a minimum of 4 in diameter and drilled using sonic or auger methods. Each digiTAM temperature sensor string is constructed of a series of digital sensor points, spaced at 3 ft depth intervals, which are housed within a SS-braided SS tube. The digiTAM strings are deployed downhole in a watertight 1.5 in diameter carbon steel casing that is sealed with PTFE thread compound at its joints. The annular space around the wells will be grouted neat cement grout from total depth to ground surface in order to minimize the potential for subsurface vapors and liquids from penetrating the sensor housing. The southern portion of AOC 1 contains an area where all surface completions are to be completed below grade. The ancillary equipment for the sensor well in this area will be completed in a subsurface vault that will be accessible during operations. Sensor well

construction drawings and wellhead details are presented in **Drawings WCD-01 and WHD-02 (Appendix A)**. Vault details can be viewed **Drawing WCD-03 (Appendix A).**

Each of the down-hole sensor strings come assembled with a junction box connected at the surfacing ends. The communication cable will be wired within the sensor junction boxes at the wells and run back to a digital acquisition remote box where they will be connected to communication boards assembled by Mc^2. The remote box allows information to be read and translated back to the server allowing real-time data analysis.

The Cat5e cables will be run on the ground surface, similar to the hoses and electrode cables.

4.2.8 Vacuum Monitoring Wells

The proposed vacuum monitoring wells will be constructed to a depth of 3.0 ft BGS. Each well will be comprised of a 1.0 ft SS 10 slot screen. The annular space around the screen will be filled with 20/40 silica sand from 1.0 to 3.0 ft BGS, 40/60 silica sand from 0.5 to 1.0 ft BGS, and neat cement grout to surface. The wellhead connection will utilize 1/4-inch push to connect tubing with a quick coupler to allow vacuum measurements to be taken at the surface. See **WCD-01 (Appendix A)** for the vacuum monitoring well construction detail.

4.2.9 Shallow Vapor Extraction Wells

The proposed shallow vapor extraction wells will be installed under the slab in Building 11A. They will have a depth of 5.5 ft BGS. The annular space around the screen will be filled with 20/40 silica sand from 2.0 to 5.5 ft BGS, 40/60 silica sand from 1.5 to 2.0 ft BGS, and neat cement grout to surface. Each well will be equipped with a 2-inch SS 10 slot screen, set between 3 and 5 ft BGS. Above the screen, there will be a 2” carbon steel pipe extending to 1 foot above the slab, topped with a 2” male NPT completion. See **WCD-01 (Appendix A)** for the shallow vapor extraction well construction detail.

4.3 Above Ground Construction

4.3.1 Vapor Cap

A vapor cap insulates against heat loss through the ground surface, isolates aboveground components from electric potentials induced in the subsurface, prevents fugitive vapor emissions, reduces atmospheric air from short circuiting into the extraction wells, and limits heat loss associated with groundwater recharge in the vadose zone. A layer of cellular concrete, with a minimum R-value of 10 Fahreheit-hour-square feet per British thermal units ($F \cdot hr \cdot ft^2/BTU$), will be installed above the existing surface of the treatment areas **(Drawing VCD-01, Appendix A)**. This layer will provide a much larger degree of thermal insulation than would be possible with the existing asphalt materials. The cellular concrete cap will be installed throughout the treatment

areas, excluding the southern portions of AOC-1 that extend into the roadway and that will be constructed below grade. The southern area (below grade portion) of AOC-1 will also have a vapor cap installed, but the construction of it will be modified so that it is finished at existing grade to allow truck traffic back and forth through this area. The details of construction for this are detailed in **Drawing VCD-02 (Appendix A)**. The vapor cap will assist with maintaining high temperatures in the vadose zone and minimizing the potential for condensation of vaporized VOCs.

If fugitive emissions are detected during active heating operations, repairs will be performed at the surface of the cellular concrete by using a QUIKRETE® concrete repair caulking gun, grouting inside larger cracks, and/or installing polyethylene sheeting.

4.3.2 Piping Systems

Aboveground extraction system piping will be installed and connected to the extraction wellheads. Separate pipe and hose networks for (i) extracted fluids, (ii) compressed air, (iii) WCS water, and (iv) electrode over-pressurization fluid returns will be installed throughout the well field and connected the treatment system components. Each of these pipe networks will be electrically isolated during operations.

The main multiphase extraction pipe header will be constructed of steel, and will split into smaller laterals that are connected to the wellheads. Extraction pipes will be sloped towards the treatment system in order to facilitate the gravity drainage of recovered liquids. The steel supports will be affixed on top of sections of wooden 2x4's for electrical isolation, and electrical cables and hoses will run underneath or adjacent to these supports. **Drawing WHD-01 (Appendix A).** Additional hoses will also run on these supports to supply compressed air to the slurper tubes, feed water to the WCS units, and allow electrode injection water to return to the treatment system in the event of over-pressurization. Refer to **Drawing PIL-01, PIL-02, and PIL-03 (Appendix A)** for extraction system piping details.

From AOC 1, the conveyance piping will enter a trench and will then run into a lift station in order to convey the liquids to an elevated pipe run that will then connect to the treatment system. The lift station will be housed within a 4' x 4' (approximate) concrete vault. Inside the vault, the conveyance piping will connect to a small knockout vessel where a pump will lift liquid from the vault to the conveyance piping above grade. Vapors will discharge from the top of the knockout vessel and then travel to the treatment system. An example of this system is presented in **Figure 3** below. Refer to **Drawing LS-01 (Appendix A)** for lift station details.



Figure 3 - Example Lift Station

The MPE wellheads and horizontal SVE wellheads will each have three connections to the treatment area headers: (i) a 1-in high temperature vacuum hose for the vapor stream, connecting at 1-in female camlock fittings, (ii) a 1-in PEX tube for the recovered groundwater stream and (iii) a 1/4-in PFTE tube for the compressed air stream internal to the 1-in PEX tube. The shallow SVE wellheads will have only the 1-in high temperature vacuum hose for the vapor stream, connecting at 1-in female camlock fittings. Each type of connection will have a ball valve to adjust fluid flow rates Refer to Drawing WHD-01 and WHD-02 (Appendix A) for extraction system connection details. Each connection point will be equipped with a ball valve to adjust the liquid, vapor and compressed air flow rates. The vapor extraction line connection points associated with the MPE, and horizontal extraction wells will also be equipped with cam-and-groove fittings. Refer to **Drawing WHD-01 and WHD-02 (Appendix A)** for extraction system connection details.WHD-01 also depicts the manner in which the HX and MPE wells will be connected to the main conveyance pipe.

4.3.3 Power Supply and Electrical Connections

A detailed description of all power supply connections, cable runs, and specifications can be found in **Drawing ESL-01 (Appendix A)**. Local power drop and transformer will be installed prior to turning on the thermal treatment system. Downstream of the step-down transformer, Mc² will run all cables into place and coordinate with a local electric contractor to perform the appropriate connections. Note that all earth-grounded equipment, including transformers, power distribution panels (PDPs), ground rods, and guy wires will be at least 25 ft from the nearest electrode location. Due to the limited space available, PDS units will be placed on 6×6 inches wood timbers and elevated off of ground surface for electrical isolation from the well field.

4.3.4 ET-DSP™ Neutral Connections

All extraction wells will be fitted with electrical lugs on the bottom flange of the wellhead, onto which a #1/0 bonding wire will be landed. Bonding wires from multiple wells will be connected together using split bolts and the trunk wire will be connected to the ET-DSP™ neutral within each PDS unit. The groups of extraction wells that are bonded together depend on the distribution of electrodes connected internal to the PDS units, but will be grouped in accordance with location in the well field. Consequently, specific areas in the well field will be able to be isolated while others operate.

Aboveground structures, such as treatment system components, PDS units and WCS units will be grounded with grounding wire. This ground network will be brought back to the transformer and connected to the utility ground. All equipment in and around the well field will be placed on wood dunnage or otherwise isolated. The ET-DSP™ neutral will remain separate from the utility ground, in order to create a return path for the electrodes and control power delivery.

Horizontal vapor extraction wells in the TTZ will be constructed of non-conductive materials (e.g., fiberglass) to avoid introducing preferential electrical pathways between the electrodes. Similarly, any metal materials that may be present in the TTZ could affect heating efficacy. Such materials will be evaluated to assess whether bonding, isolating, or abandoning the component will minimize its impact on heating performance.

4.3.5 Treatment System

Process equipment that may contain untreated liquids will be placed in secondary containment berms outfitted with level sensors in the sump to automatically shut off the system if a leak is detected.. Additionally, all transfer hoses with unprocessed liquids will be double contained, and any cam-and-groove fittings will be pinned or zip-tied shut. Refer to **Drawings P&ID 01 to 05 (Appendix A)** for a piping and instrumentation diagram (P&ID) of the treatment train. Once the treatment system is set up onsite, a short section of pipe will be installed to connect the well field extraction to the system influent. After completing the piping connections the liquid treatment system will be leak tested with potable water so that any leaking components can be identified and repaired prior to startup and to verify that the equipment and controls are operating as designed.

4.3.6 Site Security and Safety

A privacy fence will be in place for the full duration of drilling, construction, operation, and demobilization activities at the Site. This fence will mitigate the exposure of nonqualified personnel to electrical, thermal and physical hazards associated with the construction and operation activities. A rigorous step and touch potential test will be performed on all fences to ensure electrical isolation, and wooden posts will be used within 25 ft of the nearest electrode. A shipping container may be placed onsite for electrode and material storage during the project. High voltage, hot surface, confined space, and other hazard

warning signage will be in clear view where the potential for such hazards exists.

There is existing fencing in both AOC's that will need to be replaced and/or modified. Chain-link fence with metal posts will not be permitted within 25 feet of the nearest electrode. Fencing within 25' of the nearest electrode will be constructed with wood posts and a chain-link fence that is positioned 4 inches off the ground. The chain-link fence will be constructed so that there are electrical breaks every 40 ft. See the equipment layout drawing for the proposed fence layout (**Drawing EQL-01,02,03, and 04, Appendix A**)

4.3.7 Traffic Control

To facilitate the construction activities and maintain a safe environment, various temporary traffic control measures will be employed during construction. These measures encompass the strategic placement of signage, barricades, and an advanced warning area to efficiently guide traffic around areas where construction work might temporarily impede the regular flow of site traffic. Emphasizing safety for both workers and the public, these measures aim to minimize disruptions.

During the installation of subsurface components, including wells, vaults, and a vapor cap in the southern section of AOC 1, a temporary detour will be established. This detour is necessary to redirect traffic to the north, allowing for the completion of drilling and civil work in the designated area without compromising the overall flow of vehicle traffic through the area. Additionally, temporary access restrictions will be in place around the process corridor connecting the treatment compound and AOC 1 while trenching is completed. Trenching will be completed in segments to allow for vehicle access.

Refer to Figures 4 and 5 below for details.

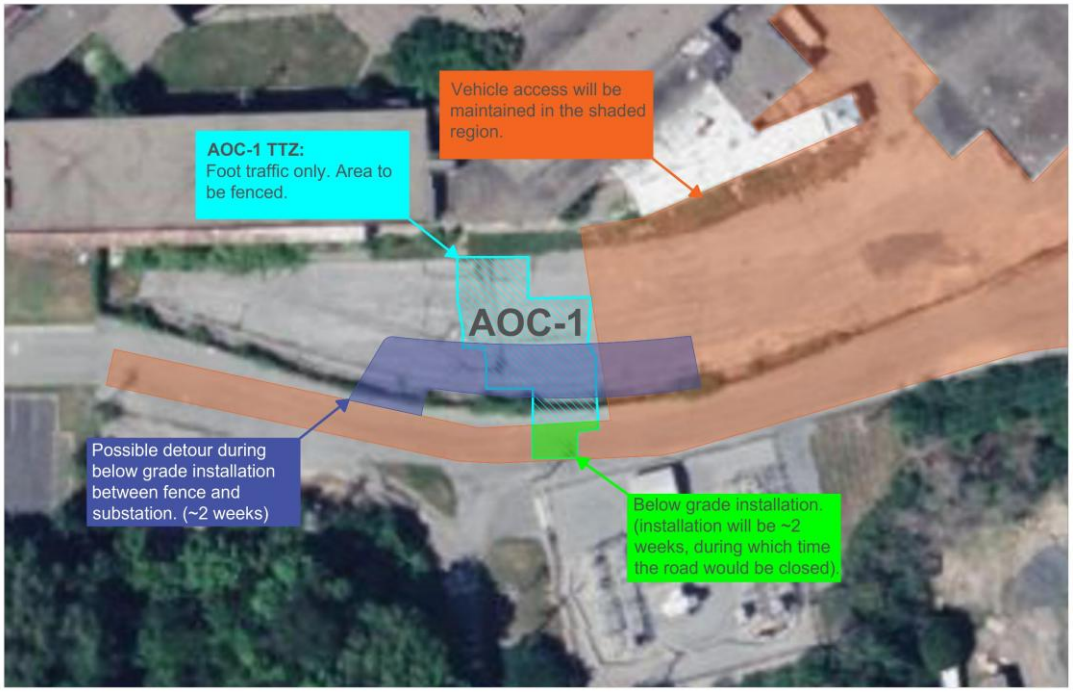


Figure 4: Traffic Control Around AOC-1



Figure 5: Traffic Control at Process Corridor

4.4 System Shutdown and Site Restoration

Once the operational objectives for the ISTR system have been achieved and soil concentrations have been reduced below the target cleanup goal of 200 mg/kg, the ET-DSP heating system will be turned off. The extraction and treatment system will continue to operate for approximately 5 additional days following shutdown of the heating system to help remove residual pressurized steam from the subsurface during the initial cooldown period. The extraction system will be turned off once steam production subsides and the temperature sensors indicate that water steam is no longer being generated.

Demobilization of the thermal remediation equipment will proceed after final shutdown of the system. Wellheads will be removed, and piping and cables recovered. Electrodes, extraction wells, and sensor drop tubes will be abandoned in accordance with local regulations. The vapor cap will be removed and disposed of.

5. Operational Strategy

5.1 Pneumatic and Hydraulic Control

Controlling potential migration and/or redistribution of COCs will be achieved by maintaining sufficient vacuum and extraction within the TTZ. Pneumatic and hydraulic control will be established and maintained through the extraction of subsurface fluids at sufficient rates and monitored throughout the ET-DSP™ application with pressure sensors and flow totalizers. An approach of maintaining an extraction/injection ratio above unity is used to prevent the thermal system from mobilizing more aqueous mass than under the natural gradient. Groundwater levels can be measured at select extraction wells, if needed for troubleshooting purposes, using a water level tape while the electrodes are turned off.

5.2 Aggressive Heating and Extraction

After flow rates are adjusted to establish pneumatic and hydraulic control, power input to the electrodes will be increased to the design range. Applied voltages will be optimized as subsurface electrical conductivities change with temperature and saturation (e.g., Archie's Law, Waxman-Smits Equation) by performing tap changes on the transformers that feed the electrodes. The TDCM/IPS system will be used to control and adjust power input to individual electrodes, based on the local subsurface resistivities calculated throughout the TTZ. Solenoid valves internal to the WCS units will trigger water injection to individual electrodes based on transient power input and temperature measurements. Extraction wells will be operated under applied vacuum, and based on soil, vapor, and water temperatures, as well as vacuum, pitot tube and PID measurements at the wellheads, optimized to maximize the capture of VOC vapors. Liquid extraction rates will be adjusted in order to minimize convective heat losses associated with extraction, while ensuring the capture of NAPL and dissolved VOCs. Temperatures will be monitored at digiTAM locations to evaluate progress towards the achievement of temperature goals.

5.3 Performance Evaluation and Shutdown

Continued monitoring throughout operations will inform project personnel of system performance and the achievement of shutdown criterion, referenced in 1.3.2 Thermal Treatment Objectives. Additional details on metrics for performance monitoring are discussed in **Section 6**.

6. Performance Monitoring

Performance monitoring of the ET-DSP™ and treatment system will be performed in order to assess progress towards project objectives and inform operators of conditions that warrant operational adjustment.

6.1 Subsurface Monitoring

Continuous monitoring of subsurface parameters will be conducted to ensure that target temperatures are achieved and degrees of hydraulic and pneumatic control are maintained throughout operations. Vapor pressure gradients will be determined by manually measuring the vacuum in the vadose zone at the extraction wells and vacuum monitoring wells. Hydraulic gradients will be determined by manually measuring water levels at selected well locations. Refer to **Table 4** for a summary of the monitoring activities.

Temperature monitoring will be achieved with 84 individual digiTAM sensors deployed at 7 sensor well locations. Temperature data will be logged in the project database and used to generate subsurface temperatures in thermal contour maps using interpolation methods (e.g.,**Figure 6**). Each temperature monitoring location has been selected to vary from 0 to 4 ft from the centroid of the nearest electrode locations (i.e., the centroid of the triangle formed by the nearest three electrodes). This approach improves the interpolation procedure and more accurately represents the overall distribution of subsurface temperatures, while maintaining a sufficient distance from the electrodes, where non-linear electric field intensities are greater, to provide a degree of conservatism.

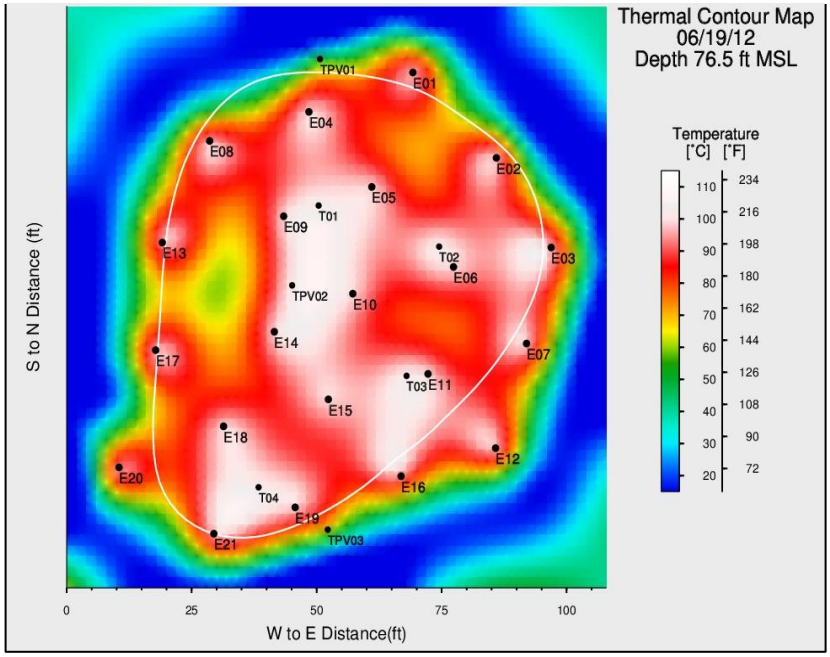


Figure 6: Sample Subsurface Temperature Distribution Map

6.2 Treatment System Monitoring

During thermal operations, onsite operators will monitor treatment system performance and respond to treatment system alarms as needed. Site monitoring activities will be conducted at least once per day on weekdays, or at a reasonable frequency agreed upon by all members of the project team. Information will be compiled into a project database on the project website. Liquid and vapor extraction rates and mass removal of VOCs will be estimated by collecting measurements from treatment system components downstream of initial condensation and cooling processes. Specific measurements that will be used to calculate mass recovery include: (i) vapor concentrations at sample port SP-240 combined with pitot tube readings at flow element FE-240 (VOC vapors); (ii) liquid concentrations at sample port SP-480 combined with totalizer readings at flow element FQIT-501 (dissolved phase VOCs); and, (iii) dipping of product storage tanks T-461 and T-462 combined with a laboratory measurement of NAPL density (NAPL VOCs). Details of the treatment system monitoring program can be viewed in **Table 4**.

6.3 Vapor Temperature and Vacuum Monitoring

Extracted vapor temperatures and applied vacuums in the TTZ will be monitored using gauges affixed to each extraction wellhead. This data collected will be entered manually into fillable forms on the project webpage.

6.4 Confirmation Soil Sampling

Confirmation soil sampling will be initiated after either of the following conditions are met:

(i) The system has operated for at least 30 days after the target temperature of 90°C has been achieved within the TTZ (allowing extraction of approximately 300 pore volumes of vapor from the TTZ) AND asymptotic mass removal rates have been achieved (i.e., TCE mass removal rates fall below 10% of the peak recovery rate for 10 consecutive days); or

– (ii) The system has operated for 60 days after the target temperature of 90°C is achieved.. The confirmation soil sampling program will be conducted to verify that TCE concentrations within both treatment areas have been reduced below the 200 mg/kg treatment goal and that NAPL is no longer present. The ET-DSP™ electrodes will be temporarily deactivated in advance of the confirmation soil sampling program but will be restarted once sampling has been completed. ET-DSP operations will be terminated once analytical results are received verifying that the soil concentration goals have been attained.

6.5 Data Collection & Management

An electronic data collection and management system will transmit data collected automatically from addressed digital sensors onsite via a communication protocol to an onsite server. The onsite server's database will function as the first storage location for the collected data, and will also act as

a node for data transfer to an offsite server for redundant storage. All data will be transferred between the onsite and offsite servers over a secure virtual private network. The offsite server will be accessed to perform calculations and process data for further presentation. Data collected manually by ET-DSP™ operators will be entered into fillable forms on the project webpage.

6.6 ET-DSP™ Control Systems

ET-DSP™ utilizes a TDCM/IPS to control the power to individual electrodes via controllers within the PDS units. This method controls the sine wave such that each phase can be individually manipulated, and can alter the phases of power applied to individual electrodes, in order to change the direction of current flow between electrodes. For example, if certain electrodes appear to be in resistive zones of the subsurface, the power to these electrodes can be increased with the TDCM/IPS to encourage the development of a more uniform heating pattern. Additionally, the transformers internal to PDS units have a range of voltage tap settings that can be used to control the gradient in electric potential between adjacent electrodes. Proportioning solenoid valves internal to the WCS units can be used to modulate and control the average rate of water injection supplied to individual electrodes, based on measurements of electrical resistance at each electrode (e.g., resistive conditions can occur during vapor generation).

The ET-DSP™ control system will be connected to a LAN that is accessible over the internet and can be monitored via the project webpage. This will provide remote access and system control for offsite Mc² project engineers.

7. Summary and Conclusions

A combination of ET-DSP™ and MPE will be used to target the Site for thermal remediation of the chlorinated VOCs present. Background information of the Site and the remedial approach were presented. A summary of the technical design is presented in **Table 3**, and includes:

1. One hundred (100) electrodes at 50 locations;
2. Twenty-three (23) MPE well locations;
3. Seven (7) digiTAM temperature monitoring locations;
4. Four hundred and ten linear ft (410 linear ft) of horizontal soil vapor extraction wells;
5. Ten (10) vacuum monitoring wells;
6. Seven (7) shallow vapor extraction wells;
7. Vapor cap additions, totaling an area of 12,675 ft²;
8. An estimated IDW volume of 4,600 ft³;
9. Electrodes of 12 ft length by 8 in diameter;
10. Electrode locations spaced at 18.0 ft, with ±1.5 ft of tolerance;
11. Electrode depth intervals of 3.0 ft to 35.0 ft BGS depending on the encountered bedrock depth;
12. Average and peak electrode power inputs of 521 and 799 kW;
13. A total energy input to the electrodes of 2,251 MWh;
14. A minimum target vapor extraction rate of 77 scfm;
15. Total liquid injection and extraction rates of 7.50 and 7.69 gpm;
16. A water injection requirement of 1.94×106 gal; and,
17. An approximate active heating time of 180 days.

Comprehensive performance monitoring data will be conducted during system operations, which will include the following elements:

1. Electrode power, current, and voltage;
2. Subsurface temperatures and pressures;
3. Extraction well vacuum and temperature;
4. Water injection and extraction rate;
5. Vapor extraction rate; and,
6. Extracted, processed, and discharged VOC concentrations.

These data will be used to inform the operation of the system, and will be available on a secure project website for remote monitoring. Asymptotic conditions in the cumulative mass removal data will be used to assess the timing for conducting the confirmation soil sampling program. Once the confirmation soil sampling results verify that TCE concentrations have been reduced below the 200 mg/kg treatment goal and DNAPL has been removed, ET-DSP™ operations will be shutdown.

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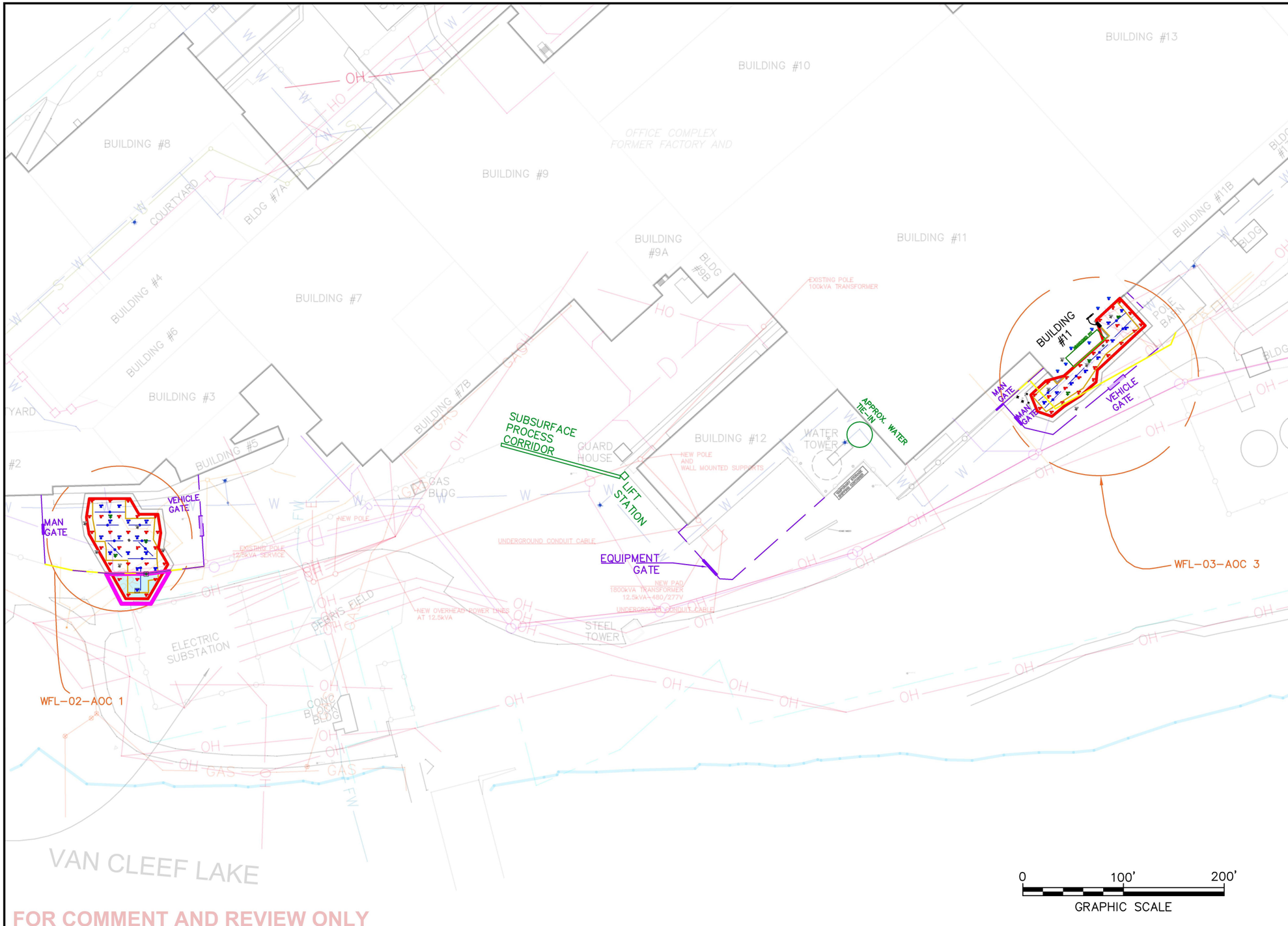
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Appendix A – Design Drawings

1. ET-DSP™ Well Field Layout (WFL-01)
2. ET-DSP™ Well Field Layout AOC 1 (WFL-02)
3. ET-DSP™ Well Field Layout AOC 3 (WFL-03)
4. ET-DSP™ Equipment Layout (EQL-01)
5. ET-DSP™ Equipment Layout AOC 1 (EQL-02)
6. ET-DSP™ Equipment Layout AOC 3 (EQL-03)
7. ET-DSP™ Equipment Layout Treatment System (EQL-04)
8. ET-DSP™ Equipment Layout (PIL-01)
9. ET-DSP™ Equipment Layout AOC 1 (PIL-02)
10. ET-DSP™ Equipment Layout AOC 3 (PIL-03)
11. ET-DSP™ Electrode Well Construction Details (WCD-01)
12. ET-DSP™ Electrode Well Construction Details (WCD-02)
13. ET-DSP™ Electrode Well Construction Details (WCD-03)
14. ET-DSP™ Electrode Well Construction Details (WCD-04)
15. ET-DSP™ Well Head Details (WHD-01)
16. ET-DSP™ Well Head Details (WHD-02)
17. ET-DSP™ Trench Detail (TD-01)
18. ET-DSP™ Vapor Cap Detail (VCD-01)
19. ET-DSP™ Vapor Cap Detail (VCD-02)
20. Lift Station Detail (LS-01)
21. Electrical Single Line Drawing (ESL-01)
22. Treatment System Process Flow Diagram (PFD-01)
23. Treatment System P&IDs (P&ID-01)
24. Treatment System P&IDs (P&ID-02)
25. Treatment System P&IDs (P&ID-03)
26. Treatment System P&IDs (P&ID-04)
27. Treatment System P&IDs (P&ID-05)



LEGEND

- ELECTRODE WELL [50]
- EXTRACTION WELL [23]
- VACUUM MONITORING WELL [10]
- SENSOR WELL [7]
- HORIZONTAL EXTRACTION [410]
- ISTR TREATMENT AREA [3,750 + 2,599 FT²]
- THERMAL INFLUENCE [5,460 + 3,734 FT²]
- VAPOR CAP [5,651 + 4,935 FT²]
- FLUSH W/ GRADE VAPOR CAP [1,409 FT²]
- VAULT [2]
- SVE — SHALLOW VAPOR EXTRACTION WELL [7]
- ABOVE GROUND TREATMENT SYSTEM
- BELOW GRADE INSTALLATION
- NEW FENCE [712 FT]
- PROPERTY BOUNDARY
- EDGE OF WATER
- 440 — ELEVATION CONTOUR
- EXISTING FENCE
- INTERCEPTOR PIPE
- WATER LINE
- E — ELECTRIC LINE
- OH — ELECTRIC LINE (OVERHEAD)
- GAS — GAS LINE
- D — STORM SEWER PIPE
- R — STORM WATER (ROOF DRAINS)
- PR — PROCESS WASTE LINES
- S — SANITARY SEWER
- FW — FORMER WATER LINE
- MANHOLE/CATCH BASIN
- MONITORING WELL
- EXISTING FENCE TO BE REMOVED
- GATE

NOTES:

1. FINAL POSITIONING OF EQUIPMENT TO BE DETERMINED ON SITE.
2. ELECTRODES REQUIRE 25 cm [10"] BORING.
3. EXTRACTORS REQUIRE 15 cm [8"] BORING.
4. SENSOR WELLS REQUIRE 5 cm [2"] DROP TUBE. BORING SIZE IS MIN. 10 cm [4"].

FOR COMMENT AND REVIEW ONLY

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REV.	DATE (DD/MM/YYYY)	DESCRIPTION	DRAWN BY	REV'D BY	APP'D BY
B11	17/03/2025	NYSDEC COMMENT UPDATES	DJP	DJP	CC
B8	29/05/2024	EDITS TO DRAFT FINAL	CO	CC	CC
B7	29/05/2024	EDITS TO DRAFT FINAL	CO	CC	CC
B6	21/05/2024	EDITS TO DRAFT FINAL	CO	CC	CC
B5	13/05/2024	DRAFT FINAL	CO	CC	CC
B4	22/01/2024	ELECTRICAL UPDATES	DJP	CC	CC

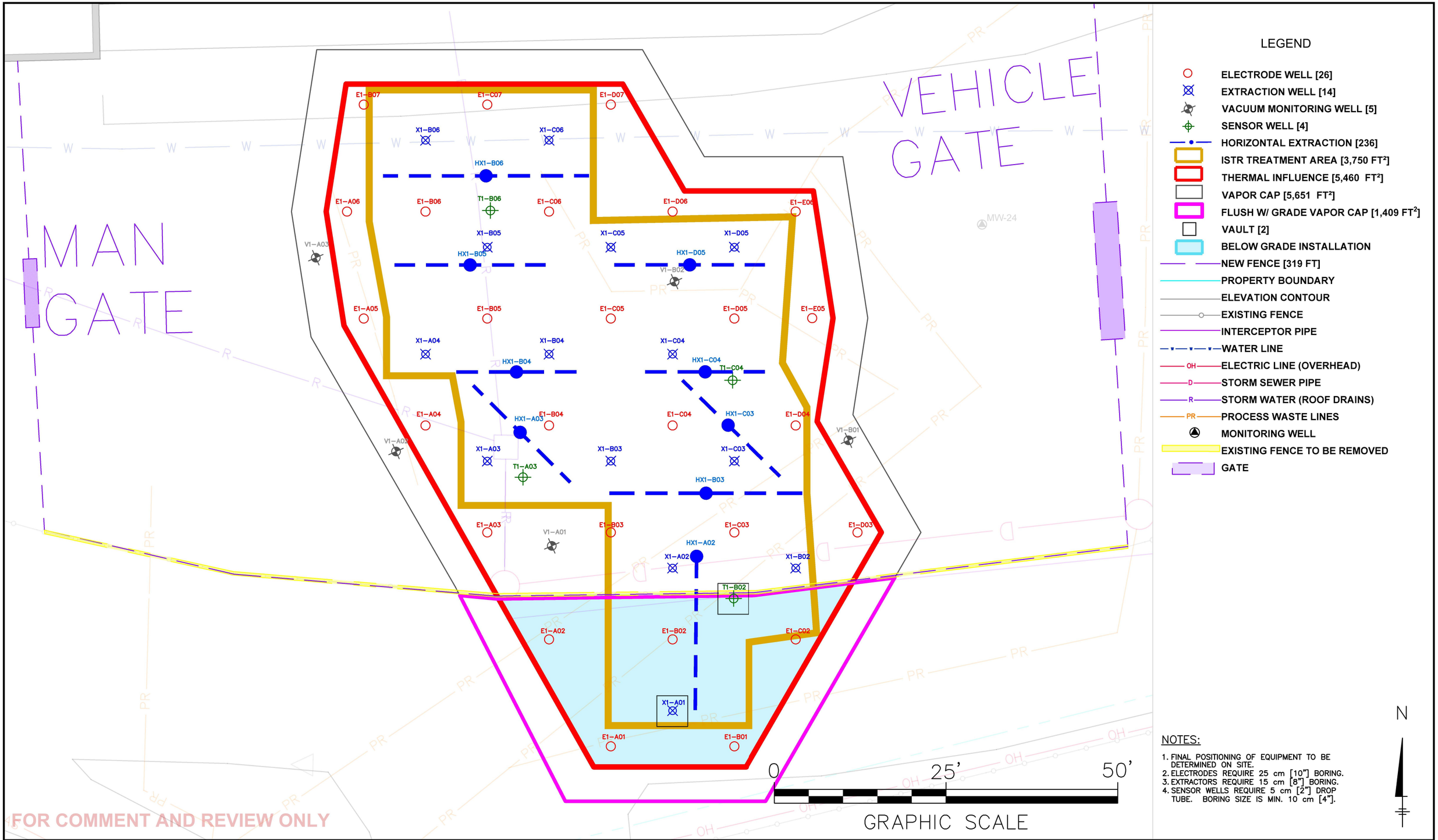
APEGA PERMIT NUMBER: P09178

TITLE: **Well Field Layout**

CLIENT: **Arcadis**

PROJECT: **G.T.E. Products Corporation Site**
NYSDEC Site No. 850003
Seneca Falls, New York

SHEET: **WFL-01**



LEGEND

- ELECTRODE WELL [26]
- EXTRACTION WELL [14]
- VACUUM MONITORING WELL [5]
- SENSOR WELL [4]
- HORIZONTAL EXTRACTION [236]
- ISTR TREATMENT AREA [3,750 FT²]
- THERMAL INFLUENCE [5,460 FT²]
- VAPOR CAP [5,651 FT²]
- FLUSH W/ GRADE VAPOR CAP [1,409 FT²]
- VAULT [2]
- BELOW GRADE INSTALLATION
- NEW FENCE [319 FT]
- PROPERTY BOUNDARY
- ELEVATION CONTOUR
- EXISTING FENCE
- INTERCEPTOR PIPE
- WATER LINE
- OH — ELECTRIC LINE (OVERHEAD)
- D — STORM SEWER PIPE
- R — STORM WATER (ROOF DRAINS)
- PR — PROCESS WASTE LINES
- MONITORING WELL
- EXISTING FENCE TO BE REMOVED
- GATE

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B12	04/09/2025	NYSDEC COMMENT UPDATES REV 2	DJP	DJP	CC
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B8	19/08/2024	TRENCH AND VAULT CHANGES	DJP		
B7	29/05/2024	EDITS TO DRAFT FINAL	CO	CC	CC
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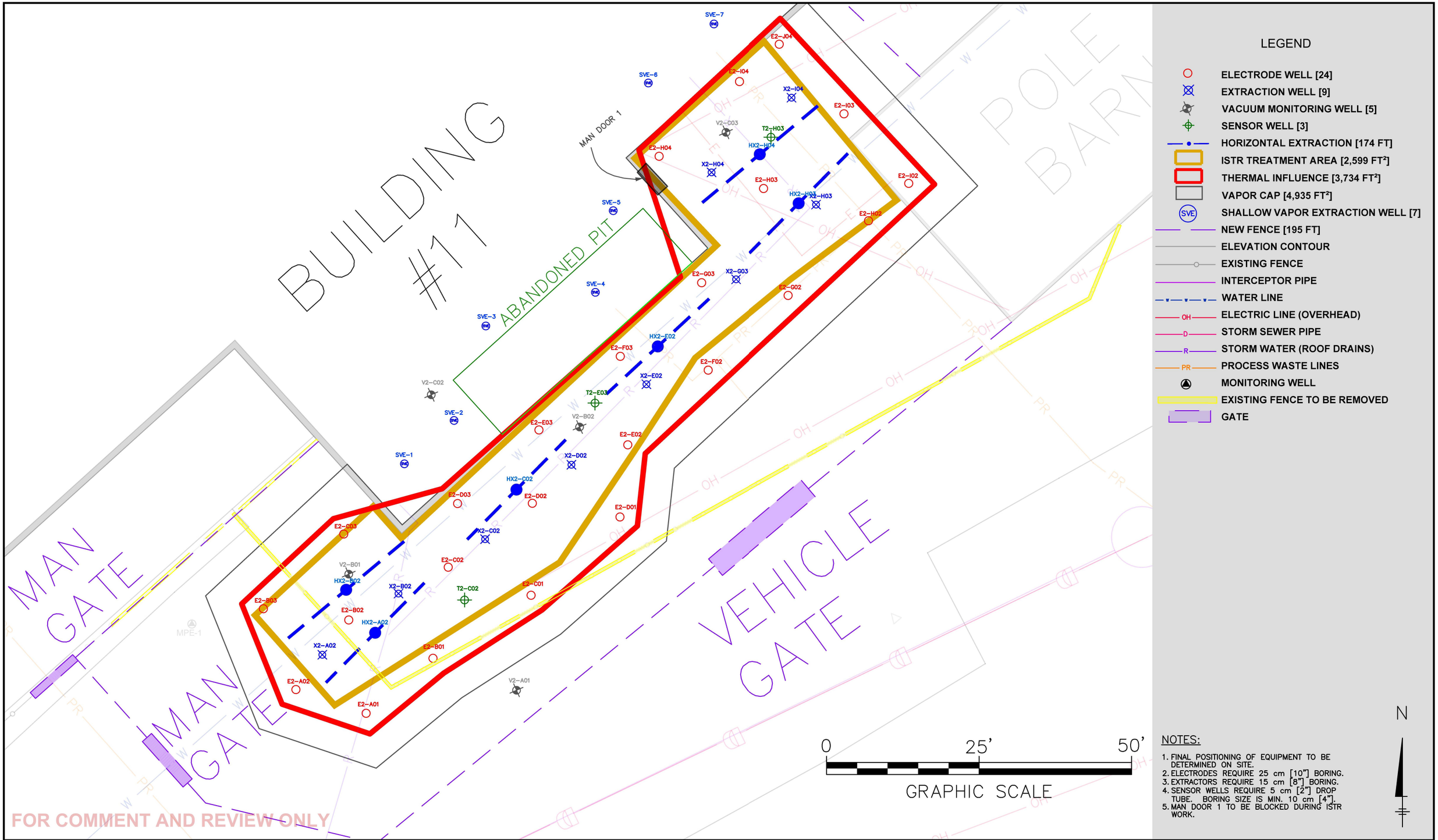
APEGA PERMIT NUMBER: P09178

TITLE: **Well Field Layout**
AOC 1

CLIENT: **Arcadis**

PROJECT: **G.T.E. Products Corporation Site**
NYSDEC Site No. 850003
Seneca Falls, New York

SHEET: **WFL-02**



LEGEND

- ELECTRODE WELL [24]
- EXTRACTION WELL [9]
- VACUUM MONITORING WELL [5]
- SENSOR WELL [3]
- HORIZONTAL EXTRACTION [174 FT]
- ISTR TREATMENT AREA [2,599 FT²]
- THERMAL INFLUENCE [3,734 FT²]
- VAPOR CAP [4,935 FT²]
- SHALLOW VAPOR EXTRACTION WELL [7]
- NEW FENCE [195 FT]
- ELEVATION CONTOUR
- EXISTING FENCE
- INTERCEPTOR PIPE
- WATER LINE
- ELECTRIC LINE (OVERHEAD)
- STORM SEWER PIPE
- STORM WATER (ROOF DRAINS)
- PROCESS WASTE LINES
- MONITORING WELL
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2. ELECTRODES REQUIRE 25 cm [10"] BORING.
3. EXTRACTORS REQUIRE 15 cm [8"] BORING.
4. SENSOR WELLS REQUIRE 5 cm [2"] DROP TUBE. BORING SIZE IS MIN. 10 cm [4"].
5. MAN DOOR 1 TO BE BLOCKED DURING ISTR WORK.

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B11	17/03/2025	NYSDEC COMMENT UPDATES	DJP	DJP	CC
B8	16/07/2024	SVE NUMBERING FIX	CO		
B7	29/05/2024	EDITS TO DRAFT FINAL	CO	CC	CC
B6	21/05/2024	EDITS TO DRAFT FINAL	CO	CC	CC
B5	13/05/2024	DRAFT FINAL	CO	CC	CC
B4	22/01/2024	WELL MOVES	DJP	CC	CC

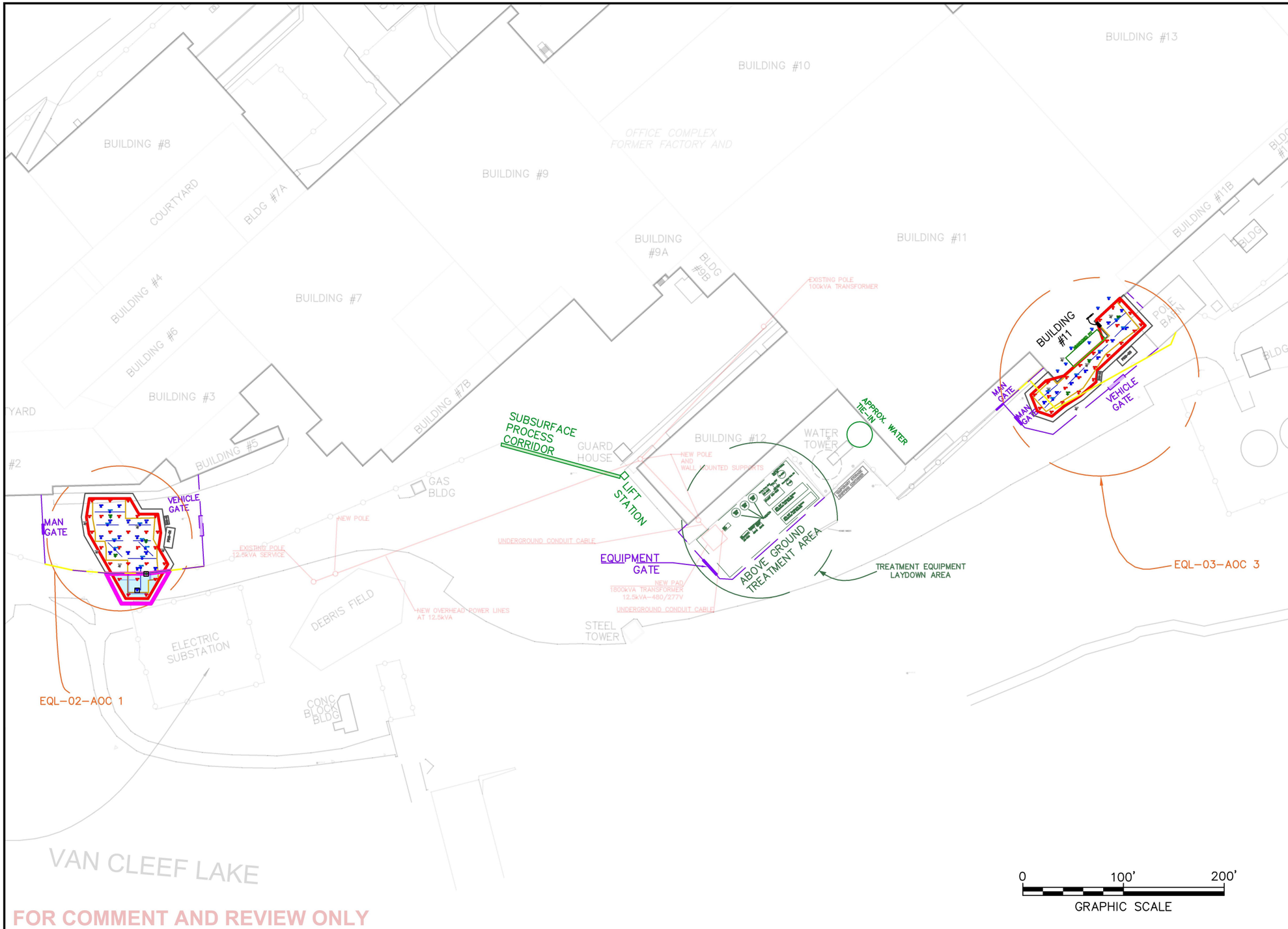
APEGA PERMIT NUMBER: P09178

TITLE: **Well Field Layout AOC 3**

CLIENT: **Arcadis**

PROJECT: **G.T.E. Products Corporation Site NYSDEC Site No. 850003 Seneca Falls, New York**

SHEET: **WFL-03**



FOR COMMENT AND REVIEW ONLY

LEGEND

- ELECTRODE WELL [50]
- EXTRACTION WELL [23]
- VACUUM MONITORING WELL [10]
- SENSOR WELL [7]
- HORIZONTAL EXTRACTION [410]
- ISTR TREATMENT AREA [3,750 + 2,599 FT²]
- THERMAL INFLUENCE [5,460 + 3,734 FT²]
- VAPOR CAP [5,651 + 4,935 FT²]
- FLUSH W/ GRADE VAPOR CAP [1,409 FT²]
- VAULT [2]
- SVE — SHALLOW VAPOR EXTRACTION WELL [7]
- ABOVE GROUND TREATMENT AREA
- BELOW GRADE INSTALLATION
- NEW FENCE [712 FT]
- 440 — ELEVATION CONTOUR
- EXISTING FENCE
- PDS — POWER DELIVERY SYSTEM
- WCS — WATER CIRCULATION SYSTEM
- MONITORING WELL
- EXISTING FENCE TO BE REMOVED
- GATE

0 100' 200'

GRAPHIC SCALE

N

NOTES:

1. FINAL POSITIONING OF EQUIPMENT TO BE DETERMINED ON SITE.
2. POWER DROP AND WATER CONNECTION LOCATIONS TO BE PROVIDED BY ARCADIS.
3. FENCING TO BE MOVED FOR CRANE ACCESS AS REQUIRED.
4. TWO 60 CHANNEL POWER DELIVERY AND TWO 60 CHANNEL WATER CIRCULATION SYSTEMS.

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B6	21/05/2024	EDITS TO DRAFT FINAL	CO	CC	CC
B5	13/05/2024	DRAFT FINAL	CO	CC	CC
B4	22/01/2024	WELL MOVES	DJP	CC	CC

APEGA PERMIT NUMBER: P09178

TITLE: **Equipment Layout**

CLIENT: **Arcadis**

PROJECT: **G.T.E. Products Corporation Site**
NYSDEC Site No. 850003
Seneca Falls, New York

SHEET: **EQL-01**

MAN GATE

VEHICLE GATE

WCS–01

PDS–01

MW-24

E1–B07 E1–C07 E1–D07
X1–B06 X1–C06
HX1–B06
E1–A06 E1–B06 T1–B06 E1–C06 E1–D06 E1–E06
V1–A03
X1–B05 X1–C05 X1–D05
HX1–B05 HX1–D05
V1–B02
E1–A05 E1–B05 E1–C05 E1–D05 E1–E05
X1–A04 X1–B04 X1–C04
HX1–B04 HX1–C04 T1–C04
E1–A04 E1–B04 E1–C04 HX1–C03 E1–D04
HX1–A03
V1–A02
V1–B01
X1–A03 X1–B03 X1–C03
T1–A03
HX1–B03
E1–A03 V1–A01 E1–B03 E1–C03 E1–D03
HX1–A02
X1–A02 X1–B02
T1–B02
E1–A02 E1–B02 E1–C02
X1–A01
E1–A01 E1–B01

0 25’ 50’

GRAPHIC SCALE

FOR COMMENT AND REVIEW ONLY

LEGEND

- ELECTRODE WELL [26]
- EXTRACTION WELL [14]
- VACUUM MONITORING WELL [5]
- SENSOR WELL [4]
- HORIZONTAL EXTRACTION [236]
- ISTR TREATMENT AREA [3,750 FT²]
- THERMAL INFLUENCE [5,460 FT²]
- VAPOR CAP [5,651 FT²]
- FLUSH W/ GRADE VAPOR CAP [1,409 FT²]
- VAULT [2]
- BELOW GRADE INSTALLATION
- NEW FENCE [319 FT]
- ELEVATION CONTOUR
- EXISTING FENCE
- PDS — POWER DELIVERY SYSTEM
- WCS — WATER CIRCULATION SYSTEM
- MONITORING WELL
- EXISTING FENCE TO BE REMOVED
- GATE

NOTES:

1. FINAL POSITIONING OF EQUIPMENT TO BE DETERMINED ON SITE.
2. POWER DROP AND WATER CONNECTION LOCATIONS TO BE PROVIDED BY ARCADIS.
3. FENCING TO BE MOVED FOR CRANE ACCESS AS REQUIRED.
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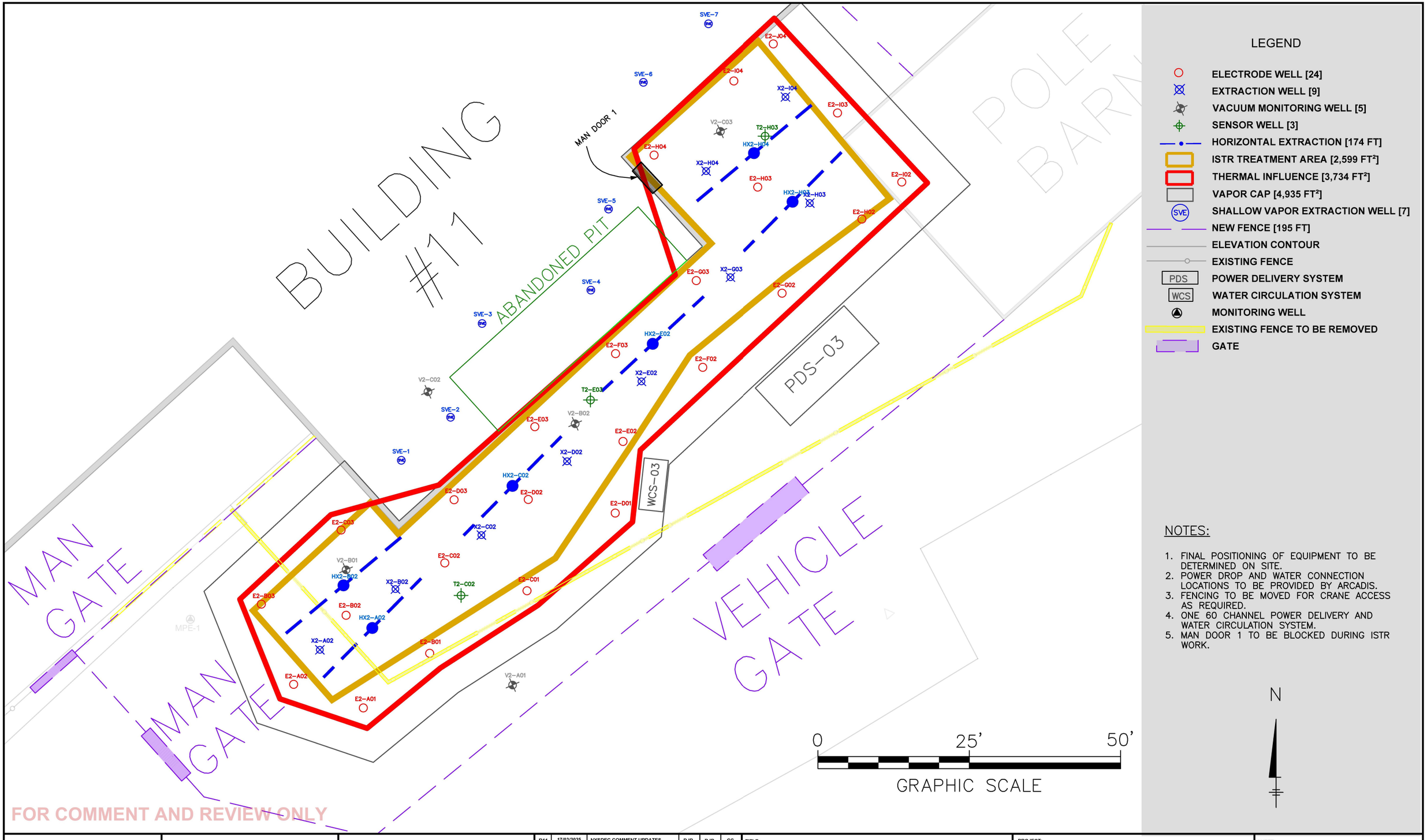
APEGA PERMIT NUMBER: P09178

TITLE: **Equipment Layout AOC 1**

CLIENT: **Arcadis**

PROJECT: **G.T.E. Products Corporation Site NYSDEC Site No. 850003 Seneca Falls, New York**

SHEET: **EQL-02**



LEGEND

- ELECTRODE WELL [24]
- EXTRACTION WELL [9]
- VACUUM MONITORING WELL [5]
- SENSOR WELL [3]
- HORIZONTAL EXTRACTION [174 FT]
- ISTR TREATMENT AREA [2,599 FT^2]
- THERMAL INFLUENCE [3,734 FT^2]
- VAPOR CAP [4,935 FT^2]
- SHALLOW VAPOR EXTRACTION WELL [7]
- NEW FENCE [195 FT]
- ELEVATION CONTOUR
- EXISTING FENCE
- POWER DELIVERY SYSTEM
- WATER CIRCULATION SYSTEM
- MONITORING WELL
- EXISTING FENCE TO BE REMOVED
- GATE

NOTES:

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2. POWER DROP AND WATER CONNECTION LOCATIONS TO BE PROVIDED BY ARCADIS.
3. FENCING TO BE MOVED FOR CRANE ACCESS AS REQUIRED.
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5. MAN DOOR 1 TO BE BLOCKED DURING ISTR WORK.

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B5	13/05/2024	DRAFT FINAL	CO	CC	CC
B4	22/01/2024	WELL MOVES	DJP	CC	CC

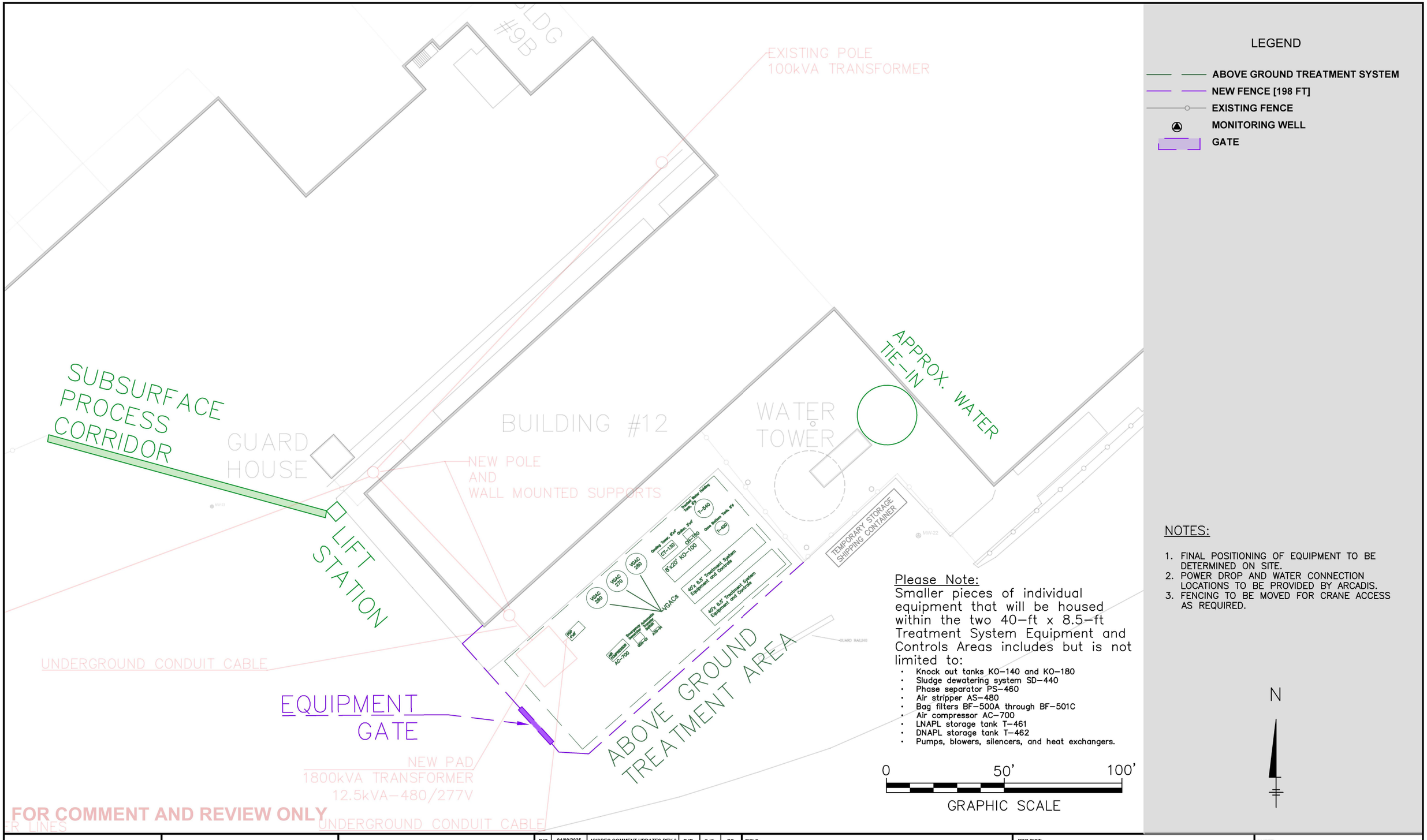
APEGA PERMIT NUMBER: P09178

TITLE: **Equipment Layout AOC 3**

CLIENT: **Arcadis**

PROJECT: **G.T.E. Products Corporation Site NYSDEC Site No. 850003 Seneca Falls, New York**

SHEET: **EQL-03**



LEGEND

- ABOVE GROUND TREATMENT SYSTEM
- NEW FENCE [198 FT]
- EXISTING FENCE
- MONITORING WELL
- GATE

Please Note:
Smaller pieces of individual equipment that will be housed within the two 40-ft x 8.5-ft Treatment System Equipment and Controls Areas includes but is not limited to:

- Knock out tanks KO-140 and KO-180
- Sludge dewatering system SD-440
- Phase separator PS-460
- Air stripper AS-480
- Bag filters BF-500A through BF-501C
- Air compressor AC-700
- LNAPL storage tank T-461
- DNAPL storage tank T-462
- Pumps, blowers, silencers, and heat exchangers.

0 50' 100'

GRAPHIC SCALE

NOTES:

1. FINAL POSITIONING OF EQUIPMENT TO BE DETERMINED ON SITE.
2. POWER DROP AND WATER CONNECTION LOCATIONS TO BE PROVIDED BY ARCADIS.
3. FENCING TO BE MOVED FOR CRANE ACCESS AS REQUIRED.

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B6	29/05/2024	EDITS TO DRAFT FINAL	CO	CC	CC
B5	21/05/2024	EDITS TO DRAFT FINAL	CO	CC	CC
B4	13/05/2024	DRAFT FINAL	CO	CC	CC
B3	01/12/2023	ELECTRICAL UPDATES	CE	CC	CC

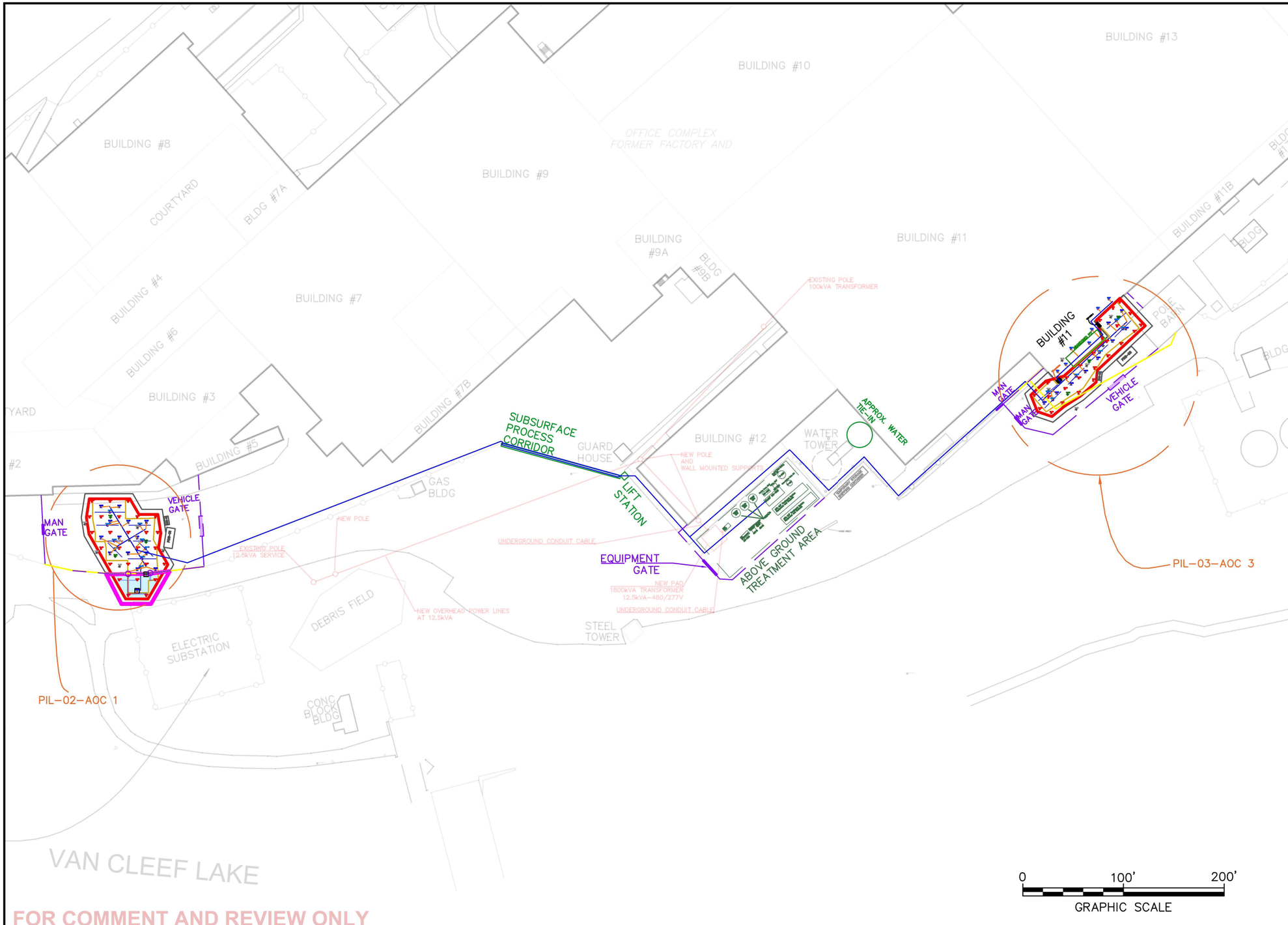
APEGA PERMIT NUMBER: P09178

TITLE: **Equipment Layout Treatment System**

CLIENT: **Arcadis**

PROJECT: **G.T.E. Products Corporation Site NYSDEC Site No. 850003 Seneca Falls, New York**

SHEET: **EQL-04**



FOR COMMENT AND REVIEW ONLY

LEGEND

- ELECTRODE WELL [50]
- EXTRACTION WELL [23]
- VACUUM MONITORING WELL [10]
- SENSOR WELL [7]
- HORIZONTAL EXTRACTION [410]
- ISTR TREATMENT AREA [3,750 + 2,599 FT²]
- THERMAL INFLUENCE [5,460 + 3,734 FT²]
- VAPOR CAP [5,651 + 4,935 FT²]
- FLUSH W/ GRADE VAPOR CAP [1,409 FT²]
- VAULT [2]
- SVE — SHALLOW VAPOR EXTRACTION WELL [7]
- ABOVE GROUND TREATMENT AREA
- EXTRACTION MAINLINE
- HOSE TO MAINLINE
- BELOW GRADE INSTALLATION
- NEW FENCE [712 FT]
- 440 — ELEVATION CONTOUR
- EXISTING FENCE
- PDS — POWER DELIVERY SYSTEM
- WCS — WATER CIRCULATION SYSTEM
- MONITORING WELL
- EXISTING FENCE TO BE REMOVED
- GATE

NOTES:

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2. POWER DROP AND WATER CONNECTION LOCATIONS TO BE PROVIDED BY ARCADIS.
3. FENCING TO BE MOVED FOR CRANE ACCESS AS REQUIRED.
4. TWO 60 CHANNEL POWER DELIVERY AND TWO 60 CHANNEL WATER CIRCULATION SYSTEMS.

0 100' 200'
GRAPHIC SCALE

N

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B6	21/05/2024	EDITS TO DRAFT FINAL	CO	CC	CC
B5	13/05/2024	DRAFT FINAL	CO	CC	CC
B4	22/01/2024	WELL MOVES	DJP	CC	CC

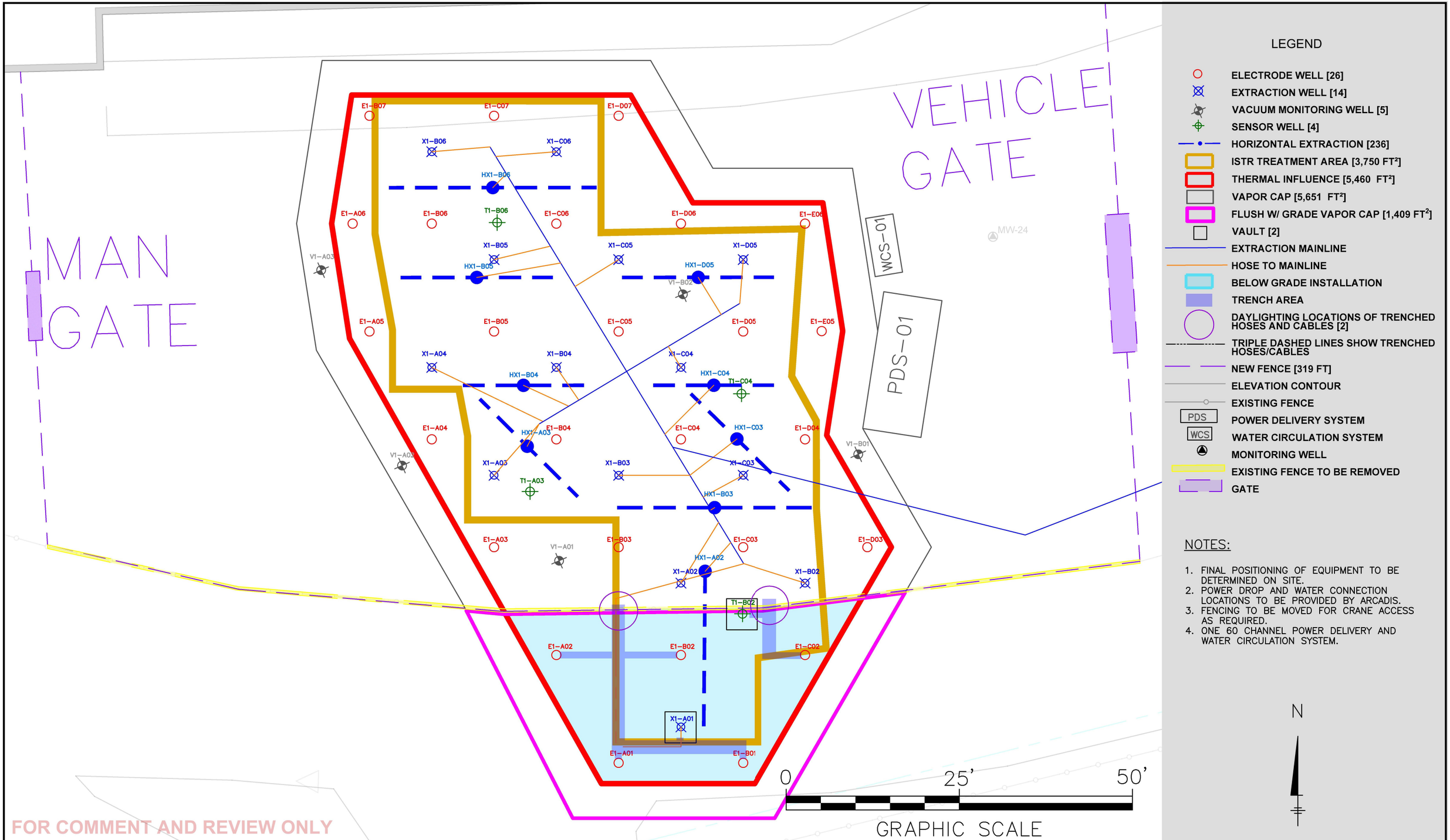
APEGA PERMIT NUMBER: P09178

TITLE: **Piping Layout**

CLIENT: **Arcadis**

PROJECT: **G.T.E. Products Corporation Site**
NYSDEC Site No. 850003
Seneca Falls, New York

SHEET: **PIL-01**



LEGEND

- ELECTRODE WELL [26]
- EXTRACTION WELL [14]
- VACUUM MONITORING WELL [5]
- SENSOR WELL [4]
- HORIZONTAL EXTRACTION [236]
- ISTR TREATMENT AREA [3,750 FT²]
- THERMAL INFLUENCE [5,460 FT²]
- VAPOR CAP [5,651 FT²]
- FLUSH W/ GRADE VAPOR CAP [1,409 FT²]
- VAULT [2]
- EXTRACTION MAINLINE
- HOSE TO MAINLINE
- BELOW GRADE INSTALLATION
- TRENCH AREA
- DAYLIGHTING LOCATIONS OF TRENCHED HOSES AND CABLES [2]
- TRIPLE DASHED LINES SHOW TRENCHED HOSES/CABLES
- NEW FENCE [319 FT]
- ELEVATION CONTOUR
- EXISTING FENCE
- PDS — POWER DELIVERY SYSTEM
- WCS — WATER CIRCULATION SYSTEM
- MONITORING WELL
- EXISTING FENCE TO BE REMOVED
- GATE

NOTES:

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B5	21/05/2024	EDITS TO DRAFT FINAL	CO	CC	CC

APEGA PERMIT NUMBER: P09178

TITLE: **Piping Layout AOC 1**

CLIENT: **Arcadis**

PROJECT: **G.T.E. Products Corporation Site NYSDEC Site No. 850003 Seneca Falls, New York**

SHEET: **PIL-02**

BUILDING #11

ABANDONED PIT

MAN DOOR 1

Wall penetration

PDS-03

WCS-03

MAN GATE

MAN GATE

MAN GATE

VEHICLE GATE

MPE-1

SVE-1 SVE-2 SVE-3 SVE-4 SVE-5 SVE-6 SVE-7

E2-A01 E2-A02 E2-B01 E2-B02 E2-B03 E2-C01 E2-C02 E2-C03 E2-D01 E2-D02 E2-D03 E2-E02 E2-E03 E2-F02 E2-F03 E2-G02 E2-G03 E2-H02 E2-H03 E2-H04 E2-I02 E2-I03 E2-I04 E2-J04

X2-A02 X2-B02 X2-C02 X2-D02 X2-E02 X2-G03 X2-H03 X2-H04 X2-I04

HX2-A02 HX2-B02 HX2-C02 HX2-E02 HX2-H03 HX2-H04

T2-C02 T2-E03 T2-H03

V2-A01 V2-B01 V2-B02 V2-C02 V2-C03

0 25' 50'

GRAPHIC SCALE

N

LEGEND

- ELECTRODE WELL [24]
- EXTRACTION WELL [9]
- VACUUM MONITORING WELL [5]
- SENSOR WELL [3]
- HORIZONTAL EXTRACTION [174 FT]
- ISTR TREATMENT AREA [2,599 FT²]
- THERMAL INFLUENCE [3,734 FT²]
- VAPOR CAP [4,935 FT²]
- SHALLOW VAPOR EXTRACTION WELL [7]
- NEW FENCE [195 FT]
- EXTRACTION MAINLINE
- HOSE TO MAINLINE
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- WATER CIRCULATION SYSTEM
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- EXISTING FENCE TO BE REMOVED
- GATE

NOTES:

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B5	13/05/2024	DRAFT FINAL	CO	CC	CC
B4	22/01/2024	WELL MOVES	DJP	CC	CC

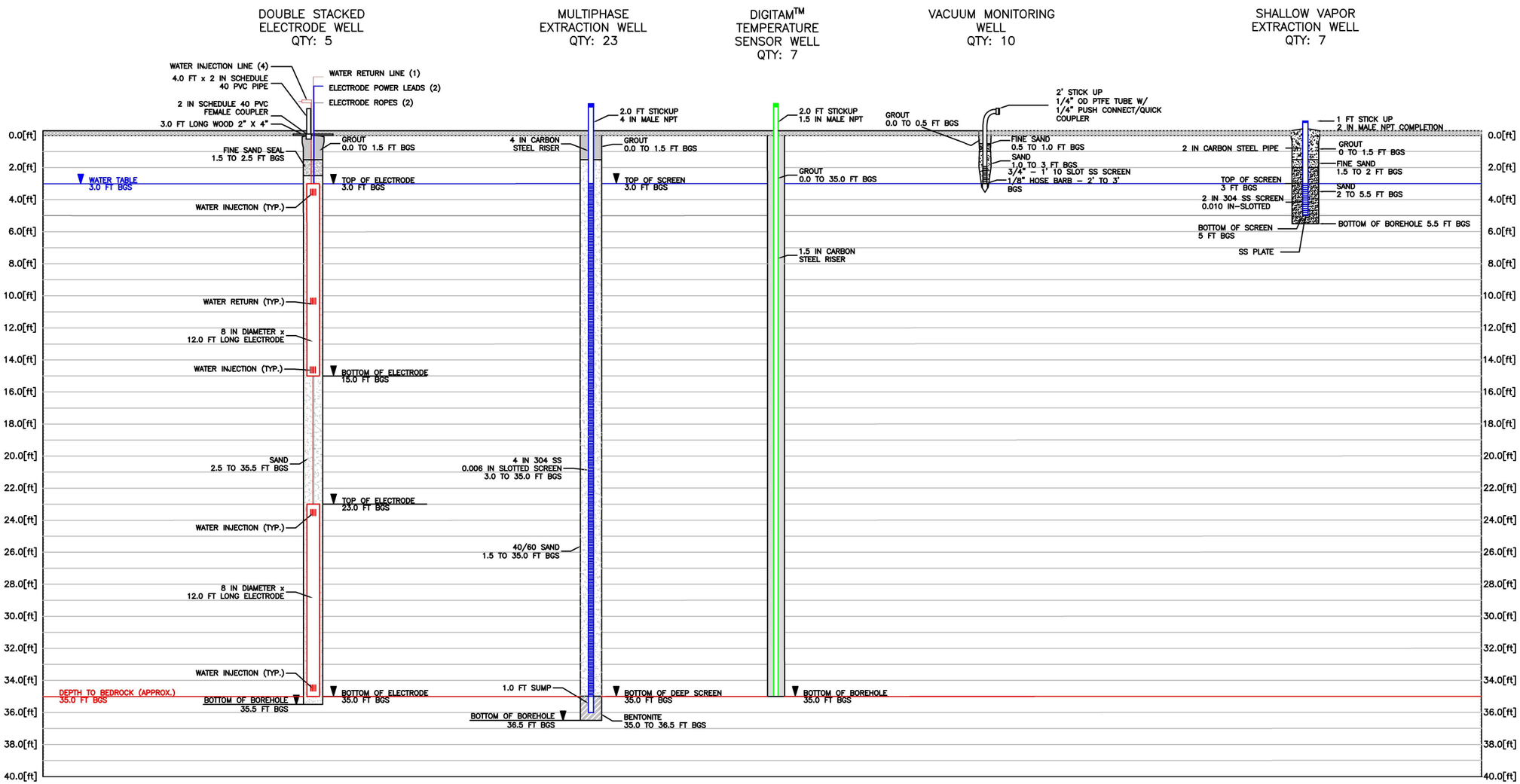
APEGA PERMIT NUMBER: P09178

TITLE: **Piping Layout AOC 3**

CLIENT: **Arcadis**

PROJECT: **G.T.E. Products Corporation Site NYSDEC Site No. 850003 Seneca Falls, New York**

SHEET: **PIL-03**



GENERAL NOTES:

1. MATERIAL TYPES
   - A. GROUT
     - NEAT PORTLAND TYPE 1/2 (NO BENTONITE)
   - B. SAND
     - ELECTRODE WELLS: 10/20 SILICA SAND
     - MULTIPHASE EXTRACTION WELLS: 40/60 SILICA SAND FOR 6 SLOT
     - VACUUM MONITORING WELLS: 20/40 SILICA SAND
     - SHALLOW VAPOR EXTRACTION WELLS: 20/40 SILICA SAND
   - C. FINE SAND
     - ELECTRODE WELLS: 40/60 SILICA SAND
     - MULTIPHASE EXTRACTION WELLS: 40/60 SILICA SAND
     - VACUUM MONITORING WELLS: 40/60 SILICA SAND
     - SHALLOW VAPOR EXTRACTION WELLS: 40/60 SILICA SAND
   - D. BENTONITE
     - MEDIUM CHIPS
2. DOUBLE STACKED ELECTRODE WELLS
   - A. MINIMUM 10" DIAMETER BOREHOLE
   - B. WATER RETURN LINE INCLUDED TO ALLEVIATE LOCALIZED PRESSURE BUILD UP WITHIN THE ELECTRODE WELL
   - C. ELECTRODES TO BE LOWERED INTO BOREHOLES WITH TECH LINE ROPE AND SECURED TO A 3 FT LONG PIECE OF 2x4" LUMBER AT GROUND SURFACE, TO PREVENT POSSIBLE SINKING DUE TO SETTLEMENT
   - D. NO BENTONITE TO BE USED FOR ELECTRODE WELLS
   - E. INJECTION HOSES ARE 0.25" DIAMETER
3. MULTIPHASE EXTRACTION WELLS
   - A. MINIMUM 8" DIAMETER BOREHOLE TO ACCOMMODATE 4" NOMINAL DIAMETER RISER PIPE
   - B. WELL SCREEN IS 4" 304 STAINLESS STEEL WITH CONTINUOUS KEYSTONE WIRE WRAP WITH 0.006" SLOT SIZE
   - C. RISER PIPE IS 4" SCHEDULE 40 OR EQUIVALENT CARBON STEEL PIPE WITH NPT THREADED CONNECTIONS
   - D. STICKUPS MUST BE 4" MALE NPT
   - E. EXTRACTION RISER PIPE TO BE WRENCH TIGHTENED. THREADS TO BE SEALED WITH PTFE TAPE
4. TEMPERATURE SENSOR WELLS
   - A. MINIMUM 4" DIAMETER BOREHOLE
   - B. RISER PIPE IS 1.5" SCHEDULE 40 OR EQUIVALENT CARBON STEEL PIPE WITH NPT THREADED CONNECTIONS
   - C. STICKUP MUST BE 1.5" MALE NPT
   - D. TEMPERATURE SENSOR RISER PIPE TO BE WRENCH TIGHTENED. THREADS TO BE SEALED WITH PTFE TAPE
5. VACUUM MONITORING WELLS
   - A. DIRECT PUSH INSTALLATION OR MINIMUM 1" DIAMETER BOREHOLE
6. SHALLOW VAPOR EXTRACTION WELLS
   - A. MINIMUM 4" DIAMETER BOREHOLE
7. ACTUAL INSTALL DEPTHS WILL BE DEPENDENT ON ENCOUNTERED BEDROCK DEPTH
8. DRAWING REFERENCES
   - A. SEE WHD-01 AND WHD-02 FOR WELLHEAD DETAILS

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B7	17/03/2025	NYSDEC COMMENT UPDATES	DJP	DJP	CC
B4	29/05/2024	EDITS TO DRAFT FINAL	CO	CC	CC
B3	13/05/2024	DRAFT FINAL	CO	CC	CC
B2	07/09/2023	DRAFT FOR REVIEW	SP	CC	CC
B1	18/08/2023	DRAFT FOR REVIEW	DN	CC	CC
A1	02/03/2023	DRAFT FOR REVIEW	JM	AD	CC

APEGA PERMIT NUMBER: P09178 | SCALE: NTS

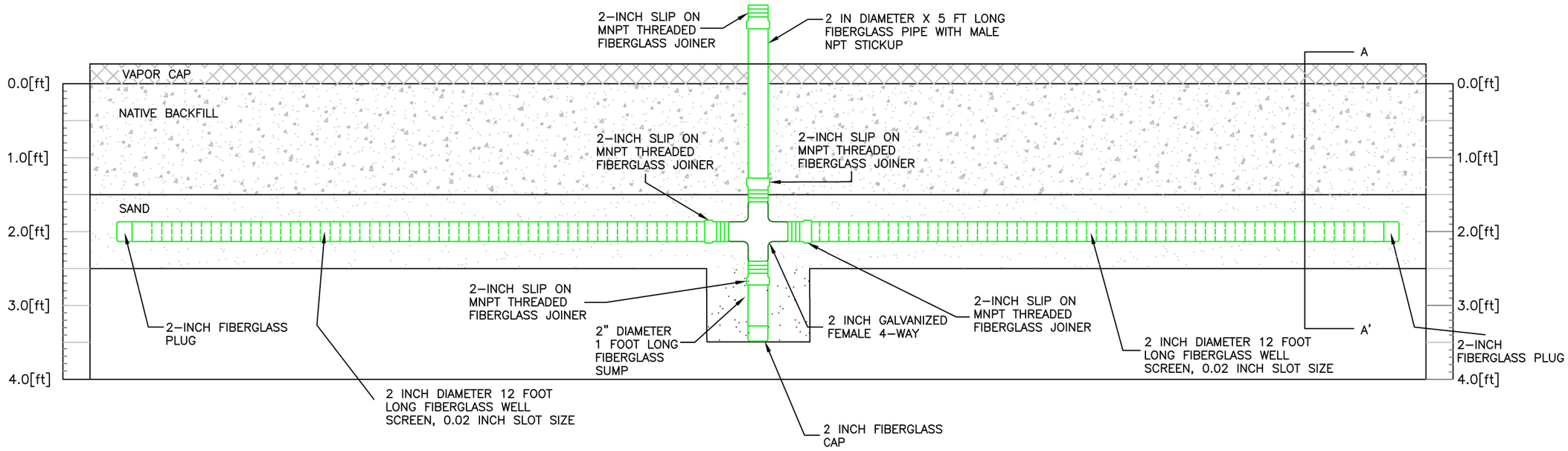
TITLE: **ISTR Well Construction Diagram - Preliminary For Review and Discussion Purposes Only**

CLIENT: **Arcadis**

PROJECT: **G.T.E. Products Corporation Site NYSDEC Site No. 850003 Seneca Falls, New York**

SHEET: **WCD-01**

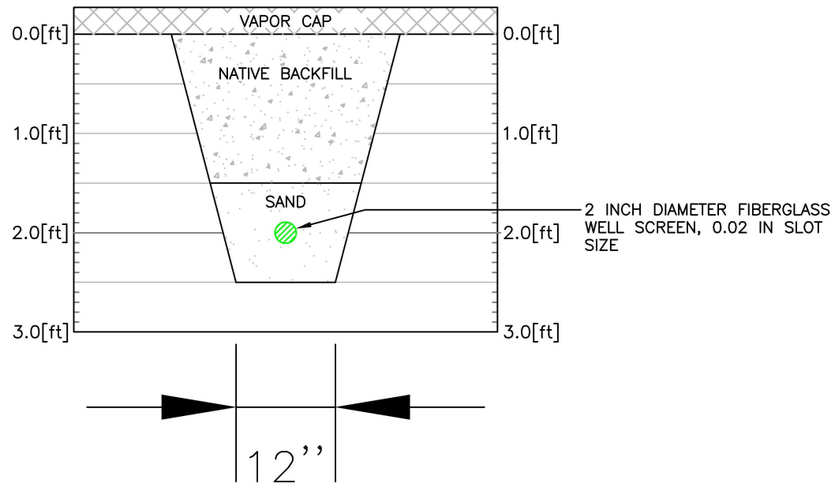
HORIZONTAL SOIL VAPOR EXTRACTION WELLS – QTY. 16



GENERAL NOTES

1. HORIZONTAL PIPE TO BE SET 2.0 FT BELOW EXISTING GRADE
2. HORIZONTAL PIPE TO BE SET ABOVE THE WATER TABLE (IF ENCOUNTERED DURING INSTALLATION)
3. BOTTOM OF TRENCH APPROXIMATELY 12 INCH WIDTH, OR AS PER BUCKET WIDTH ON MACHINERY AVAILABLE
4. FILL MATERIAL IS 10/20 SILICA SAND FOR 0.02 IN SLOT SIZE
5. BACKFILL IS NATIVE AND TO BE TAMPED DOWN IN NO MORE THAN 1 FT LIFTS
6. FIBERGLASS WILL BE GREEN THREAD SPEC

SECTION A–A'



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B8	04/09/2025	NYSDEC COMMENT UPDATES REV 2	DJP	DJP	CC
B7	17/03/2025	NYSDEC COMMENT UPDATES	DJP	DJP	CC
B4	29/05/2024	EDITS TO DRAFT FINAL	CO	CC	CC
B3	13/05/2024	DRAFT FINAL	CO	CC	CC
B2	06/09/2023	DRAFT FOR REVIEW	SP	CC	CC
B1	18/08/2023	DRAFT FOR REVIEW	DN	CC	CC

APEGA PERMIT NUMBER: P09178 SCALE: NTS

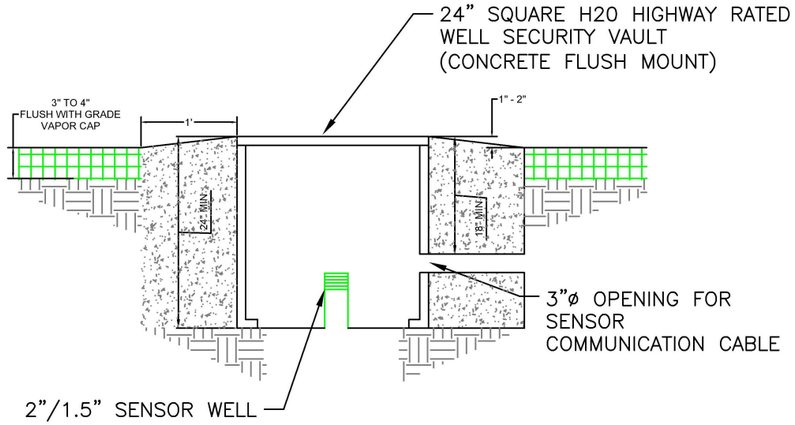
TITLE: **Horizontal Soil Vapor Extraction Well Construction Diagram**

CLIENT: **Arcadis**

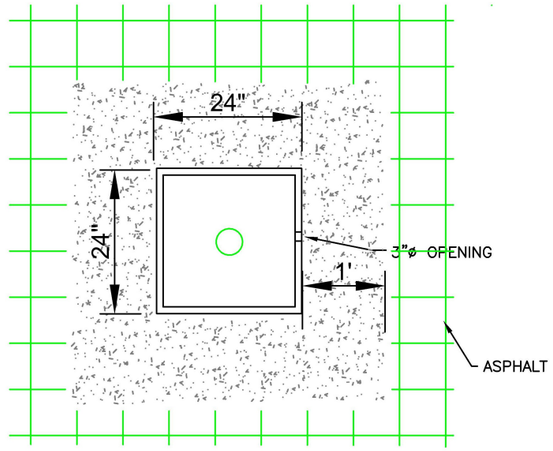
PROJECT: **G.T.E. Products Corporation Site NYSDEC Site No. 850003 Seneca Falls, New York**

SHEET: **WCD-02**

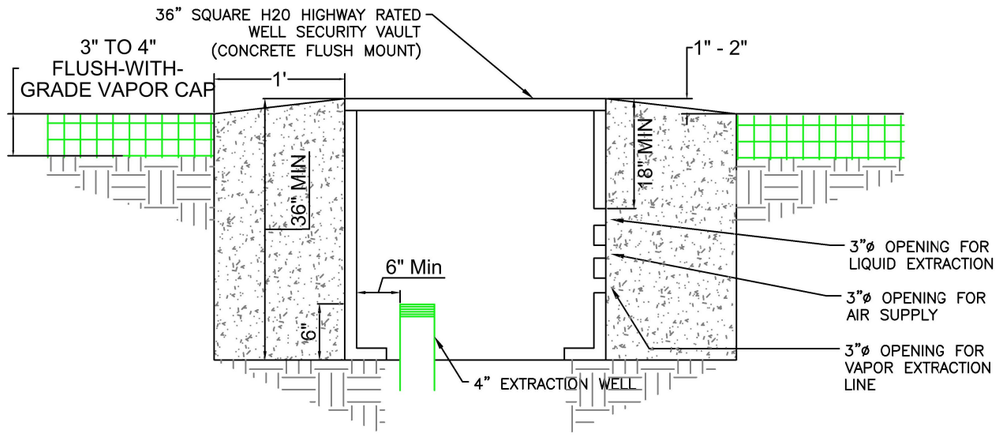
SENSOR WELL VAULT SIDE VIEW
2'X2'X2' VAULT



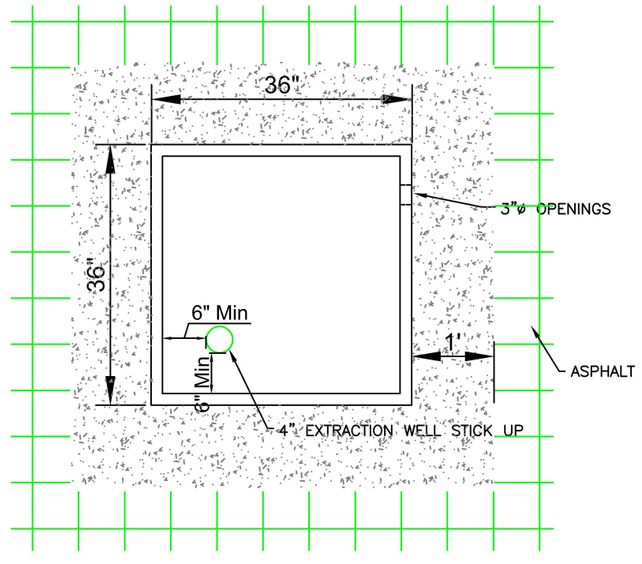
SENSOR WELL VAULT TOP VIEW
2'X2'X2' VAULT



MULTIPHASE EXTRACTION WELL VAULT SIDE VIEW
3'X3'X3' VAULT



MULTIPHASE EXTRACTION WELL VAULT TOP VIEW
3'X3'X3' VAULT



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B9	01/10/2025	ARCADIS COMMENT UPDATES	ZV	CC	CC
B8	04/09/2025	NYSDEC COMMENT UPDATES REV 2	DJP	DJP	CC
B7	17/03/2025	NYSDEC COMMENT UPDATES	DJP	DJP	CC
B3	29/05/2024	EDITS TO DRAFT FINAL	CO	CC	CC
B2	13/05/2024	DRAFT FINAL	CO	CC	CC
B1	18/08/2023	DRAFT FOR REVIEW	DN	CC	CC

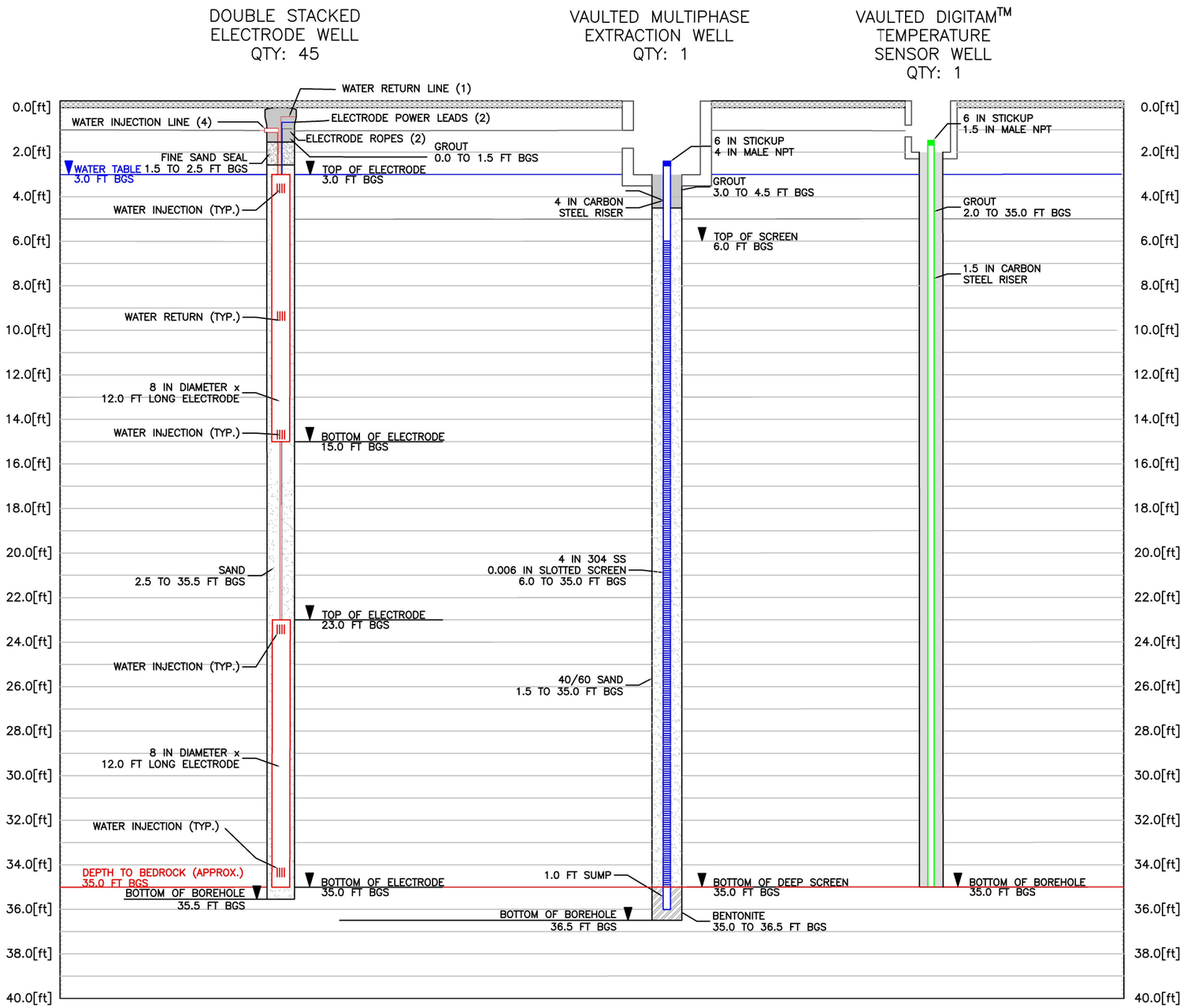
APEGA PERMIT NUMBER: P09178
SCALE: NTS

TITLE: **Vaulted Well Construction Diagram**

CLIENT: **Arcadis**

PROJECT: **G.T.E. Products Corporation Site**
NYSDEC Site No. 850003
Seneca Falls, New York

SHEET: **WCD-03**



GENERAL NOTES:

1. MATERIAL TYPES
   - A. GROUT
     - NEAT PORTLAND TYPE 1/2 (NO BENTONITE)
   - B. SAND
     - MULTIPHASE EXTRACTION WELLS: 40/60 SILICA SAND FOR 6 SLOT
     - ELECTRODE WELLS: 10/20 SILICA SAND
   - C. FINE SAND
     - MULTIPHASE EXTRACTION WELLS: 40/60 SILICA SAND
     - ELECTRODE WELLS:40/60 SILICA SAND
   - D. BENTONITE
     - MEDIUM CHIPS
2. DOUBLE STACKED ELECTRODE WELLS
   - A. MINIMUM 10" DIAMETER BOREHOLE
   - B. WATER RETURN LINE INCLUDED TO ALLEVIATE LOCALIZED PRESSURE BUILD UP WITHIN THE ELECTRODE WELL
   - C. ELECTRODES TO BE LOWERED INTO BOREHOLES WITH TECH LINE ROPE AND SECURED TO A 3 FT LONG PIECE OF 2X4" LUMBER AT GROUND SURFACE, TO PREVENT POSSIBLE SINKING DUE TO SETTLEMENT
   - D. NO BENTONITE TO BE USED FOR ELECTRODE WELLS
   - E. INJECTION HOSES ARE 0.25" DIAMETER
3. MULTIPHASE EXTRACTION WELLS
   - A. MINIMUM 8" DIAMETER BOREHOLE TO ACCOMMODATE 4" NOMINAL DIAMETER RISER PIPE
   - B. WELL SCREEN IS 4" 304 STAINLESS STEEL WITH CONTINUOUS KEYSTONE WIRE WRAP WITH 0.006" SLOT SIZE
   - C. RISER PIPE IS 4" SCHEDULE 40 OR EQUIVALENT CARBON STEEL PIPE WITH NPT THREADED CONNECTIONS
   - D. STICKUPS MUST BE 4" MALE NPT
   - E. EXTRACTION RISER PIPE TO BE WRENCH TIGHTENED. THREADS TO BE SEALED WITH PTFE TAPE
4. TEMPERATURE SENSOR WELLS
   - A. MINIMUM 4" DIAMETER BOREHOLE
   - B. RISER PIPE IS 1.5" SCHEDULE 40 OR EQUIVALENT CARBON STEEL PIPE WITH NPT THREADED CONNECTIONS
   - C. STICKUP MUST BE 1.5" MALE NPT
   - D. TEMPERATURE SENSOR RISER PIPE TO BE WRENCH TIGHTENED. THREADS TO BE SEALED WITH PTFE TAPE
5. DRAWING REFERENCES
   - A. SEE WCD-03 FOR VAULT DETAILS
   - B. SEE WHD-01 AND WHD-02 FOR WELL HEAD DETAILS
6. ACTUAL INSTALL DEPTHS WILL BE DEPENDENT ON ENCOUNTERED BEDROCK DEPTH.

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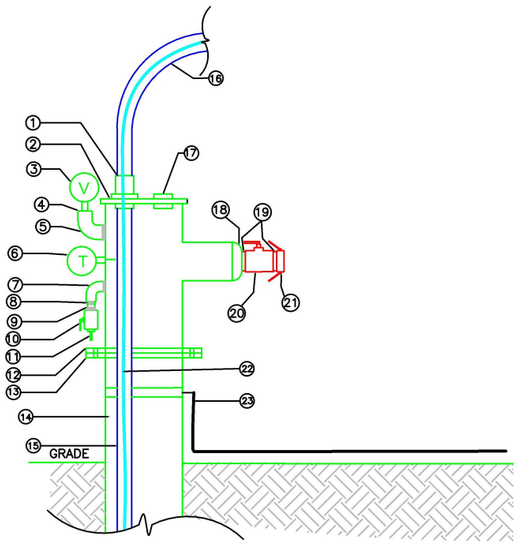
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B7	17/03/2025	NYSDEC COMMENT UPDATES	DJP	DJP	CC
B6	11/06/2024	VAULTED WELL EDIT	CO	CC	CC
B5	29/05/2024	EDITS TO DRAFT FINAL	CO	CC	CC
B4	13/05/2024	DRAFT FINAL	CO	CC	CC
B3	22/01/2024	UPDATING WCD NUMBER	DJP	CC	CC
B2	06/09/2023	DRAFT FOR REVIEW	SP	CC	CC

APEGA PERMIT NUMBER: P09178
SCALE: NTS

TITLE: **Well Construction Diagram**
CLIENT: **Arcadis**
PROJECT: **G.T.E. Products Corporation Site NYSDEC Site No. 850003 Seneca Falls, New York**
SHEET: **WCD-04**

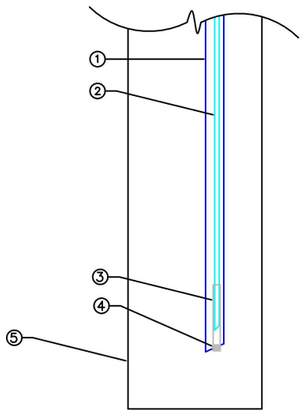
MULTI–PHASE EXTRACTION WELL WITH SLURPER TUBE DETAIL



WELLHEAD COMPONENTS

1. STRAIN RELIEF
2. 4" ø WELL SEAL
3. VACUUM GAUGE 0–30" HG
4. 1/2" M NPT X 1/4" F NPT BUSHING, GALV.
5. 1/2" NPT STREET ELBOW, GALV.
6. TEMPERATURE GAUGE –17.78–121C [0–250F]
7. 1/2" NPT STREET ELBOW, GALV.
8. 1/2" M NPT x 3/8" F NPT REDUCER BUSHING, GALV.
9. 3/8" NPT CLOSE NIPPLE, BRASS
10. 3/8" NPT BALL VALVE, BRASS
11. 3/8" M NPT X 1/4" HOSE BARB, BRASS
12. 4" ø STEEL SCH40 FLANGE
13. 4" ø CARBON STEEL BOLT FLANGE
14. 4" NOMINAL I.D. CARBON STEEL WELL CASING
15. 1" NOMINAL DIAMETER PEX GW EXTRACTION HOSE
16. 1" NOMINAL DIAMETER PEX GW EXTRACTION HOSE /TO MAINLINE
17. 3/4" NPT SAMPLE PORT PLUG
18. 2" F NPT X 1" F NPT BELL REDUCER, GALV.
19. 1" CLOSE NIPPLE, GALV.
20. 1" ø BALL VALVE, BRASS
21. 1" F CAM LOCK X 1" F NPT, AL. ALLOY
22. ¼" I.D. COMPRESSED AIR LINE
23. ET–DSP™ NEUTRAL WIRE

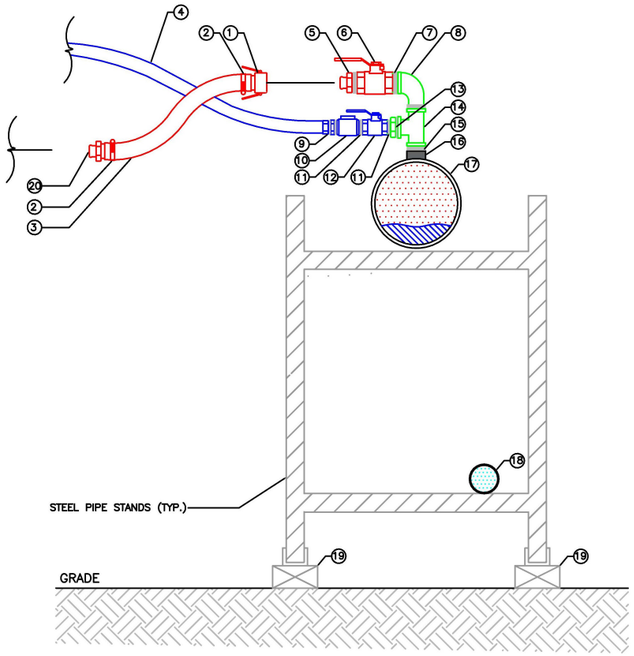
SLURPER TUBE DETAIL



SLURPER TUBE DETAIL COMPONENTS

1. 1" NOMINAL DIAMETER PEX TUBE CUT ON 45 DEGREE ANGLE
2. ¼" I.D. COMPRESSED AIR LINE CUT ON 45 DEGREE ANGLE
3. 1/2" HDPE INNER TUBE AIRLINE HOUSING
4. 1/2" NPT PLUG, GALV.
5. 4" NOMINAL I.D. SCHED. 40 0.010" SLOTTED CONTINUOUS WIRE WRAP SCREEN

MULTIPHASE EXTRACTION WELL AND HORIZONTAL EXTRACTION WELL CONNECTION TO CONVEYANCE PIPING NETWORK



NOTE: Main conveyance pipe is interconnected with dresser couplings and sloped at approximately 1 degree from horizontal towards the inlet of the treatment system. Multiphase flow regime may not be as illustrated. Details are elevation views.

PIPING CONNECTION COMPONENTS

1. 1–1/2" F CAMLOCK X 1–1/2" HOSE BARB (PART C), ALUM. ALLOY
2. 1–1/2" HOSE CLAMP
3. 1–1/2" ID PARKER SERIES 7373T BLUE THUNDER CORRUGATED CHEMICAL SUCTION VAPOR EXTRACTION HOSE
4. 3/4" ID PTFE GROUNDWATER EXTRACTION HOSE
5. 1–1/2" M CAMLOCK X 1–1/2" M NPT (PART F), ALUM. ALLOY
6. 1–1/2" NPT BALL VALVE, BRASS
7. 1–1/2" NPT CLOSE NIPPLE, GALV.
8. 1–1/2" NPT STREET ELBOW, GALV.
9. 1/2" M NPT X 3/4" COMPRESSION FITTNG, BRASS
10. 1/2" NPT SWING CHECK VALVE, BRASS
11. 1/2" NPT CLOSE NIPPLE, BRASS
12. 1/2" NPT BALL VALVE, BRASS
13. 1–1/2" M NPT X 1/2" F NPT REDUCER BUSHING, GALV.
14. 1–1/2" F NPT PIPE TEE, GALV.
15. 1–1/2" NPT CLOSE NIPPLE, GALV.
16. 1" F NPT WELDOLET, CARBON STEEL
17. 2" to 3" ø STEAM HEADER, CARBON STEEL
18. 1" ø AIR SUPPLY LINE, CARBON STEEL
19. SECTION OF WOODEN 2x4 FOR ELECTRICAL ISOLATION
20. 1–1/2" M CAMLOCK X 1–1/2" HOSE BARB (PART E), ALUM. ALLOY

LEGEND

- LIQUID
- VAPOR
- COMPRESSED AIR
- MULTIPHASE

NOTE: Wellhead details are elevation views.

FOR COMMENT AND REVIEW ONLY

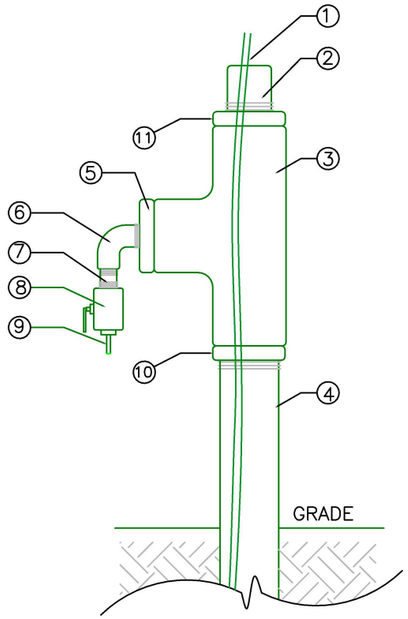
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B6	03/09/2025	NYSDEC COMMENT UPDATES REV 2	DJP	DJP	CC
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B3	13/05/2024	DRAFT FINAL	CO	CC	CC
B2	06/09/2023	DRAFT FOR REVIEW	SP	CC	CC
B1	18/08/2023	DRAFT FOR REVIEW	DN	CC	CC

APEGA PERMIT NUMBER: P09178
SCALE: NTS

TITLE: **ET-DSP™ Well Head Details**
CLIENT: **Arcadis**
PROJECT: **G.T.E. Products Corporation Site NYSDEC Site No. 850003 Seneca Falls, New York**
SHEET: **WHD-01**

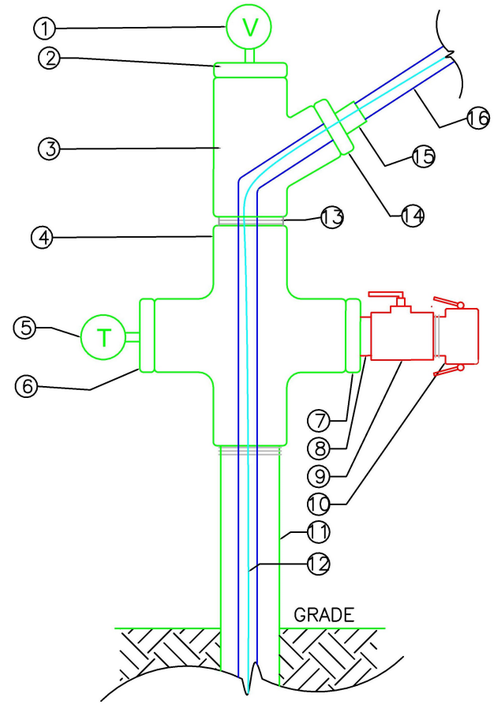
digiTAM™ WELLHEAD DETAIL



digiTAM™ WELLHEAD COMPONENTS

1. digiTAM™ SENSOR STRING
2. 1/2" STRAIN RELIEF AND 1" M NPT TO 1/2" F NPT REDUCER BUSHING (ASSEMBLED ON digiTAM™)
3. 2" F NPT x 2" F NPT x 2" F NPT TEE, GALV.
4. 1.5" CARBON STEEL CASING
5. 2" M NPT x 3/8" F NPT BUSHING, GALV.
6. 3/8" NPT STREET ELBOW, GALV.
7. 3/8" NPT CLOSE NIPPLE, GALV.
8. 3/8" NPT BALL VALVE, BRASS
9. 3/8" M NPT X 1/4" HOSE BARB, BRASS
10. 2" M NPT x 1.5" F NPT BUSHING, GALV.
11. 2" M NPT x 1"F NPT BUSHING, GALV.

HORIZONTAL EXTRACTION WELLHEAD DETAIL

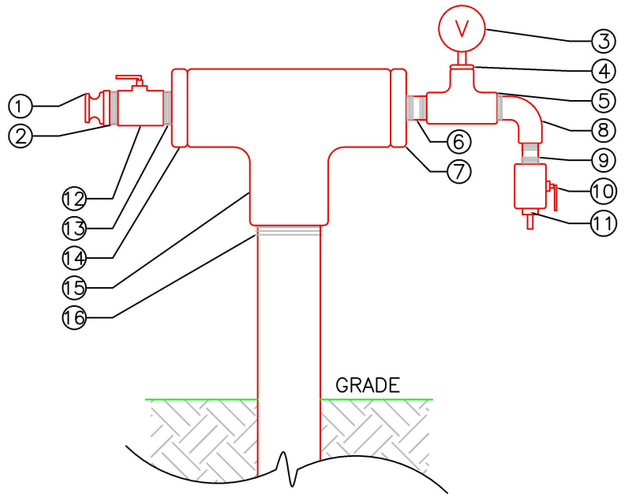


WELLHEAD COMPONENTS

1. VACUUM GAUGE, −20/0/+20in H2O.
2. 2" X 3/8" REDUCER BUSHING, GALV.
3. 2" WYE, GALV.
4. 2" F x 2" F x 2" F x 2"F TEE, GALV.
5. TEMPERATURE GAUGE, −20/0/+20in H2O.
6. 2" X 1/2" REDUCER BUSHING, GALV.
7. 2" X 1" REDUCER BUSHING, GALV.
8. 1" CLOSE NIPPLE, GALV.
9. 1" BALL VALVE, BRASS.
10. 1" M NPT X 1" FEMALE CAMLOCK, ALLOY.
11. 2" FIBERGLASS CASING.
12. 1/4" I.D. COMPRESSED AIR LINE.
13. 2" CLOSE NIPPLE, GALV.
14. 2" X 1" REDUCER BUSHING, GALV.
15. 1" STRAIN RELIEF.
16. 1" NOMINAL DIAMETER PEX GW EXTRACTION HOSE TO MAINLINE.

NOTE: Wellhead details are elevation views.

SHALLOW EXTRACTION WELLHEAD DETAIL



SHALLOW EXTRACTION WELLHEAD COMPONENTS

1. 1" M CAMLOCK X 1" F NPT – ALUMINUM
2. 1" CLOSE NIPPLE, GALV.
3. VACUUM GAUGE, 0–30 INHG.
4. 3/8"M x 1/4"F BUSHING, BRASS
5. 3/8" PIPE TEE, GALV.
6. 3/8" CLOSE NIPPLE, GALV.
7. 2" X 3/8" REDUCER BUSHING, GALV.
8. 3/8" STREET ELBOW, GALV.
9. 3/8" CLOSE NIPPLE, BRASS
10. 3/8" BALL VALVE, BRASS
11. 3/8" M NPT X 3/8" HOSE BARB, BRASS
12. 1" BALL VALVE, BRASS
13. 1" CLOSE NIPPLE, GALV.
14. 2"M x 1"F REDUCER BUSHING, GALV.
15. 2" PIPE TEE, GALV.
16. 2" FIBERGLASS CASING

LEGEND

- LIQUID
- VAPOR
- COMPRESSED AIR
- MULTIPHASE
- TEMPERATURE SENSOR WELL

NOTE: Wellhead details are elevation views.

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B2	07/09/2023	DRAFT FOR REVIEW	SP	CC	CC
B1	18/08/2023	DRAFT FOR REVIEW	DN	CC	CC

APEGA PERMIT NUMBER: P09178 SCALE: NTS

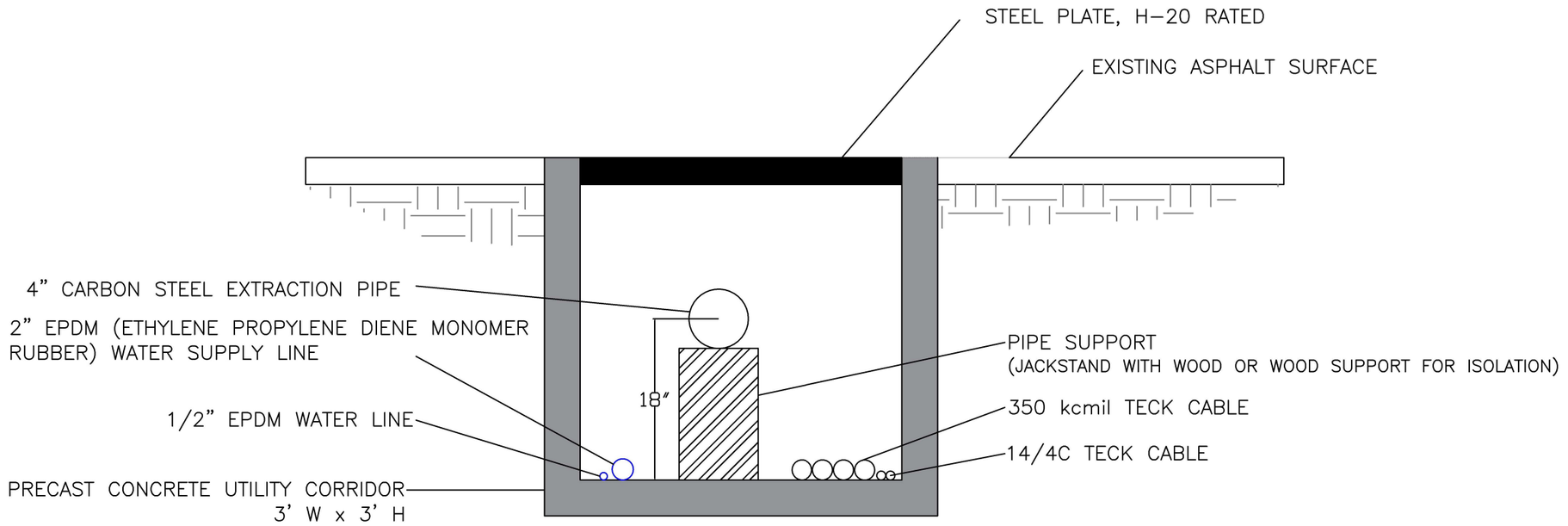
TITLE: **ET-DSP™ Well Head Details**

CLIENT: **Arcadis**

PROJECT: **G.T.E. Products Corporation Site NYSDEC Site No. 850003 Seneca Falls, New York**

SHEET: **WHD-02**

PROCESS CORRIDOR DETAIL



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B5	04/09/2025	NYSDEC COMMENT UPDATES REV 2	DJP	DJP	CC
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B3	29/05/2023	EDITS TO DRAFT FINAL	CO	CC	CC
B2	13/05/2023	DRAFT FINAL	CO	CC	CC
B1	18/08/2023	FOR COMMENT AND REVIEW	AD	AD	CC
A1	02/03/2023	FOR COMMENT AND REVIEW	AD	AD	--

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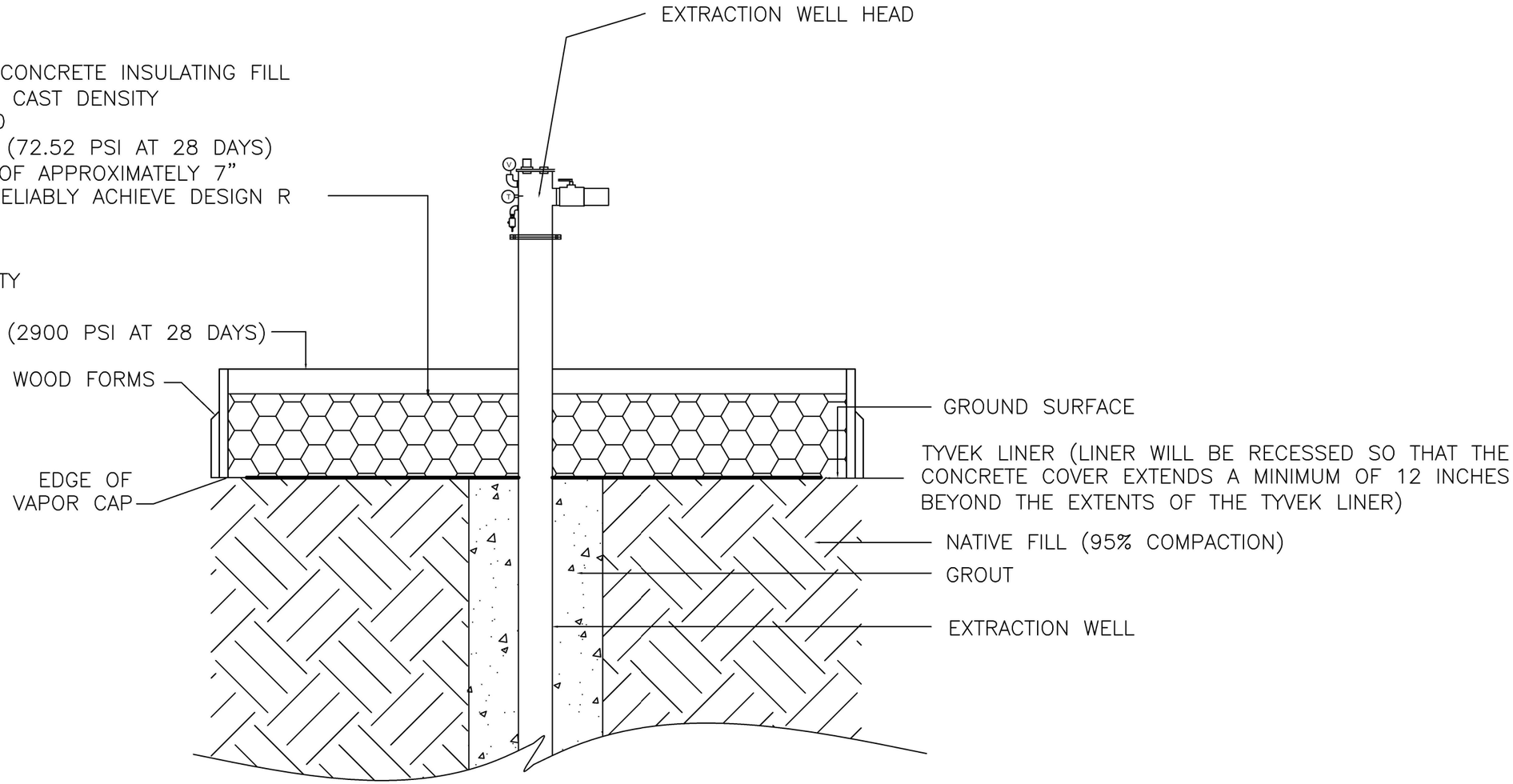
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TITLE: **Subsurface Process Corridor Detail**

PROJECT: **G.T.E. Products Corporation Site NYSDEC Site No. 850003 Seneca Falls, New York**

SHEET: **TD-01**

CELLULAR CONCRETE VAPOUR CAP
CROSS SECTION



NOTE: The cast density noted assumes that the corresponding thickness results in a minimum R value of 10 Ft2hrF/BTU. If this is incorrect for the mix chosen, adjust the cast density to achieve R 10 with the thickness noted above. Any change in thickness must be approved by Mc^2.

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B5	17/04/2025	NYSDEC COMMENT UPDATES	DJP	DJP	CC
B4	29/05/2023	EDITS TO DRAFT FINAL	CO	CC	CC
B3	13/05/2023	DRAFT FINAL	CO	CC	CC
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B1	18/08/2023	DRAFT FOR REVIEW	DN	CC	CC

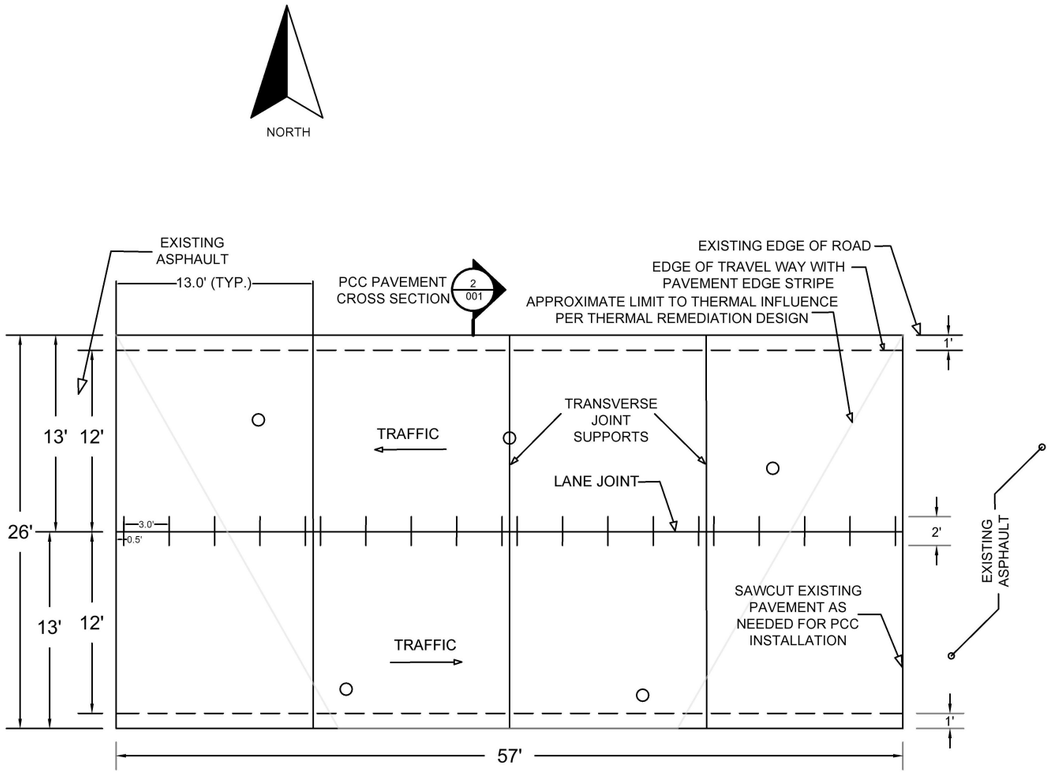
APEGA PERMIT NUMBER: P09178 SCALE: NTS

TITLE: **Vapor Cap Detail**

CLIENT: **Arcadis**

PROJECT: **G.T.E. Products Corporation Site**
NYSDEC Site No. 850003
Seneca Falls, New York

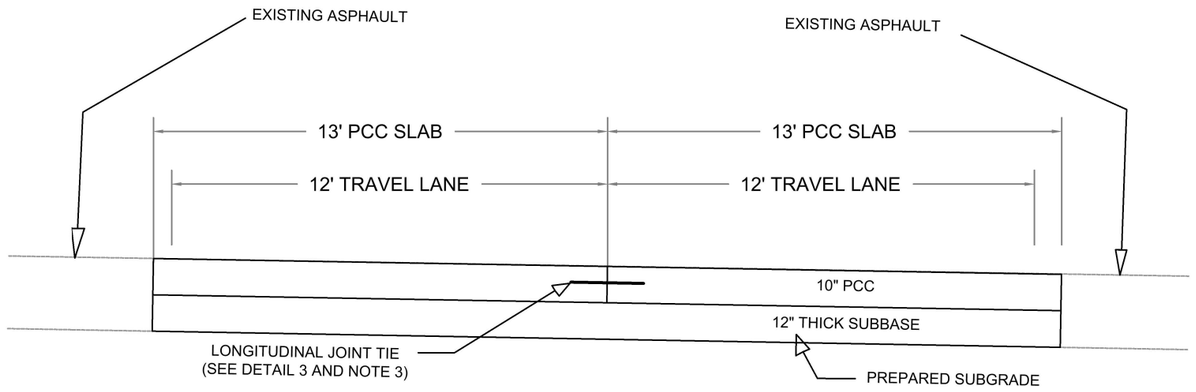
SHEET: **VCD-01**



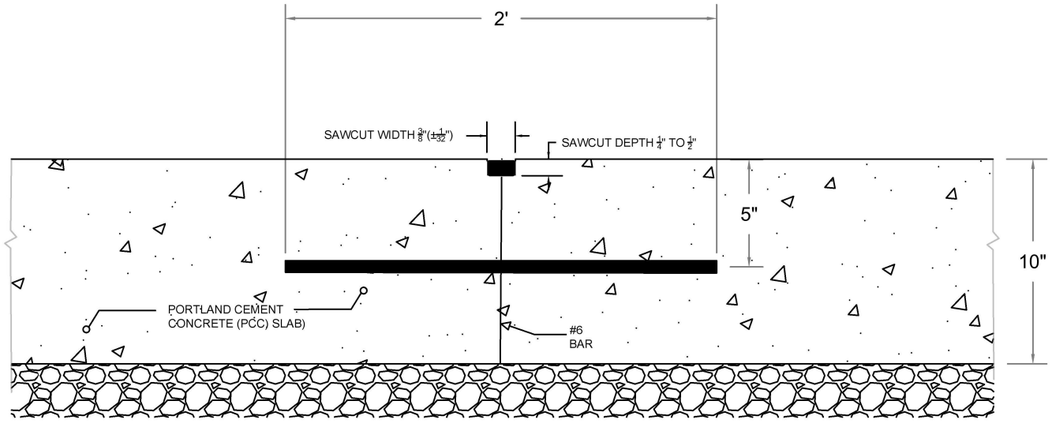
1 PCC PAVEMENT PLAN

NOTES:

1. PORTLAND CEMENT CONCRETE SHALL BE IN ACCORDANCE WITH NYSDOT STANDARD MATERIALS SECTION 501.
2. SUBBASE SHALL BE IN ACCORDANCE WITH NYSDOT STANDARD SPECIFICATION SECTION 304 AND INSTALLED IN ACCORDANCE WITH STANDARD SPECIFICATION SECTION 308.
3. SUBGRADE SHALL BE COMPACTED IN ACCORDANCE WITH NYSDOT STANDARD SPECIFICATION SECTION 203 WITH THE USE OF MINIMUM 30 TON PROOF-ROLLER-TYPE COMPACTORS.
4. THE INSIDE LONGITUDINAL JOINT CAN BE OMITTED IF THE CONTRACTOR ELECTS TO PLACE THE SHOULDER AND ADJACENT TRAVEL LANE IN A SINGLE PLACEMENT. THE MAXIMUM PLACEMENT WIDTH IS 16'. REFER TO STANDARD SHEET 502-07, NOTE 4 FOR ADDITIONAL GUIDANCE ON SLAB GEOMETRY.
5. CONSTRUCT THE LONGITUDINAL JOINTS USING #6 BAR, GRADE 60 STEEL, THAT IS 24" LONG AND SPACED 36" ON CENTER.
6. IF A LONGITUDINAL BAR MUST BE PLACED IN THE WHEEL PATH DUE TO PROJECT STAGING, PLACE THE BARS 24" O.C. NO ADDITIONAL PAYMENT WILL BE MADE FOR ADDITIONAL NUMBER OF TIES.
7. PLACE TIES AT A DEPTH OF 5 INCHES OR HALF THE PCC SLAB THICKNESS.
8. USE ASTM TYPE IV HOT POUR HIGHWAY JOINT SEALER, UNLESS THE CONTRACT CALLS FOR PERFORMED ELASTIC JOINT SEALER.
9. PROVIDE NON-SHRINK GROUT AS DIRECTED BY THE ENGINEER AT THE FIGURE INTERFACE OF NEW PCC AND EXISTING ASPHALT PAVEMENT.



1 PCC PAVEMENT CROSS SECTION



3 LONGITUDINAL JOINT TIE

FOR COMMENT AND REVIEW ONLY

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REV.	DATE (DD/MM/YYYY)	DESCRIPTION	DRAWN BY	REV'D BY	APP'D BY
B6	04/09/2025	NYSDEC COMMENT UPDATES REV 2	DJP	DJP	CC
B5	17/04/2025	NYSDEC COMMENT UPDATES	DJP	DJP	CC
B3	29/05/2023	EDITS TO DRAFT FINAL	CO	CC	CC
B2	16/05/2023	DRAFT FINAL	CO	CC	CC
B1	15/09/2023	DRAFT FOR REVIEW	CE	CC	CC

APEGA PERMIT NUMBER: P09178 SCALE: NTS

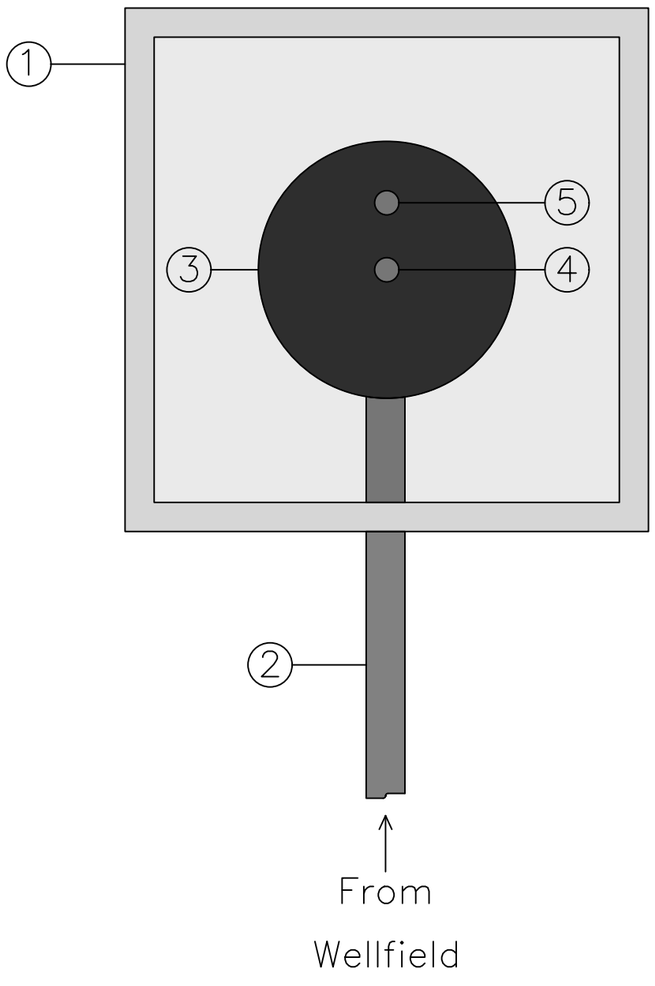
TITLE: **Flush-With-Grade Vapor Cap Detail AOC1**

CLIENT: **Arcadis**

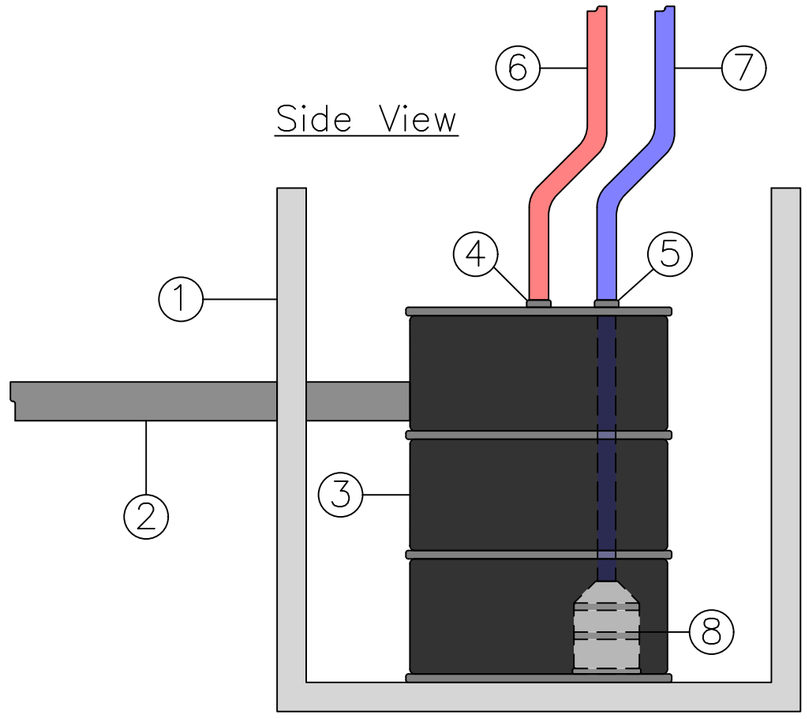
PROJECT: **G.T.E. Products Corporation Site NYSDEC Site No. 850003 Seneca Falls, New York**

SHEET: **VCD-02**

Top View



Side View



Lift Station Components:

1. 4'x4'x4' Concrete Vault
2. 4" Conveyance Piping From Wellfield (Entering from Process Corridor)
3. 85 Gallon Steel OverPack Drum
4. Vapor Outlet
5. Liquid Outlet
6. Vapor Outlet PEX Line
7. Liquid Outlet PEX Line
8. Submerssible Electric Slurry Pump

Note: 85 gallon overpack drum is subject to change. A custom tank may get fabricated in order to reduce pump cycling times.

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REV.	DATE (DD/MM/YYYY)	DESCRIPTION	DRAWN BY	REV'D BY	APP'D BY
B1	17/03/2025	DRAFT FOR REVIEW	DJP	CC	DAR

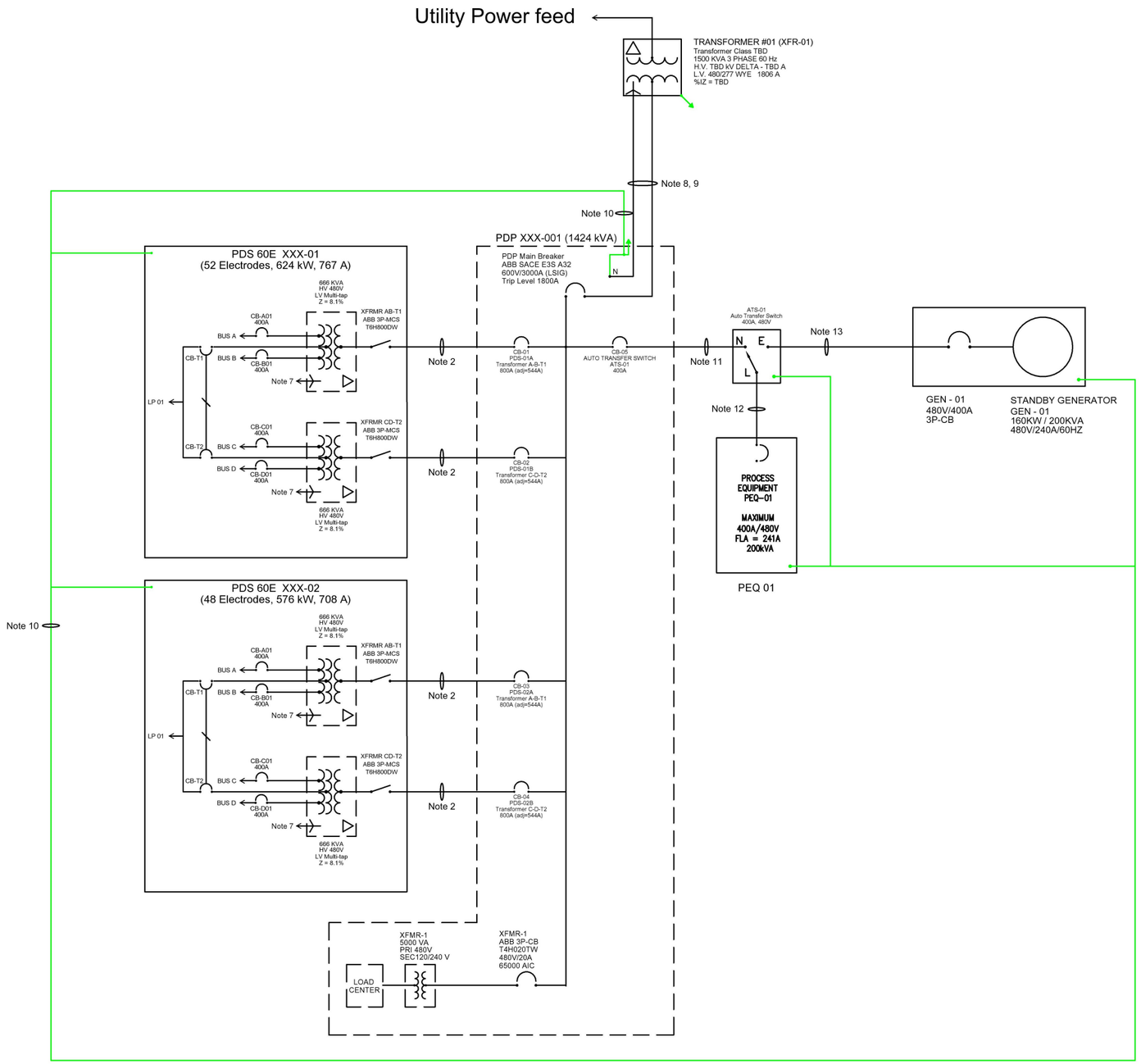
APEGA PERMIT NUMBER: P09178
SCALE: NTS

TITLE: **Lift Station Construction Diagram - Preliminary For Review and Discussion Purposes Only**

CLIENT: **Arcadis**

PROJECT: **G.T.E. Products Corporation Site NYSDEC Site No. 850003 Seneca Falls, New York**

SHEET: **LS-01**



TOTAL ESTIMATED LOAD for TRANSFORMER #01 (XFR 01)
100 Electrodes = 1224 kVA / 1475 A
Process Equipment = 200kVA / 241 A
TOTAL = 1424 kVA / 1716 A

General Notes

1. Construction and material shall comply with New York building code, National Electrical Code and applicable local codes.

2. Cable from PDP XXX-001 to PDS 60E XXX-01, & XXX-02 will be two (2) parallel 3C-350 kcmil AWG AL c/w #2 Ground to each A-B and C-D transformer: STR AL NUAL Alcan Type ACWU90 XLPE INS AIA BLK PVC JKT 600V 90C HL CSA C22.2 NO.51 or equivalent. Above ground installation.

3. Cable from PDS Units to Wellfield Electrodes: 1C, #1/0 AWG CU Type DAA1048B Exane XLPE STR TNC 110C FT4 600V CSA/UL or equivalent.

4. ET-DSP Neutral Reference Cable: 1C, #1/0 AWG CU Type DAA1048B Exane XLPE STR TNC 110C FT4 600V CSA/UL or equivalent.

5. Maximum operating load for:
60E PDS unit (52 electrodes) is 52 x 12.0 kW = 624 kW.
60E PDS unit (48 electrodes) is 48 x 12.0 kW = 576 kW.

6. All electrical equipment shall be grounded in accordance with NEC Article 250. Equipment is not to be earth grounded within 25 feet of electrode wellfield.

7. ETDSP Neutral Reference Grounding scheme determined during commissioning and shall include all metal constructed extraction wells. ETDSP-N is connected to the XO connection point of PDS transformers A-B & C-D. These connections to be separate from utility ground.

8. Power feed from Transformer 01 (XFR-01) to Power Distribution Panel (PDP) XXX-001 main breaker: Six (6) parallel sets of conductors. Each set of conductors will be three (3) 500 kcmil Aluminum conductors and one (1) 4/0 AWG Aluminum conductor. Conductors to be installed in conduit below ground.

9. Transformer 01 (XFR 01) secondary wye point to be grounded to the service ground at PDP XXX-001.

10. PDP, PDS, PEQ, ATS, GEN and WCS skid bases to be interconnected with a 2/0 ground cable that originates from electrical service ground at PDP.

11. Cable from PDP XXX-001 distribution breaker to Auto Transfer Switch (ATS-01) will be two (2) parallel 3C-250 kcmil AWG AL c/w #2 Ground: STR AL NUAL Alcan Type ACWU90 XLPE INS AIA BLK PVC JKT 600V 90C HL CSA C22.2 NO.51 or equivalent. Above ground installation.

12. Cable from Auto Transfer Switch (ATS-01) to Process Equipment (PEQ-01) will be two (2) parallel 3C-250 kcmil AWG AL c/w #2 Ground: STR AL NUAL Alcan Type ACWU90 XLPE INS AIA BLK PVC JKT 600V 90C HL CSA C22.2 NO.51 or equivalent. Above ground installation.

13. Cable from Auto Transfer Switch (ATS-01) to Generator (GEN-01) will be two (2) 3C-250 kcmil AWG AL c/w #2 Ground: STR AL NUAL Alcan Type ACWU90 XLPE INS AIA BLK PVC JKT 600V 90C HL CSA C22.2 NO.51 or equivalent. Above ground installation.

14. ***IMPORTANT: Transformer 01 (XFR-01) requires a Delta primary and a Wye secondary to be compatible with McMillan-McGee's ETDSP™ technology.***

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B3	2025/04/08	LOGO UPDATE	DJP	DJP	ER
B2	2024/05/29	EDITS TO DRAFT FINAL	CO	CC	CC
B1	2024/05/13	DRAFT FINAL	CO	CC	-
A1	2023/03/06	FOR REVIEW AND DISCUSSION	DP	CC	-

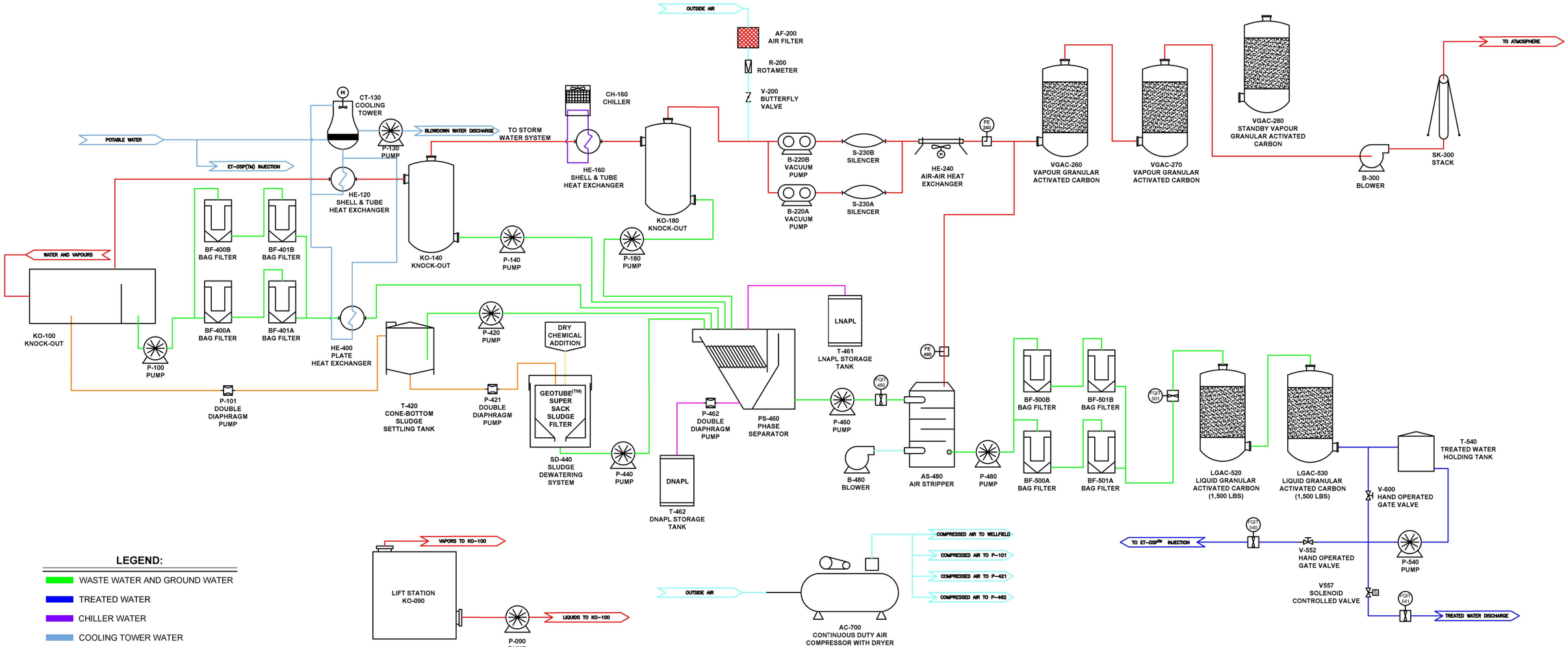
APEGA PERMIT NUMBER: P09178

TITLE: ET-DSP™ Electrical Single Line
For Review and Discussion Purposes Only

CLIENT: Arcadis

PROJECT: G.T.E. Products Corporation Site
NYSDEC Site No. 850003
Seneca Falls, New York

SHEET: ESL-01



LEGEND:

- WASTE WATER AND GROUND WATER
- TREATED WATER
- CHILLER WATER
- COOLING TOWER WATER
- AIR
- VAPOURS
- NAPL
- SLUDGE
- CHEMICAL ADDITION

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B7	09/04/2025	NYSDEC COMMENTS UPDATE	DJP	DAR	DAR
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B3	29/05/2024	EDITS TO DRAFT FINAL	CO	CC	CC
B2	13/05/2024	DRAFT FINAL	CO	CC	CC

TITLE:
Soil Vapor and Groundwater Process Flow Diagram Draft Final Design

CLIENT:
Arcadis

PROJECT:
G.T.E. Products Corporation Site
NYSDEC Site No. 850003
Seneca Falls, New York

SHEET:
PFD-01

SECONDARY CONTAINMENT WATER

SPARE SUCTION PORT

WATER AND VAPOURS

8" DIA. SCH. 40 CS

PEAK INFLUENT RATES:
500 SCFM DRY AIR W/6383 MG/M³ TCE
400 LBS/HR STEAM
12 GPM WATER W/122 MG/L TCE
194 F

KO-100
KNOCK-OUT
FULL VACUUM RATED
20 YD³ CAPACITY
INTERNAL WEIR FORMING
MIN. 100 GAL PUMP-OUT
CHAMBER

½" ID POLY VAC-RATED TUBING

8" SCH. 20 CS

8" SDR 11 HDPE

HE-120
SHELL & TUBE
HEAT EXCHANGER
373,120 BTU/HR

TO KO-140
DRAWING P&ID-02

2" DIA. GEN. PURPOSE HOSE

2" DIA. GEN. PURPOSE HOSE

BF-400A
BAG FILTER
TRADE SIZE 2

BF-401A
BAG FILTER
TRADE SIZE 2

1" CHEM. RESISTANT REINFORCED UHMWPE HOSE

1" CHEM. RESISTANT REINFORCED UHMWPE HOSE

1" CHEM. RESISTANT REINFORCED UHMWPE HOSE

HE-400
PLATE HEAT
EXCHANGER
675,070 BTU/HR

CT-130
COOLING
TOWER
70 TONS
COOLING
CAPACITY

BACKFLOW
PREVENTER

TO ET-DSP(TM) INJECTION
DRAWING P&ID-04

P-130
PUMP
121 GPM @
100 FT. HEAD

BLOWDOWN WATER DISCHARGE

TO STORM
WATER
SYSTEM

POTABLE WATER

COMPRESSED AIR FROM V715

SECONDARY CONTAINMENTS

KO-100
P-100
HE-120
KO-140
P-101
HE-160
KO-180
P-180

HE-400
T-420
P-420
P-421
SD-440
P-440

PS-460
T-461
T-462
P-460
AS-480
P-480

P-101
DOUBLE
DIAPHRAGM
PUMP
20 GPM @
100 FT HEAD
ABLE TO PUMP 20% SOLIDS SLUDGE

P-100
PUMP
25 GPM @
100 FT HEAD

1" CHEM. RESISTANT HOSE UHMWPE

P-420
PUMP
25 GPM @
100 FT HEAD

FROM P-140
DRAWING P&ID-02

1" CHEM. RESISTANT HOSE UHMWPE

FROM P-180
DRAWING P&ID-02

½" ID POLY VAC-RATED TUBING

TO KO-180
DRAWING P&ID-02

GRAVITY DRAIN

1" CHEM. RESISTANT HOSE UHMWPE
1" CHEM. RESISTANT HOSE UHMWPE
1" CHEM. RESISTANT HOSE UHMWPE

PS-460
PHASE
SEPARATOR
25 GPM, 316SS, 20-MICRON
SOIL/TCE/OIL PARTICLE REMOVAL

LNAPL

T-461
LNAPL STORAGE
TANK

250 GAL 316SS

P-462
DOUBLE
DIAPHRAGM
PUMP
5 GPM @ 50 FT HEAD
ABLE TO PUMP 20%
SOLIDS SLUDGE

FROM LGAC BACKWASH
DRAWING P&ID-04

1" CHEM. RESISTANT HOSE UHMWPE

1" CHEM. RESISTANT HOSE UHMWPE

TO KO-180
DRAWING P&ID-02

DRY
CHEMICAL
ADDITION

TO KO-180
DRAWING P&ID-02

T-420
CONE-BOTTOM
SLUDGE
SETTLING TANK
WITH
OBSERVATION
PLATFORM
1000 GAL, EPOXY-COATED CS OR FRP

P-421
DOUBLE
DIAPHRAGM
PUMP
20 GPM @
100 FT HEAD
ABLE TO PUMP 20%
SOLIDS SLUDGE

GEOTUBE(TM)
SUPER
SACK
SLUDGE
FILTER

SD-440
SLUDGE
DEWATERING
SYSTEM
1 YD³ SLUDGE CAPACITY, 316SS

P-440
PUMP
25 GPM @
100 FT HEAD

DNAPL

T-462
DNAPL STORAGE
TANK
250 GAL 316 SS

COMPRESSED AIR FROM V725

COMPRESSED AIR FROM V735

P-460
PUMP
25 GPM @
100 FT HEAD

TO AS-480
DRAWING P&ID-02

LEGEND:

- WASTE WATER AND GROUND WATER
- TREATED WATER
- CHILLER WATER
- COOLING TOWER WATER
- POTABLE WATER
- AIR
- VAPOURS
- NAPL
- SLUDGE
- CHEMICAL ADDITION

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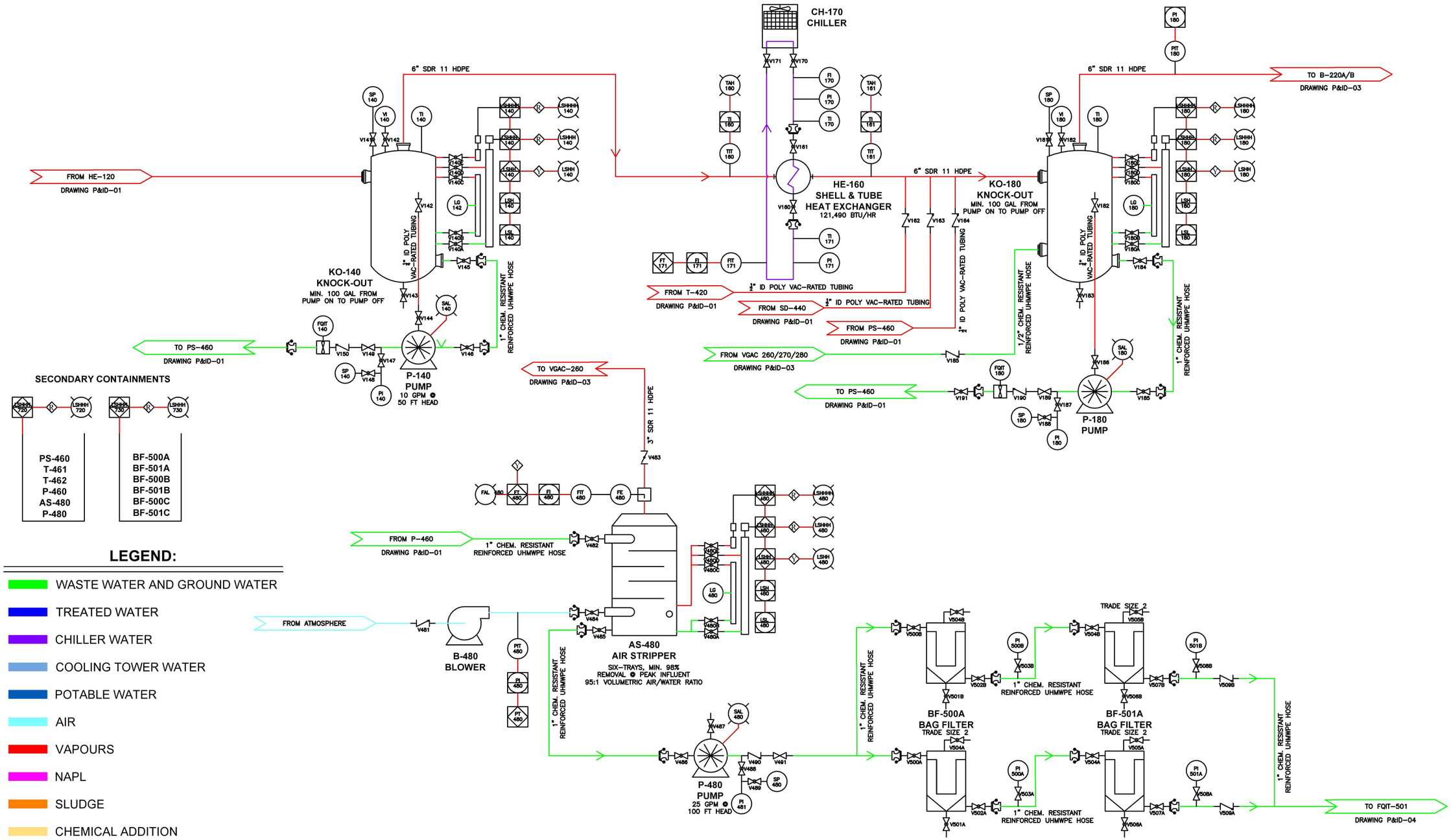
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B3	29/05/2024	EDITS TO DRAFT FINAL	CO	CC	CC
B2	13/05/2024	DRAFT FINAL	CO	CC	CC

TITLE:
Soil Vapor and Groundwater Process and Instrumentation Diagram Draft Final Design

CLIENT:
Arcadis

PROJECT:
G.T.E. Products Corporation Site
NYSDEC Site No. 850003
Seneca Falls, New York

SHEET:
P&ID-01



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SHEET:
P&ID-02

FROM ATMOSPHERE

S-200

R-200
ROTAMETER
0–400 SCFM

AF-200
AIR FILTER

V-200
BUTTERFLY
VALVE

FROM KO–180
DRAWING P&ID–02

VSL 200
VAL 200
VSH 200
VAH 200
VI 200
VT 200
V201
V202
ATM
V203

6" SDR 11 HDPE

B-220B
VACUUM PUMP
500 SCFM @ 12" HG

SIC 220B
SAL 220B
6" SCH 20 CS
V220B
V223B

S-230B
SILENCER
81 dB @ 5'

B-220A
VACUUM PUMP
500 SCFM @ 12" HG

SIC 220A
SAL 220A
6" SCH 20 CS
V220A
V223A

S-230A
SILENCER
81 dB @ 5'

6" SCH 20 CS

TI 230
TAH 230
TSH 230
PI 230
V231
PRV
V232

HE-240
AIR-AIR HEAT
EXCHANGER
55,310 BTU/HR

PAL 240
TAH 240
PSL 240
TSH 240
PI 240
TI 240
SP 240
PT 240
TT 240
V242
V243
V244

6" SDR 11 HDPE

FAL 240
FT 240
FI 240
FIT 240
FE 240
V245

6" FLEXIBLE
CHEMICAL–RESISTANT
VACUUM HOSE

PI 260
V261
TI 260
SP 260
V20
V262

VGAC-260
VAPOR
ACTIVATED
CARBON
5,000 LBS, MIN. 5.3' DIA.

6" FLEXIBLE
CHEMICAL–RESISTANT
VACUUM HOSE

PI 270
V271
TI 270
SP 270
V270
V272

VGAC-270
VAPOR
ACTIVATED
CARBON
5,000 LBS, MIN. 5.3' DIA.

TAH 300
TSH 300
TI 300
TT 300
V300

TO ATMOSPHERE

SK-300
STACK

V301
6" SDR 11 HDPE

B-300
BOOSTER
BLOWER
500 SCFM, SUFFICIENT
VACUUM TO CREATE
NEGATIVE PRESSURE IN
FLEX VGAC HOSES

PI 280
V281
TI 280
SP 280
V280
V282

VGAC-280
STANDBY
VAPOR
ACTIVATED
CARBON
5,000 LBS, MIN. 5.3' DIA

TO KO–180
DRAWING P&ID–02

1/2" CHEM. RESISTANT REINFORCED UHMWPE HOSE

FROM AS–480
DRAWING P&ID–02

LSHHH 740
LSHH 740
AC-700

FROM ATMOSPHERE
V700
V701
PRV

AC-700
CONTINUOUS DUTY AIR
COMPRESSOR WITH DRYER
70 SCFM MAXIMUM

YC 703
S
V702
V703
PI 704
PCV 704
V704
V705
COMPRESSED AIR TO WELLFIELD
20 SCFM

1" GALV.

YC 713
V712
V713
PI 714
PCV 714
V714
V715
COMPRESSED AIR TO P–101

YC 723
V722
V723
PI 724
PCV 724
V724
V725
COMPRESSED AIR TO P–421

YC 733
V732
V733
PI 734
PCV 734
V734
V735
COMPRESSED AIR TO P–462

YC 743
V742
V743
PI 744
PCV 744
V744
V745

1/2" GALV.

LEGEND:

- WASTE WATER AND GROUND WATER
- TREATED WATER
- CHILLER WATER
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- POTABLE WATER
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- VAPOURS
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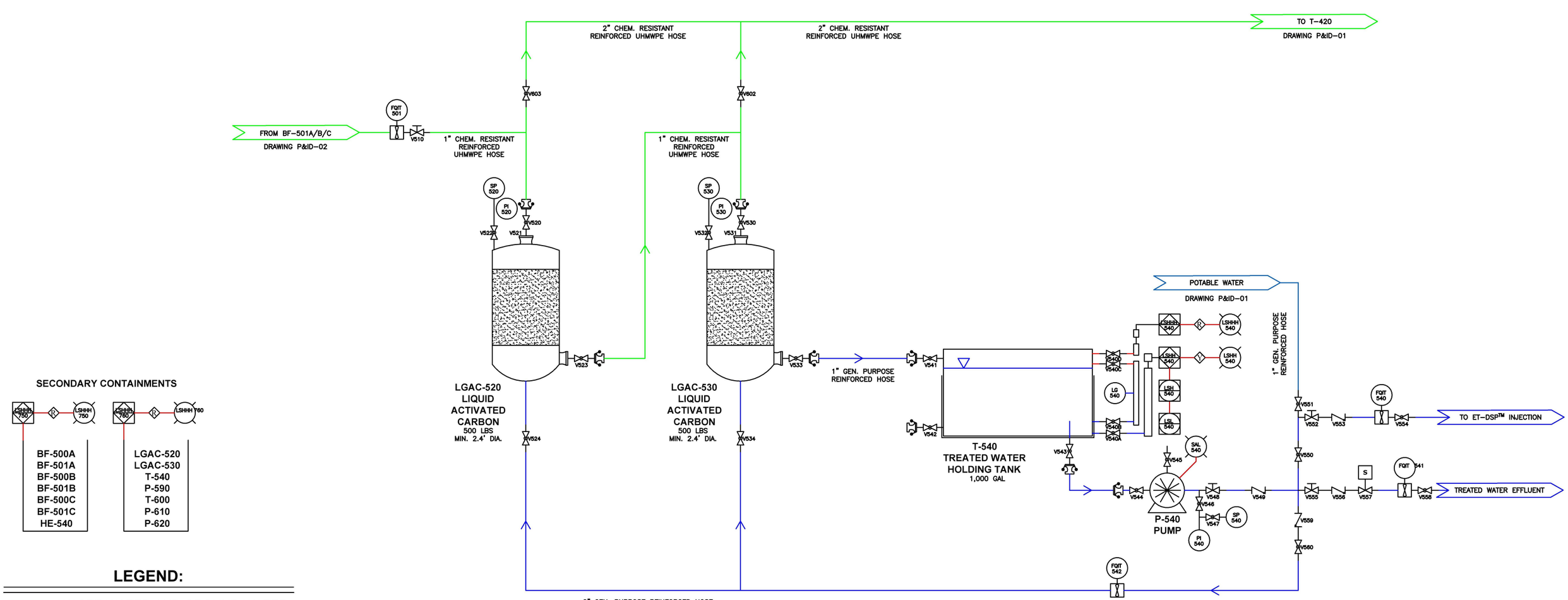
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TITLE: **Soil Vapor and Groundwater Process and Instrumentation Diagram Draft Final Design**

CLIENT: **Arcadis**

PROJECT: **G.T.E. Products Corporation Site NYSDEC Site No. 850003 Seneca Falls, New York**

SHEET: **P&ID-03**



SECONDARY CONTAINMENTS

BF-500A	LGAC-520
BF-501A	LGAC-530
BF-500B	T-540
BF-501B	P-590
BF-500C	T-600
BF-501C	P-610
HE-540	P-620

LEGEND:

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- TREATED WATER
- CHILLER WATER
- COOLING TOWER WATER
- POTABLE WATER
- AIR
- VAPOURS
- NAPL
- SLUDGE
- CHEMICAL ADDITION

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B8	04/09/2025	NYSDEC COMMENTS UPDATE REV 2	DJP	DAR	DAR
B7	09/04/2025	NYSDEC COMMENTS UPDATE	DJP	DAR	DAR
B6	04/04/2025	EDITS TO DRAFT FINAL	DJP	DAR	DAR
B5	17/03/2025	NYSDEC COMMENT UPDATES	DJP	DJP	-
B3	29/05/2024	EDITS TO DRAFT FINAL	CO	CC	CC
B2	13/05/2024	DRAFT FINAL	CO	CC	CC

TITLE: **Soil Vapor and Groundwater Process and Instrumentation Diagram Draft Final Design**

CLIENT: **Arcadis**

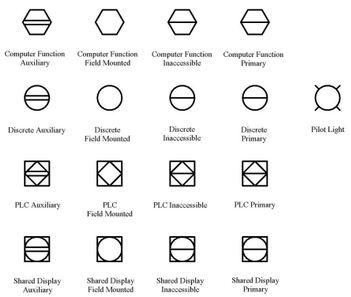
PROJECT: **G.T.E. Products Corporation Site NYSDEC Site No. 850003 Seneca Falls, New York**

SHEET: **P&ID-04**

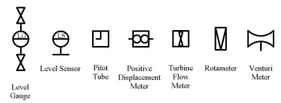
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- Green Alarm
- Red Alarm
- Yellow Alarm

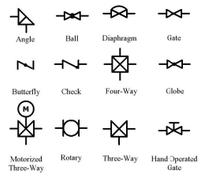
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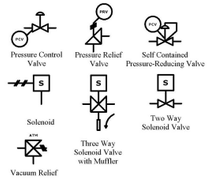
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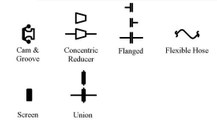
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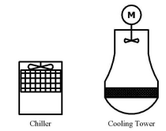
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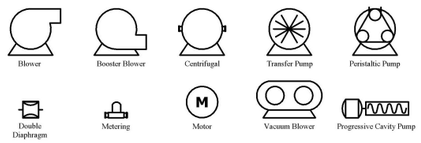
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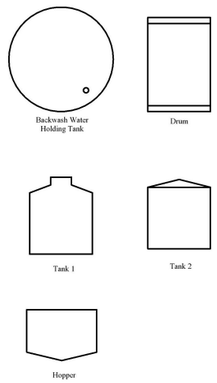
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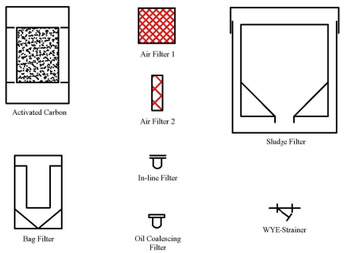
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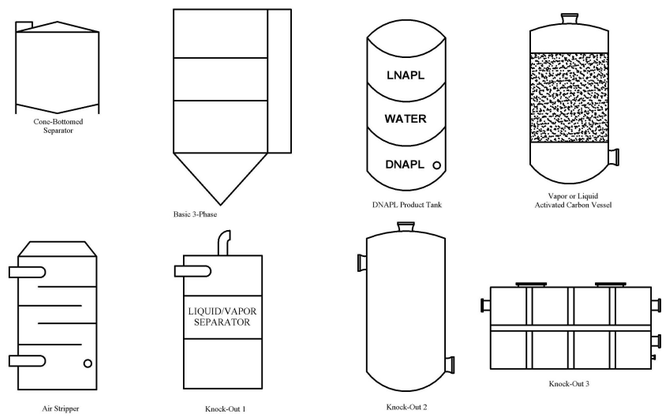
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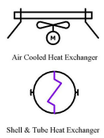
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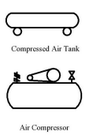
Treatment Equipment



Heat Exchangers



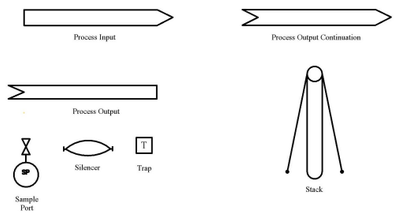
Compressed Air Equipment



LEGEND:

- WASTE WATER AND GROUND WATER
- TREATED WATER
- CHILLER WATER
- COOLING TOWER WATER
- POTABLE WATER
- AIR
- VAPOURS
- NAPL
- SLUDGE
- CHEMICAL ADDITION

Miscellaneous



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TITLE: **Soil Vapor and Groundwater Process and Instrumentation Diagram Draft Final Design**

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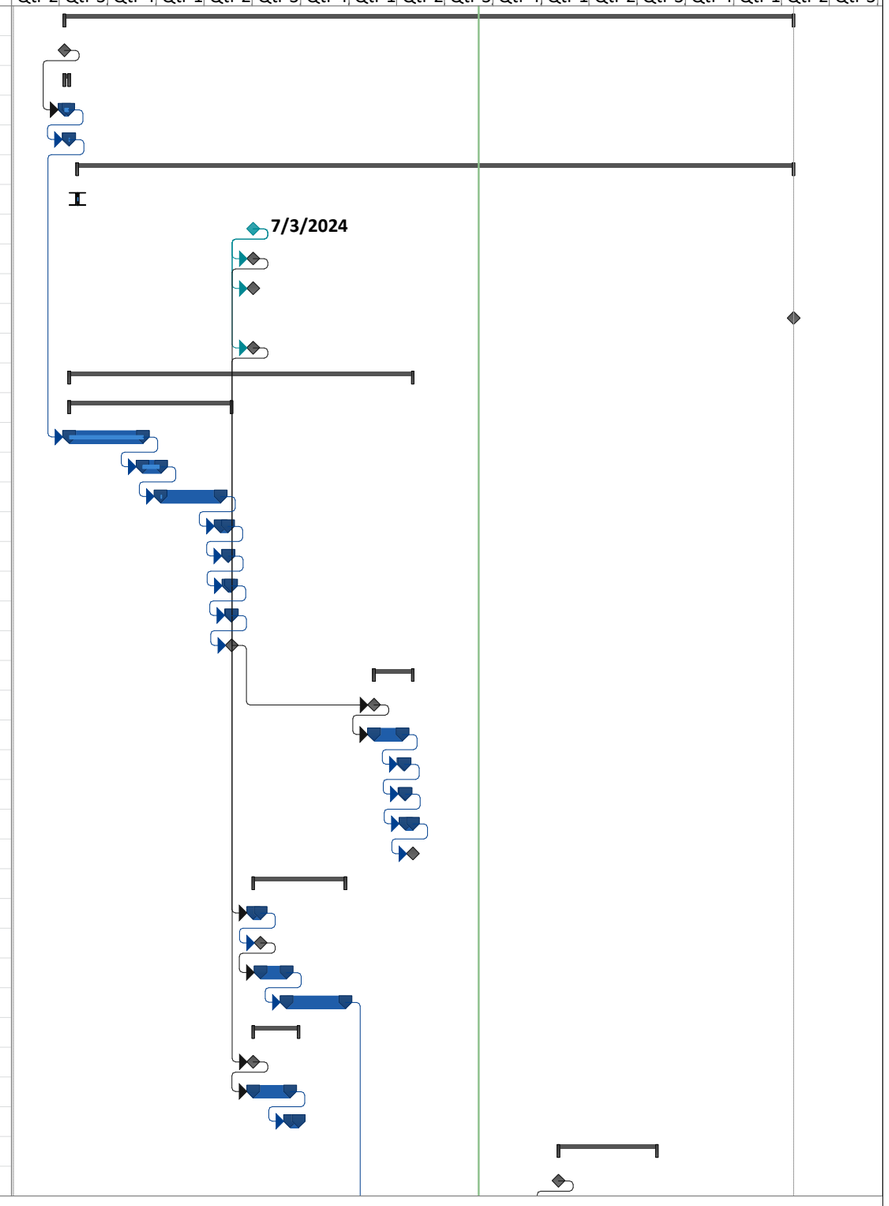
PROJECT: **G.T.E. Products Corporation Site NYSDEC Site No. 850003 Seneca Falls, New York**

SHEET: **P&ID-05**

Appendix B – Project Schedule

Seneca Falls ET-DSP(TM) Schedule

ID	Task Name	Duration	Start	Finish	Predecessors	Owner
1	**SENECA FALLS PROJECT**	**989 days**	**7/11/23**	**4/23/27**		
2	Project Award	0 days	7/11/23	7/11/23		Arcadis
3	**CONTRACTING**	**7 days**	**7/11/23**	**7/19/23**		
4	Contracting	5 days	7/11/23	7/17/23	2	Arcadis/Mc2
5	Kick-Off Call	1 day	7/19/23	7/19/23	4	Arcadis
6	**FUNDAMENTAL DELIVERABLES**	**971 days**	**8/4/23**	**4/23/27**		
7	Arcadis to Select Treatment System Type - DEADLINE	1 day	8/4/23	8/4/23		Arcadis
8	NYSDEC Long Lead Item Approval	0 days	7/3/24	7/3/24		
9	Work Authorization for Electrodes - DEADLINE	0 days	7/3/24	7/3/24	8	Arcadis
10	Work Authorization for Drilling Material - DEADLINE	0 days	7/3/24	7/3/24	8	Arcadis
11	Power Drop in Place - DEADLINE	0 days	4/23/27	4/23/27		Arcadis
12	Work Authorization for Treatment Equipment - DEADLINE	0 days	7/3/24	7/3/24	8	Arcadis
13	**DESIGN (WORK AUTHORIZATION 2023-ISTR-01)**	**466 days**	**7/20/23**	**5/1/25**		
14	**Draft Final ISTR Remedial Design Report**	**220 days**	**7/20/23**	**5/22/24**		
15	Mc2 Design Package Preparation	100 days	7/20/23	12/6/23	5	Mc2
16	Arcadis Review	24 days	12/6/23	1/9/24	15	Arcadis
17	GTEOSI Review	82 days	1/9/24	5/1/24	16	GTEOSI
18	Draft Final RDR Changes	9 days	5/2/24	5/15/24	17	Mc2
19	Draft Final RDR Submittal	1 day	5/16/24	5/16/24	18	Mc2
20	Arcadis/Mc2 Review	3 days	5/17/24	5/21/24	19	Arcadis/Mc2
21	Draft Final RDR Submittal (FINAL)	1 day	5/22/24	5/22/24	20	Mc2
22	Arcadis RDR Submittal to NYSDEC	0 days	5/22/24	5/22/24	21	Arcadis
23	**100% Design Work Plan and Drawing Package**	**54 days**	**2/17/25**	**5/1/25**		
24	NYSDEC Comments Received	0 days	2/17/25	2/17/25	22	
25	Mc2 Design Package Preparation	40 days	2/17/25	4/11/25	24	Mc2
26	Arcadis Review	2 days	4/14/25	4/15/25	25	Arcadis
27	GTEOSI Review	2 days	4/16/25	4/17/25	26	GTEOSI
28	100% RDR Changes	10 days	4/18/25	5/1/25	27	Mc2
29	100% RDR Submittal	0 days	5/1/25	5/1/25	28	Mc2
30	**TREATMENT SYSTEM & PIPING PROCUREMENT**	**125 days**	**7/3/24**	**12/24/24**		
31	Long Lead Item Selection	10 days	7/3/24	7/16/24	12	Mc2
32	Order Long Lead Items	0 days	7/16/24	7/16/24	31	Mc2
33	Detailed Design	35 days	7/17/24	9/3/24	32	Mc2
34	Fabrication and Shipment	4 mons	9/4/24	12/24/24	33	Mc2
35	**ELECTRODE PROCUREMENT**	**62 days**	**7/3/24**	**9/26/24**		
36	Electrode Materials Ordered	0 days	7/3/24	7/3/24	9	Arcadis
37	Electrode Steel Arrival to Mc2 Shop	50 days	7/3/24	9/10/24	36	Steel Mill
38	Electrode Manufacture	12 days	9/11/24	9/26/24	37	Mc2
39	**CONSTRUCTION**	**135 days**	**2/2/26**	**8/7/26**		
40	Construction Notice to Proceed	0 days	2/2/26	2/2/26		

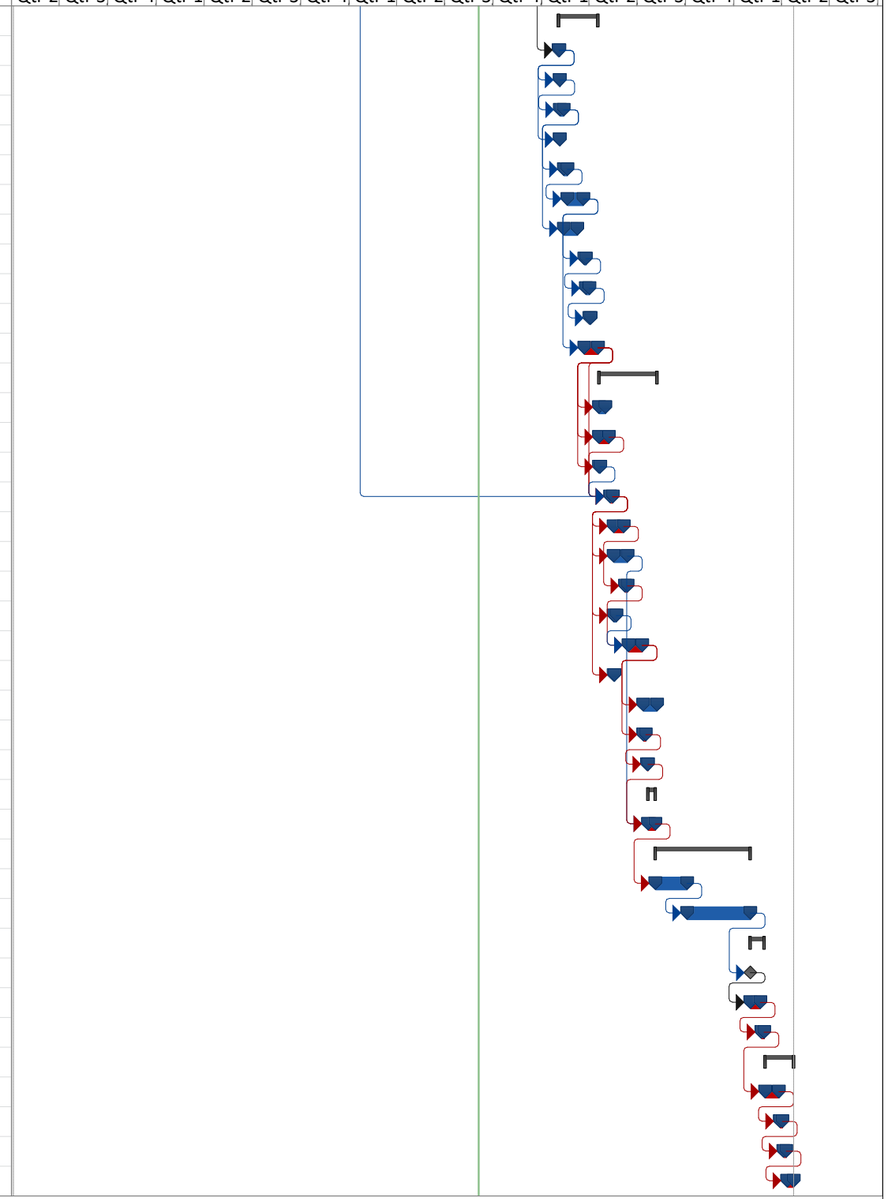


Project: Seneca Falls
Data Date: 9/4/25
Revision: B7

Task	Project Summary	Inactive Milestone	Manual Summary Rollup	Deadline
Split	External Tasks	Inactive Summary	Manual Summary	Critical
Milestone	External Milestone	Manual Task	Start-only	Critical Split
Summary	Inactive Task	Duration-only	Finish-only	Progress

Seneca Falls ET-DSP(TM) Schedule

ID	Task Name	Duration	Start	Finish	Predecessors	Owner
41	**Drilling**	**55 days**	**2/2/26**	**4/17/26**		
42	South AOC 1 Excavation	2 days	2/2/26	2/3/26	40	Mc2, McGhan
43	Surveying	1 day	2/4/26	2/4/26	42	Mc2
44	South AOC 1 Drilling	5 days	2/5/26	2/11/26	43	Mc2, Summit Drilling
45	Trench and Install South AOC 1 HX well	1 day	2/4/26	2/4/26	42	Mc2, McGhan
46	Trench Cables in South AOC 1, Pour Concrete	5 days	2/12/26	2/18/26	44	Mc2, McGhan
47	Concrete Curing	30 edays	2/18/26	3/20/26	46	
48	Drill and Install AOC 3 (2 rigs at once)	18 days	2/12/26	3/9/26	44	Mc2, Summit Drilling
49	Trench and Install AOC 1 HX wells	3 days	3/23/26	3/25/26	47	Mc2, McGhan
50	Process Corridor and Lift Station	5 days	3/26/26	4/1/26	49	Mc2, McGhan
51	Trench and Install AOC 3 HX wells	2 days	4/2/26	4/3/26	50	Mc2, McGhan
52	Drilland Install Northern Portion AOC 1 (2 rigs at once)	20 days	3/23/26	4/17/26	47	Mc2, Summit Drilling
53	**Above Ground Installation**	**80 days**	**4/20/26**	**8/7/26**		
54	Excavate Trench to Connect 2 Treatment Areas	10 days	4/20/26	5/1/26	52	Mc2
55	Vapor Cap Installation	15 days	4/20/26	5/8/26	52	Mc2
56	Fencing	2 days	4/20/26	4/21/26	52	Mc2
57	ET-DSP™ Material and Equipment Delivery and Placement	5 days	5/11/26	5/15/26	52,55,56,34	Mc2
58	Treatment Piping Installation	15 days	5/18/26	6/5/26	57	Mc2
59	Treatment System Installation	20 days	5/18/26	6/12/26	57	Mc2
60	Well Head Installation	5 days	6/8/26	6/12/26	58	Mc2
61	PDP to Well Field Equipment Teck Cable	5 days	5/18/26	5/22/26	57	Mc2
62	PDS to Electrode 1/0 Wire Layout	20 days	6/15/26	7/10/26	61,60	Mc2
63	Mains Water Connection	1 day	5/18/26	5/18/26	57	Mc2
64	WCS to Electrode Hose Layout	20 days	7/13/26	8/7/26	62	Mc2
65	Electrode Juntion Box Installation and Terminations	5 days	7/13/26	7/17/26	62	Mc2
66	Communications Setup	2 days	7/20/26	7/21/26	65	Mc2
67	**Acceptance Testing**	**10 days**	**7/22/26**	**8/4/26**		
68	System Commissioning	10 days	7/22/26	8/4/26	66,59	Mc2
69	**OPERATIONS**	**128 days**	**8/4/26**	**1/31/27**		
70	Establish Operating Temperature	60 edays	8/4/26	10/3/26	68	Mc2
71	Maintain Operating Temperature	120 edays	10/3/26	1/31/27	70	Mc2
72	**DEMOBILIZATION**	**20 days**	**1/31/27**	**2/26/27**		
73	Power Drop Disconnect Completion Date	0 days	1/31/27	1/31/27	71	GTEOSI
74	Infrastructure Breakdown	15 days	2/1/27	2/19/27	73	Mc2
75	Equipment Demobilization	5 days	2/22/27	2/26/27	74	Mc2
76	**FINAL REPORT**	**40 days**	**3/1/27**	**4/23/27**		
77	Draft Final Report	20 days	3/1/27	3/26/27	75	Mc2
78	Arcadis Review	5 days	3/29/27	4/2/27	77	Arcadis
79	GTEOSI Review	5 days	4/5/27	4/9/27	78	GTEOSI
80	Finalize Final Report	10 days	4/12/27	4/23/27	79	Mc2



Project: Seneca Falls
Data Date: 9/4/25
Revision: B7

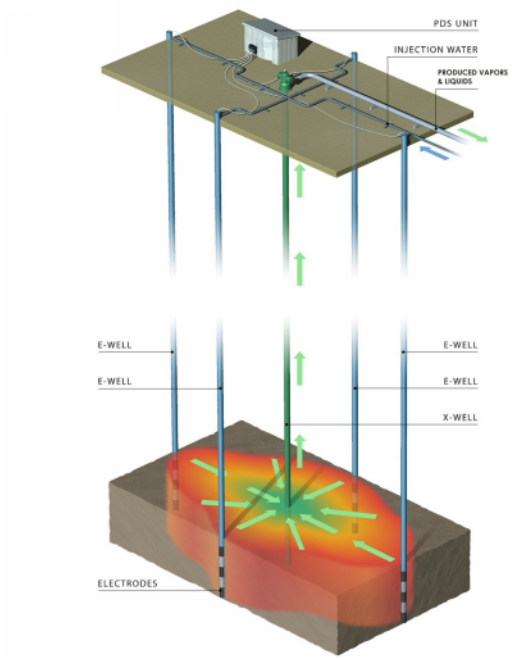
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Split	External Tasks	Inactive Summary	Manual Summary	Critical
Milestone	External Milestone	Manual Task	Start-only	Critical Split
Summary	Inactive Task	Duration-only	Finish-only	Progress

Appendix C – ET-DSP™ Numerical Simulation Report

Thermal Model

Electro-Thermal
Model and Design

Seneca Falls



McMillan-McGee Corp

Creators of ET-DSP™

Submitted to
Arcadis

New York, New York
January 19, 2024

Electro-thermal Simulation Study



APEGA Permit No. P09178

McMillan McGee Corp.
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Prepared for the:

Seneca Falls Areas A and B Project

Written by:

Bruce C.W. McGee, PhD, PEng and Clayton Campbell, PEng

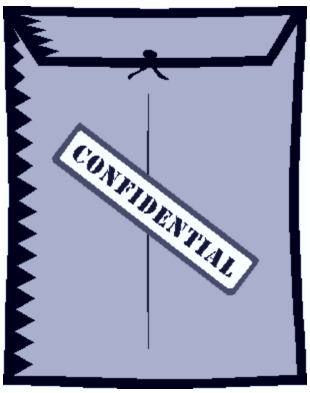
Reviewed by:

Clayton Campbell

Submitted to:

Mark Flusche
Arcadis
50 Johnston Street, Seneca Falls, NY 13148-1235 United States
Seneca Falls
New York

January 19, 2024



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Disclaimer

In preparing this report, we have relied upon information provided by you, the Client, and your representatives. This information has been accepted as represented without independent verification. We have relied upon these representations as to the completeness and accuracy of the data provided and that no material changes have occurred or is expected to occur, from that which was projected in this report, between the date the information has been provided and the date of this report, and that no new information has come to light that may result in a material change to the findings contained herein this report.

Contents

1. Summary **13**

2. Simulation Study **23**
2.1. The Site . . . 23
2.1.1. Background Information . . . 24
2.1.2. Geology . . . 29
2.2. Assumptions . . . 30
2.2.1. General Assumptions . . . 30
2.2.2. Specific Assumptions . . . 31
2.2.3. Resistivity . . . 32
2.2.4. Hydraulic Conductivity . . . 37
2.2.5. Saturation, Porosity, and σ . . . 40
2.2.6. Thermal Properties . . . 42
2.2.7. Well Layout and Grid . . . 50

3. Results **53**
3.1. Results Summary . . . 66
3.2. Radius of Capture Calculations . . . 74
3.3. Temperature and Energy Results . . . 80
3.4. Mass Recovery Curve . . . 80

4. Conclusions **84**

A. Temperature Plots **88**

B. Well-field Well Locations **103**

C. Radius of Capture Theory **107**

D. Convert Hydraulic Conductivity to Darcys 110

List of Figures

1.1. General conceptual model of the remediation process. 15
1.2. Conceptual model of the remediation process. 16
1.3. Aerial view of the project site. 17
1.4. Aerial view of the project treatment Area A. 17
1.5. Aerial view of the project treatment Area B. 18
1.6. Vertical extent of the electrode wells, extraction wells, and temperature sensor wells. 20
1.7. Resistivity profile. 21
1.8. Temperature dependent resistivity multiplier. 22

2.1. Thermal treatment areas for the project. 26
2.2. Chemical distribution in the treatment area (Area A). 27
2.3. Chemical distribution in the treatment area (Area B). 28
2.4. Resistivity profile plot for the site. 34
2.5. Dynamic resistivity as a function of temperature. 35
2.6. Resistivity profile data for both areas. 36
2.7. Clay removed from a project post heating. 41
2.8. Electrode Configuration showing the distinct lithologies. 41
2.9. Fricke Thermal Conductivity Correlation Parameters for the Bedrock. . . 45
2.10. Fricke Thermal Conductivity Correlation Parameters for the Clay. 46
2.11. Fricke Thermal Conductivity Correlation Parameters for the Clay Fine Sand. 47
2.12. Thermal Properties by Layer 48
2.13. Electrode well grid layout Area A. 51
2.14. Electrode well grid layout Area B. 52

3.1. Project study areas. 54
3.2. Area A electrode layout. 55

3.3. Area B electrode layout. 56
3.4. Well construction in the treatment volume (both areas). 57
3.5. Seneca Falls Areas A and B water balance in l/min. 62
3.6. Seneca Falls Areas A and B water balance in litres. 62
3.7. Seneca Falls Areas A and B water balance in gpm. 63
3.8. Seneca Falls Areas A and B water balance in gallons. 63
3.9. Seneca Falls Areas A and B average power flow in kW. 65
3.10. Seneca Falls Areas A and B energy balance in kWh. 65
3.11. Temperature and electrode power response for Area A. 67
3.12. Temperature and electrode power response for Area B. 68
3.13. Chemical distribution in Area A. 69
3.14. Chemical distribution in Area B. 70
3.15. Electrode wellbore configuration. 72
3.16. Radius of capture r_c for the XWells in Area A. 75
3.17. Radius of capture r_c for the XWells in Area B. 76
3.18. Radius of capture calculation summary for the XWells in Area A. 77
3.19. Radius of capture calculation summary for the XWells in Area B. 78
3.20. 3D Radius of capture r_c in Area A. 79
3.21. 3D Radius of capture r_c in Area B. 82
3.22. Estimated Mass Recovery Curve 83

A.1. Temperature distribution at the start of heating. 89
A.2. Temperature distribution after 30 days. 90
A.3. Temperature distribution after 60 days. 91
A.4. Temperature distribution after 90 days. 92
A.5. Temperature distribution after 120 days. 93
A.6. Temperature distribution after 150 days. 94
A.7. Temperature distribution after 180 days. 95
A.8. Temperature distribution at the start of heating. 96
A.9. Temperature distribution after 30 days. 97
A.10. Temperature distribution after 60 days. 98
A.11. Temperature distribution after 90 days. 99
A.12. Temperature distribution after 120 days. 100
A.13. Temperature distribution after 150 days. 101
A.14. Temperature distribution after 180 days. 102

C.1. Conceptual model for the radius of capture. 108

List of Tables

2.1. Typical Values of Hydraulic Conductivity. 38
2.2. Input permeability, k_x, k_y, and k_z data. 39
2.3. Fluid and thermal data for the model. 42
2.4. Thermal properties for the heat loss model. 43
2.5. Fricke Mid-Value Correlation Coefficients. 44
2.6. Base Case Thermal Conductivity. 49

3.1. Summary of the Seneca Falls Areas A and B project. 60
3.2. Technical approach and design basis for Seneca Falls Areas A and B. . . . 61
3.3. Water balance estimates for treatment plant design. 64
3.4. Energy and power summary. 80

B.1. Summary of E-Wells and X-Wells. 105
B.2. Summary of E-Wells and X-Wells. 106

Nomenclature

Symbol	Description
3D	Three Dimensional
BGS	Below Ground Surface
COCs	Contaminants of Concern
CVOC	Chlorinated Volatile Organic Compound
DCE	1,1-Dichloroethene
cis-1,2-DCE	cis-1,2-Dichloroethene
DNAPL	Dense Non-Aqueous-Phase Liquid
E-Well	Electrode Well
ERH	Electrical Resistive Heating
ET-DSP™	Electro-Thermal Dynamic Stripping Process™
HV	Heated Volume
IDW	Investigation-Derived Waste
LNAPL	Light Non-Aqueous Phase Liquid
Mc2	McMillan-McGee Corp.
MPE	Multiphase Extraction
PCE	Tetrachloroethene
PDS	Power Delivery System
TCE	Trichloroethene
TV	Treatment Volume
USCS	Unified Soil Classification System
VC	Vinyl Chloride
VOC	Volatile Organic Compound
X-Well	Extraction Well

Symbol	Description
	Used in Equations
λ_c	Thermal Conductivity of the chemical [W/m/°C]
λ_w	Thermal Conductivity of the Water [W/m/°C]
λ_r	Thermal Conductivity of the Rock [W/m/°C]
λ_{ob}	Thermal Conductivity of the Overburden [W/m/°C]
λ_{ub}	Thermal Conductivity of the Under-burden [W/m/°C]
ρ	Electrical Resistivity [Ωm]
σ_w	Electrical Conductivity of the Water [S/m]
A_{gw}	Area Perpendicular to Ground Water Flow [m^2]
h_e	Electrode Length [m]
K	Hydraulic Conductivity [ft/day]
L_e	Electrode Length [m]
P_i	Initial Pressure [kPa]
R_e	Electrode Resistance
S_c	Chemical Saturation [-]
S_g	Gas Saturation [-]
S_w	Water Saturation [-]
T_i	Initial Temperature [°C]
v_{gw}	Ground Water Flow Velocity [m/day]
a	Cementation Factor in Archie's Law [-]
a_i	Fit Parameters in a Cubic Fit of the Temperature [-]
z_{BGS}	distance below ground surface [m]
	Radius of Capture Equation
F	vertical flow constant [-]
C_a	Capillary number [-]
c_1, c_2	Capillary number coefficient correlation constants [-]
d_1, d_2	Capillary number exponent correlation constants [-]
d	pore throat diameter [m]
$Eó$	Eötvös number for channels with a square cross section
g	acceleration due to gravity [m/s^2]
H	Thickness of heated volume [m]
h	Characteristic height [m]
K	$k-$values [-]
k_h	Horizontal permeability [mD]
k_v	Vertical permeability [mD]
r_e	Radius of capture [m]
r_w	Radius of extraction well [m]
α	residual water fraction [-]
γ	surface tension of water [N/m]
μ_l	viscosity of water [Pas]

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Symbol	Description
ϕ	porosity [-]
ρ	density of water [kg/m^3]
τ	Tortuosity parameter [-]
υ_v	Average vertical discharge velocity [m/s]
υ_v	Horizontal velocity of the liquid [m/s]
υ_b	Vertical velocity of the vapour [m/s]
$\pm$	plus or minus

Symbol	Description
	Units of Measure
A	Ampere
α	attenuation factor
BTU	British Thermal Unit
cm	centimetre
ft	feet
ft^2	square feet
gal	gallon
gpm	gallons per minute
h	hour
in	inch
inHg	inches of mercury
K	degree Kelvin
kg	kilogram
°C	Degrees Celsius
°F	Degrees Fahrenheit
kg/m^3	kilograms per cubic meter
kW	kilowatts
L	litre
lbs	pounds
m	metre
m^2	square metre
mD	millidarcy
m^3	cubic meter
min	minute
mm	millimetre
mg/l	milligrams per liter

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Symbol	Description
mm Hg	Millimeters of Mercury
%	percent
µg/kg	micrograms per kilogram
µg/l	micrograms per Liter
µg/m^3	micrograms per cubic meter
g/m^3	grams per cubic meter
µV	microvolts
MW	megawatt
Nm^3	normal cubic metre
ohmm	Ohm meter
scfm	standard cubic feet per minute
W	watt
yd^3	cubic yards

1 Summary

The objective of the simulation study is to develop a subsurface model of the Seneca Falls Areas A and B Site (Site) located in New York using an electro-thermal process in conjunction with a multiphase extraction (MPE) system, specifically the ET-DSP™ system. The model will be used to determine the basis for the ET-DSP™ system design and operating strategy of the two systems, specifically, to address many of the design elements of the electro-thermal system as conceptually shown in Figures 1.1 and 1.2.

The results of this model estimate the pertinent design characteristics of an electro-thermal remediation project, such as:

1. Total energy input of 2,251 MW · h or 230 kWh/m^3 (176 kWh/yd^3) per unit heated volume. [1];
2. Total water extraction volume of 7,542,918 L (1,992,628 gallons);
3. Total water injection volume of 7,358,832 L (1,943,998 gallons);
4. Vapor extraction rate[2] of 2.06 sm^3/min (77 scfm);
5. Time to reach target temperatures of 69 to 76 days in greater than 90% of the treatment volume[3];

[1] Energy density per heated volume does not include ancillary energy;
[2] Does not include steam vapor.
[3] This is based on optimal conditions and may vary with operational conditions

6. Peak temperatures are generally limited to the boiling temperature of water as a function of depth and pressure in the soil[4];

7. An anticipated contaminant mass recovery of 5,000 kg (11,023 lbs).

8. Average electrode spacing of 5.49 m (18.00 ft)[5]; and,

9. An average extraction well spacing of 5.49 m (18.00 ft).

The site location is shown in Figure 1.3. The aerial location of the electrodes and extraction wells within the treatment area are shown in Figures 1.4 and 1.5.

The total area to be treated is approximately 590 m^2 (6,349 ft^2).The vertical extent of the treatment volume is from 0.00 m to 10.67 m, as shown in Figure 1.6. The treatment volume is approximately 6,294 m^3 (8,232 yd^3). The boundaries of the heated volume extend beyond the extremities of the treatment volume to ensure a *heat to treat* strategy.

The results of the simulation study are provided in chapter 3. The study resulted in a technical approach for this project with specific regard to the following design issues:

Treatment Region Treatment is confined to the area defined by the distribution of chemicals in the subsurface. The total treatment area is 590 m^2, the treatment depth is from 0.00 m to 10.67 m, and the treatment volume is 6,294 m^3 (8,232 yd^3).

Heated Region The heated volume, which encompasses the treatment volume, extends from surface to beyond the bottom of the treatment volume, to an average depth of 11.17 m. The total heated area is 877 m^2, with a heated interval from 0.00 m to 11.17 m, and the treatment volume is 9,791 m^3 (12,806 yd^3).

Vapour Cap A thermally insulating vapor cap is designed with an R-value not less than $1.76 \left[\frac{m^2\,°K}{W}\right]$.

[4]Water in the presence of chemicals will boil at the temperature of the mixture, which can be less than the co-boiling temperature of water.
[5]Electrode spacing varies slightly over the area of the treatment volume.

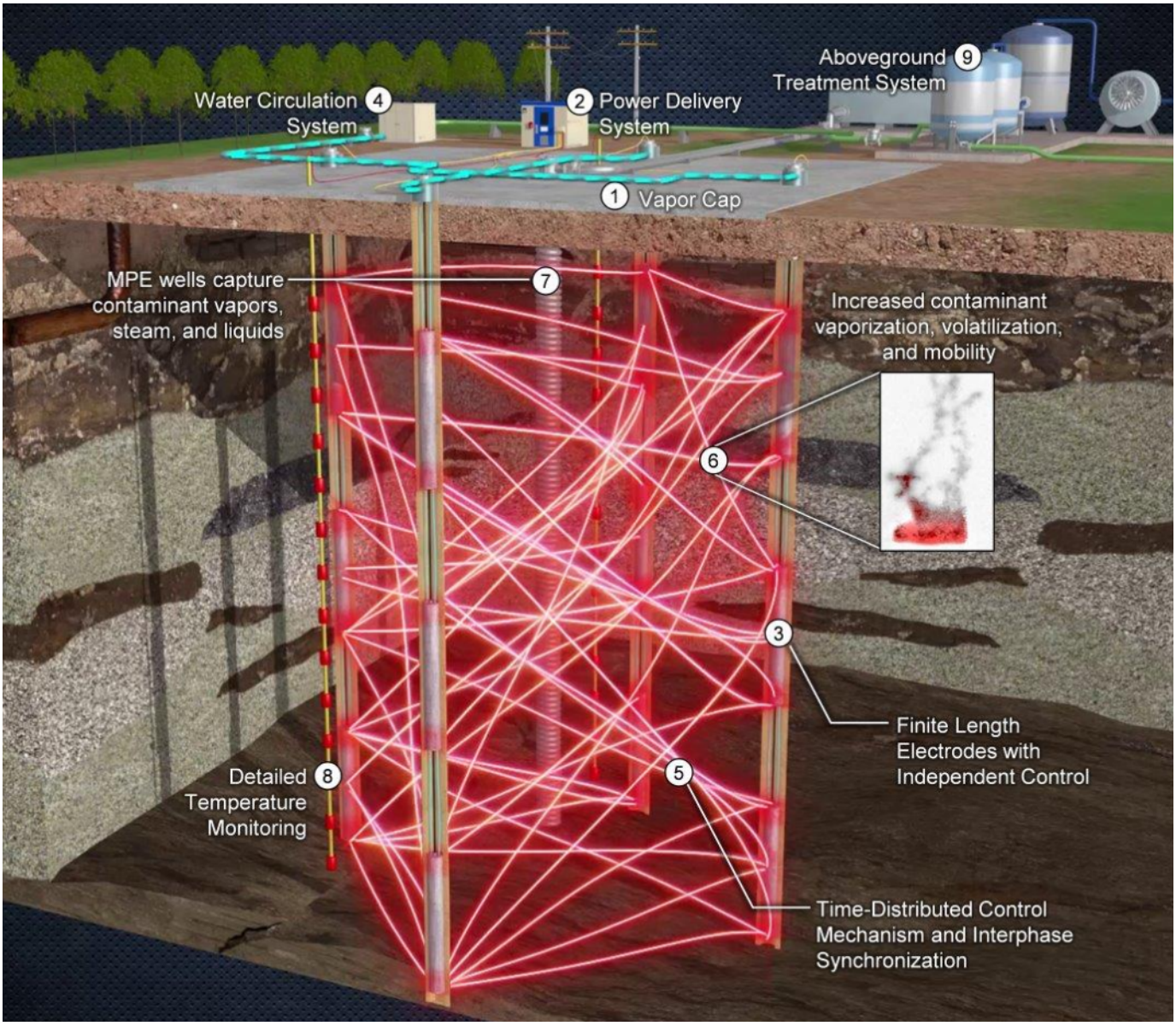


Figure 1.1.: General conceptual model of the remediation process.

Electrodes The design simulation model calls for 2 electrodes per well. The double stacked configuration is shown in Figure 1.6. The well configuration is a function of the depth of treatment interval. This design is needed to achieve target temperatures. In total, there are 50 electrode wells with 2 vertically stacked electrodes in each well. The horizontal spacing between electrodes varies slightly as a result of site constraints but on average is 5.49 m (18.00 ft). The recommended drilling method for the electrode wellbores is Sonic. The average power per electrode is 5.21 kW over a project duration of 180 days, with an estimated

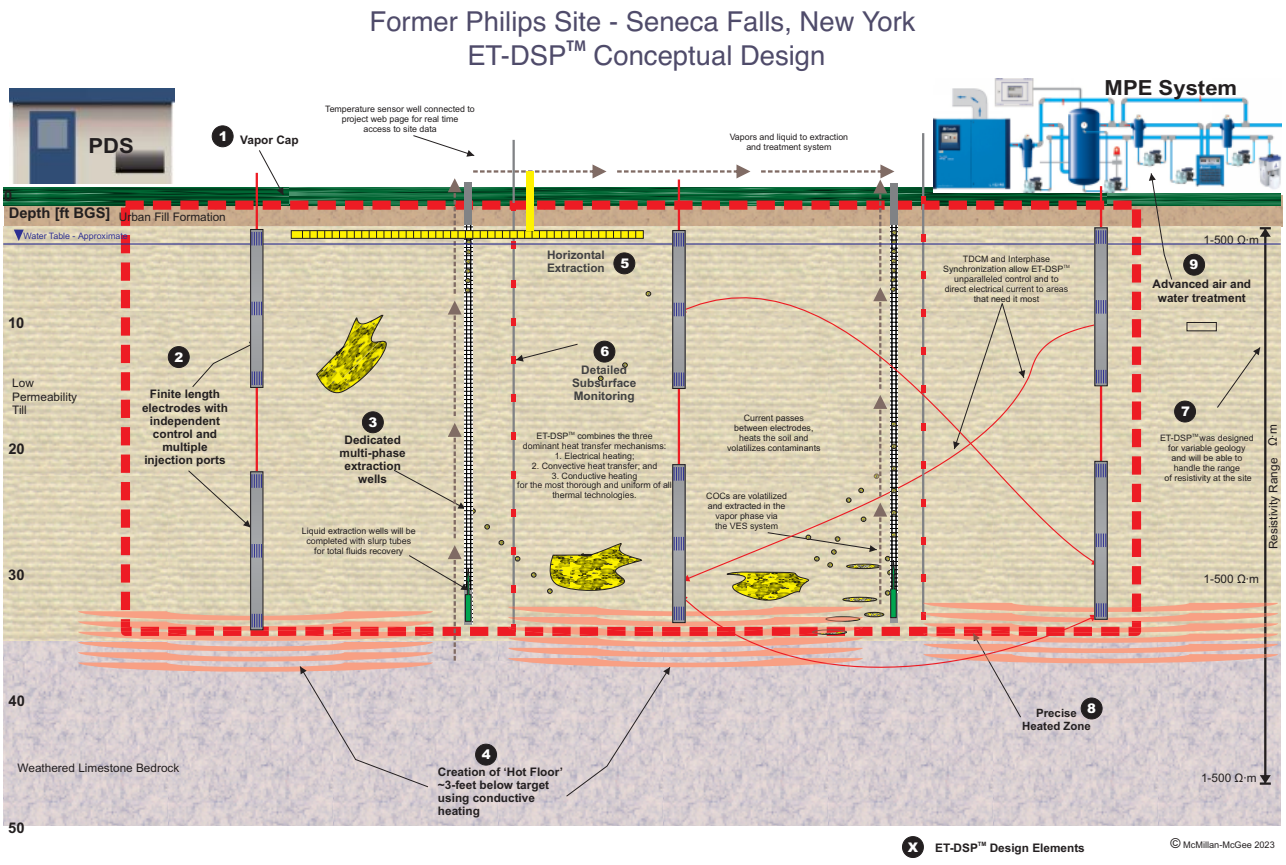


Figure 1.2.: Conceptual model of the remediation process.

peak electrode power of 7.98 kW. The average water injection rate into each electrode is 0.284 L/min. Should highly resistive soil be encountered electrolyte can be injected into the electrodes to increase power to design levels.

Extraction Wells The simulation study resulted in 23 extraction wells which are screened through the treatment interval as shown in Figure 1.6

The average extraction rate for each well is determined by taking the total project extraction rate 7.69 gal/min and dividing by the total number of wells capable of liquid extraction with a result of 0.334 gal/min.

The estimated vapour extraction rate per well for achieving mass recovery is 3.35 scfm with a total vapor flow (non-condensible) into the plant of 77 scfm. The maximum estimated vacuum needed to achieve the vapor flow rates is 40.6 kPa (12 inHg).



Figure 1.3.: Aerial view of the project site.

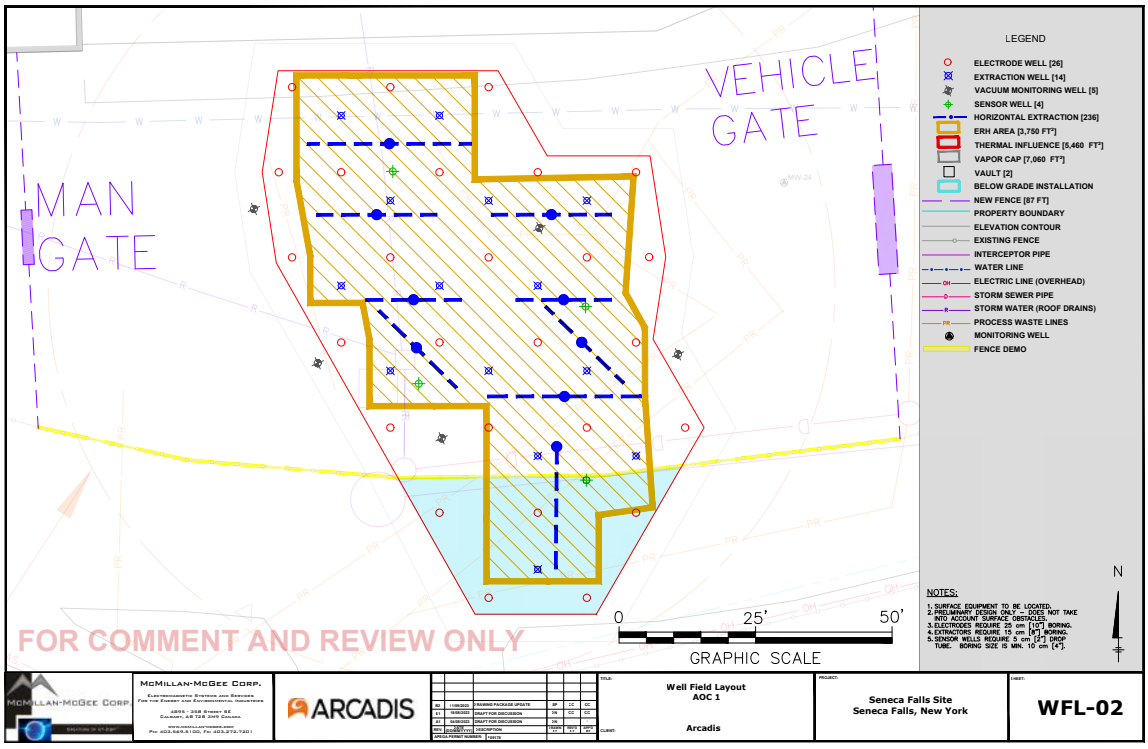


Figure 1.4.: Aerial view of the project treatment Area A.

Sensors To monitor temperature and optimize electric power input, 7 temperature monitoring wells will be used.

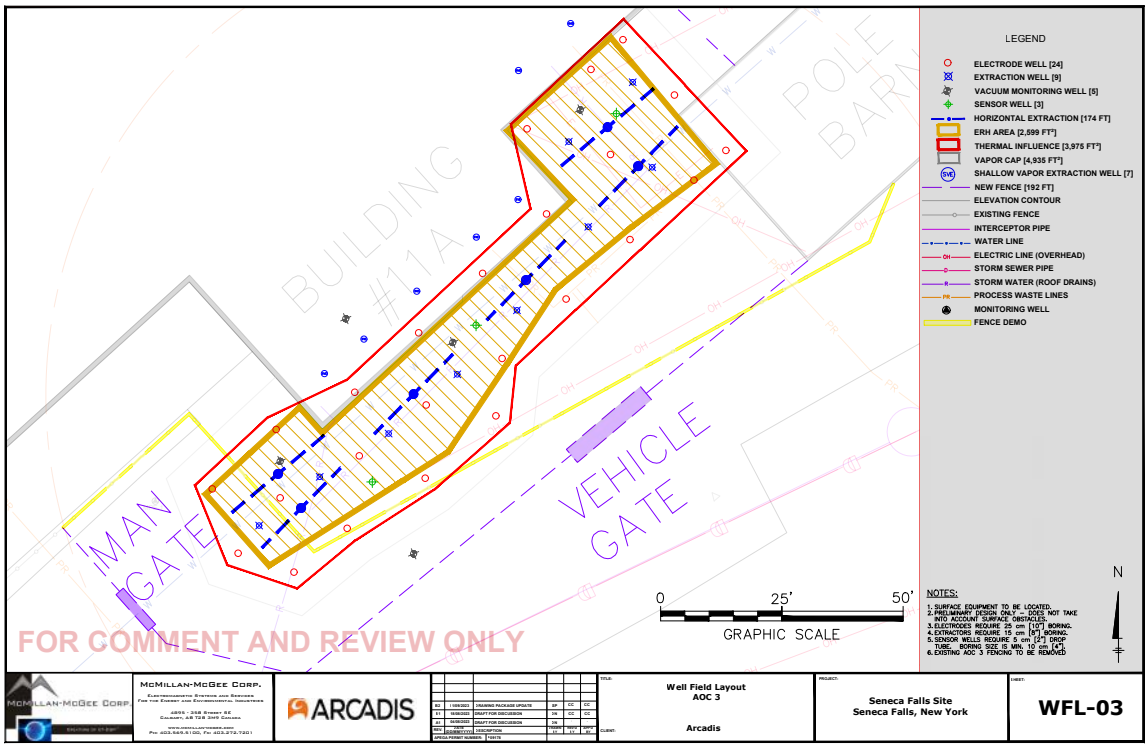


Figure 1.5.: Aerial view of the project treatment Area B.

Electrical Properties Electrical properties of the soil are variable in the treatment volume as there are different soil conditions present. The resistivity profile for the site (and assumed for this numerical simulation study) is shown in Figure 2.4. The assumed static electrical resistivity of the soil in the heated volume is 55.80 Ωm. The resistivity assumed for the simulation ranges in value from 14.20 Ωm to 92.10 Ωm.[6] The resistivity is estimated to change (approximately) by a factor of 1.89 through the operating temperature range, based on experience with similar soils. The assumed temperature dependence on resistivity is shown in Figure 1.8. Data beyond 93.73 °C are extrapolated using methods developed by Chute and Vermeulen[CVC78].

Water Table The depth to the regional water surface averages 1.22 m BGS. No perched groundwater table has been observed. For soil above the water table, treatability will depend on maintaining moisture content in the soil during electro-thermal heating.

[6]Resistivity values are based on experimental data from the site soil

Simulation Study The optimization of the heating strategy and operations through detailed data monitoring is intended to minimize the overall energy consumption of the project while still achieving the clean up goals. The simulation study provides a conservative (aggressive heating) estimate of the energy use.

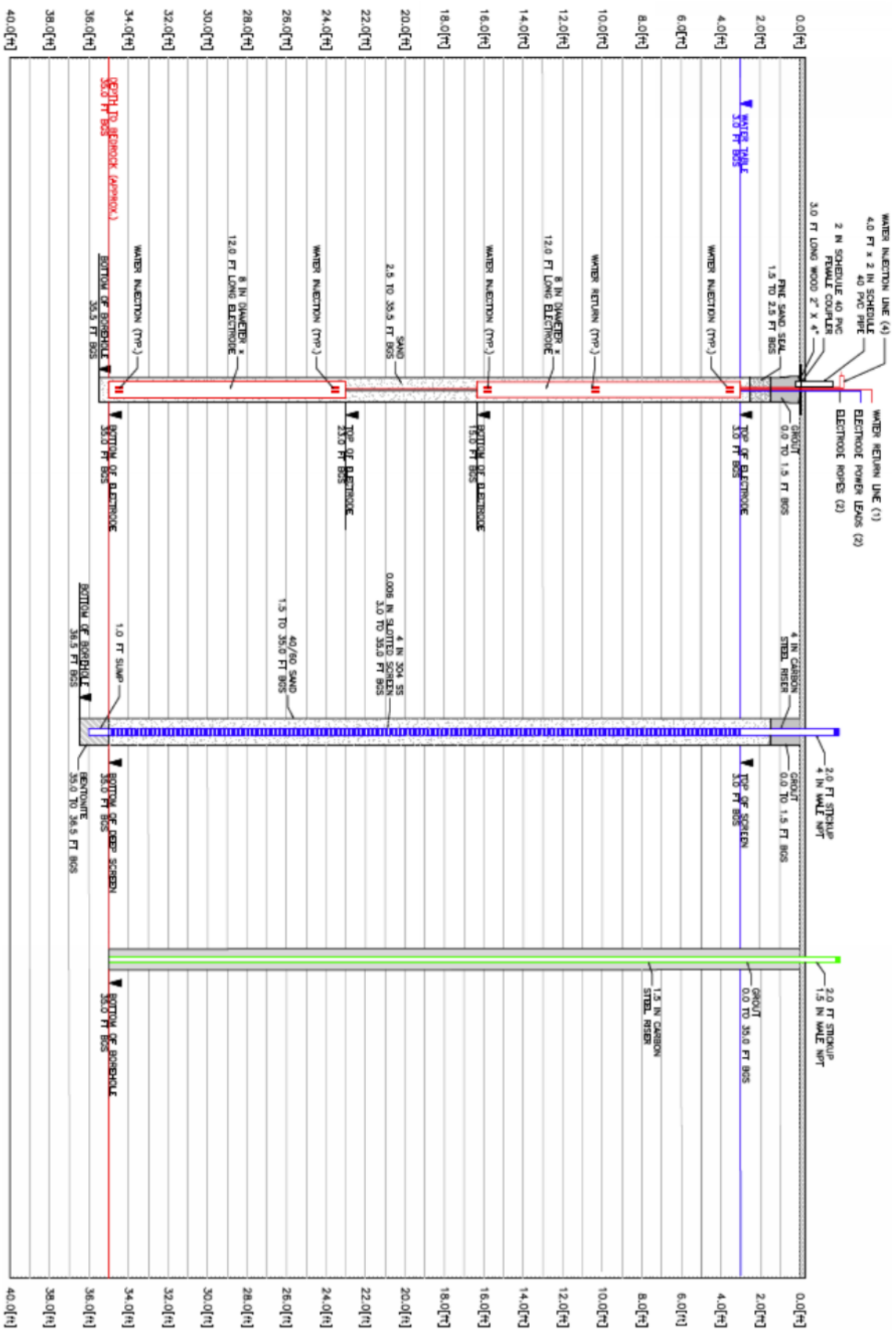


Figure 1.6.: Vertical extent of the electrode wells, extraction wells, and temperature sensor wells.

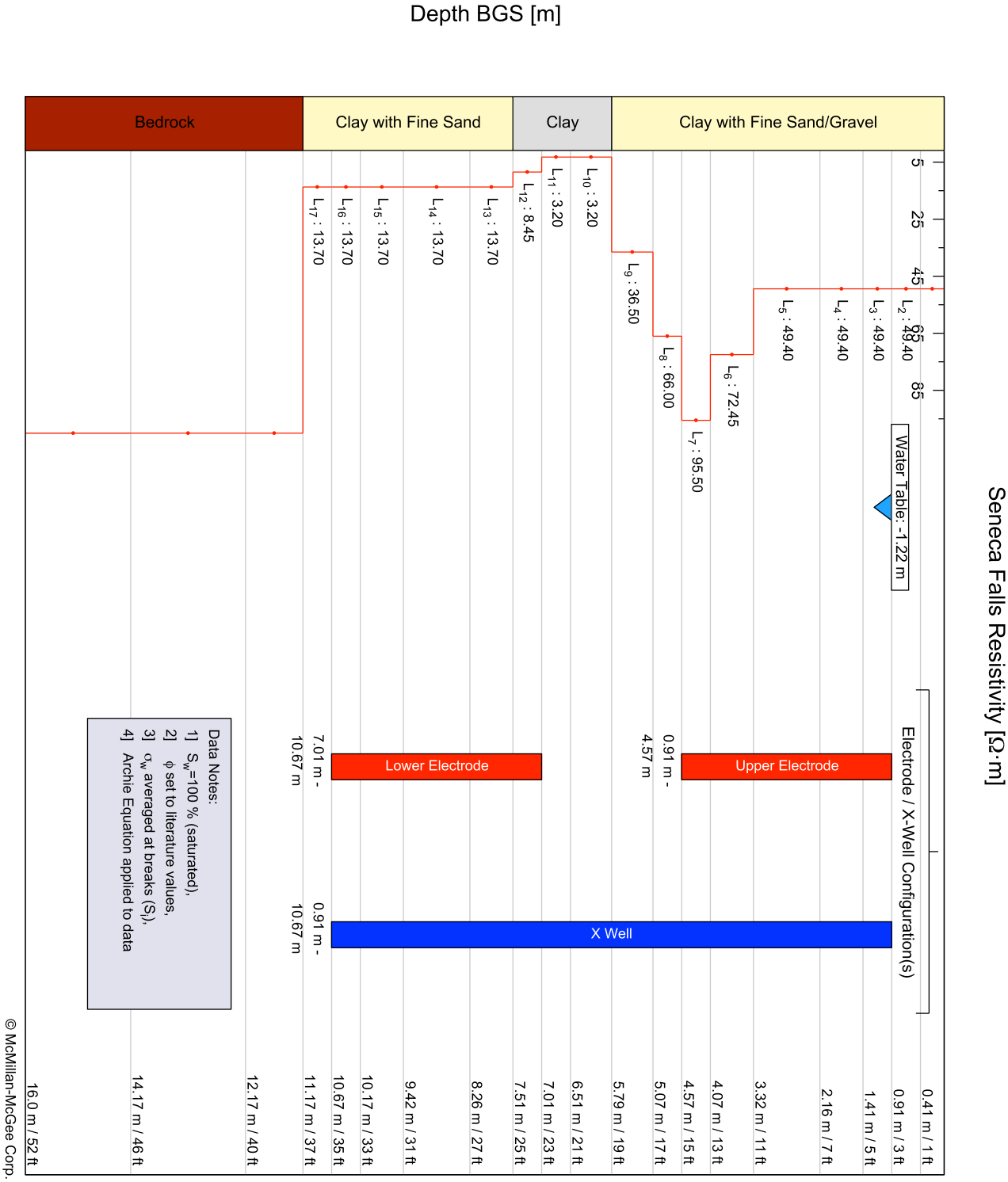
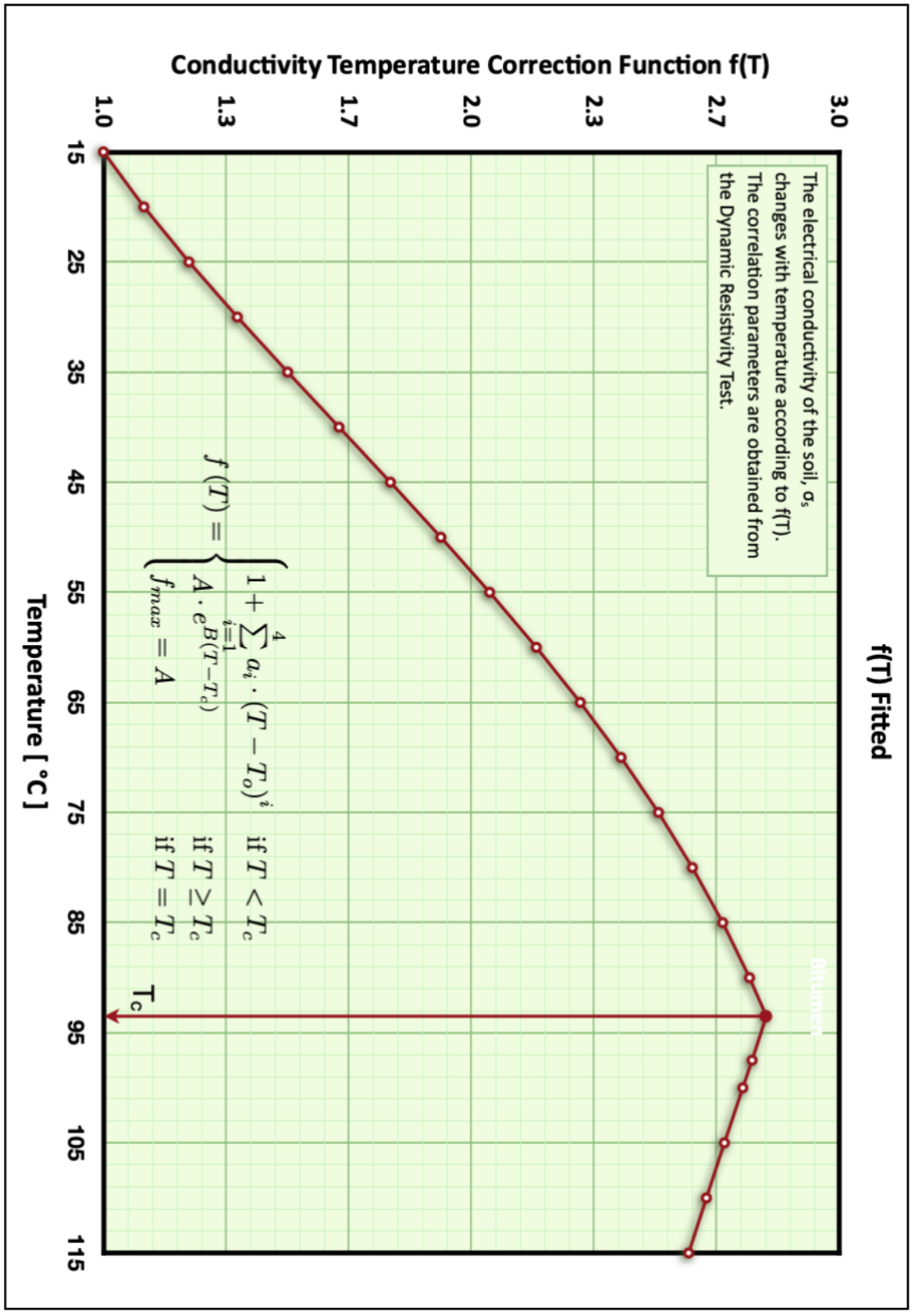


Figure 1.7.: Resistivity profile.



Resistivity Temperature Coefficients Below Tc

T_o	$a_{i=0}$	$a_{i=1}$	$a_{i=2}$	$a_{i=3}$	$a_{i=4}$
15.00	1.00	0.0205172	0.000327061 8	-0.00000543330	0.0000000212046

Resistivity Temperature Coefficients Above Tc

T_c	A	B
93.49	2.8052730	-0.003679291

Figure 1.8.: Temperature dependent resistivity multiplier.

2 Simulation Study

The input data, along with electrical property data for the soil, were obtained from Arcadis. Data were obtained from the public domain if not provided by the client. An aggressive heating strategy is assumed.

Figure 2.1 shows the ET-DSP™ thermal treatment area. The scope of this simulation study is limited to only the ET-DSP™ process within the treatment area.

2.1. The Site

Based on the overall treatment objectives and the operational performance goals for the Site, the Mc^2 technical approach for the successful completion of the project includes the following for the site:

1. An ET-DSP™ system using an electrode design approach that maximizes convective heat transfer for uniform heating of the defined treatment zone;

2. Aggressive multi-phase extraction of vapours and liquids from dedicated multi-phase extraction wells;

3. Detailed subsurface monitoring using real-time sensing technology;

4. Tight pneumatic and hydraulic control facilitated by continuous monitoring of water balance, an oversized vapour extraction system, and a network of dedicated extraction wells; and

5. Vapour treatment using a system modified for use with the high temperatures and high contaminant recovery rates expected.

Operationally, the process shall be applied over the target interval of 0.00 m to 10.67 m subsurface. Mc^2 will operate to meet the remedial objectives as follows:

1. Heat and extract contaminants from the target area for approximately 180 days;

2. Remove volatile organic compounds (VOCs) from the subsurface by enhanced mobilization, volatilization, and degradation reactions via the ET-DSP™ process. Effluents will be cooled and separated. Extracted fluids (groundwater and vapour) will be treated for removal of VOCs prior to discharge. Recovered contaminants will be stored on-site for disposal;

3. Based on achieving diminishing returns in contaminant mass recovery, determine when the target area has met goals and cease operations.

2.1.1. Background Information

The Seneca Falls Areas A and B project is located in Seneca Falls, New York. The Site is situated in an industrial zone surrounded by manufacturing facilities.

In summary:

1. The thermal treatment area is shown in Figure 2.1.

2. The assumed chemical distribution is provided in Figures 2.2 and 2.3.

3. The overall objective of the remedial action is to reduce the concentration of site COCs, primarily TCE and its breakdown products in soil and groundwater within the designed target treatment zone.

   This will be accomplished by removing the contaminant mass in the source zone as reported by Arcadis. Information provided by Arcadis is based on their review of data collected by others including previous consultants on the site.

4. The flow groundwater flow velocity is assumed to be negligible[1].

A summary of the site conditions are:

1. The constituents of concern identified at the site, provided by Arcadis are:
    a) Trichloroethylene;
    b) cis-1,2-dichloroethylene;
2. The treatment interval ranges from 0.00 m to 10.67 m below ground surface.
3. Based on information supplied by Arcadis, the site geology is as follows:
    a) Urban Fill (up to 2.4 meters, but typically less than 0.3 meters thick)
    b) Low permeability till (up to 10.6 meters thick in the treatment area)
    c) Weathered bedrock (starts at approximately 10.6 meters BGS)
4. The groundwater table is at approximately 1.22 m BGS.
5. It is expected that any pre-existing monitoring and extraction wells not suitably constructed for exposure to high temperature will be decommissioned prior to the implementation of thermal treatment.
6. Removing the volatile chemicals of concern from the subsurface and mitigating soil vapor exposure within the time frame of 180 days is the desired outcome of remediation effort.
7. Due to the depth of the treatment interval, a thermal insulating cap will be required. The cap will also significantly reduce flow at ground surface. This boundary will help mitigate vapour short circuiting and enhance contaminant recovery. The numerical simulation assumes a zero flow boundary condition at the surface.
8. A network of multiphase (vapour and groundwater) extraction wells will be installed and operated within the treatment area to ensure that hydraulic and pneumatic control can be maintained throughout operations.

[1] If groundwater flow velocities are greater than 0.3 m/day then this can result in significant heat flux out of the treatment volume. Typically this will require engineering controls to confine flow velocities to manageable values to mitigate these losses.

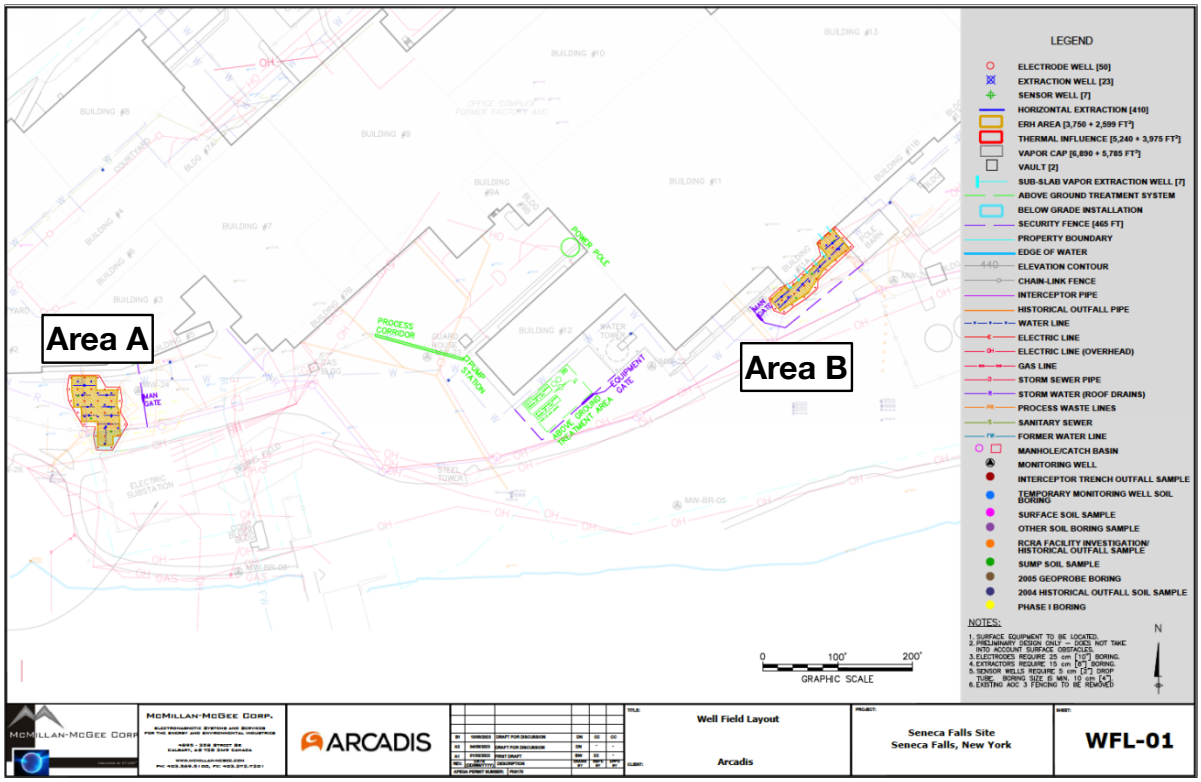


Figure 2.1.: Thermal treatment areas for the project.

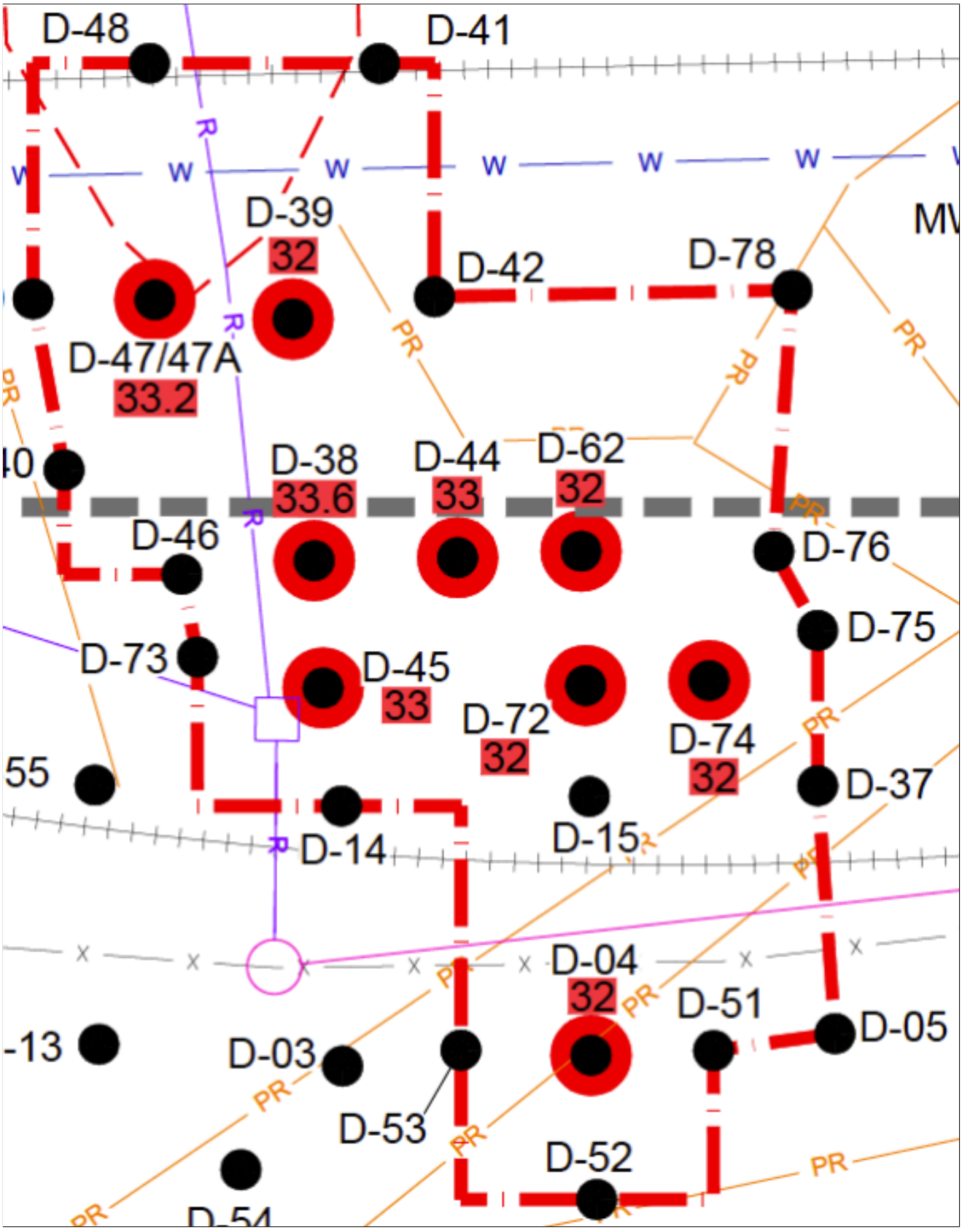


Figure 2.2.: Chemical distribution in the treatment area (Area A).

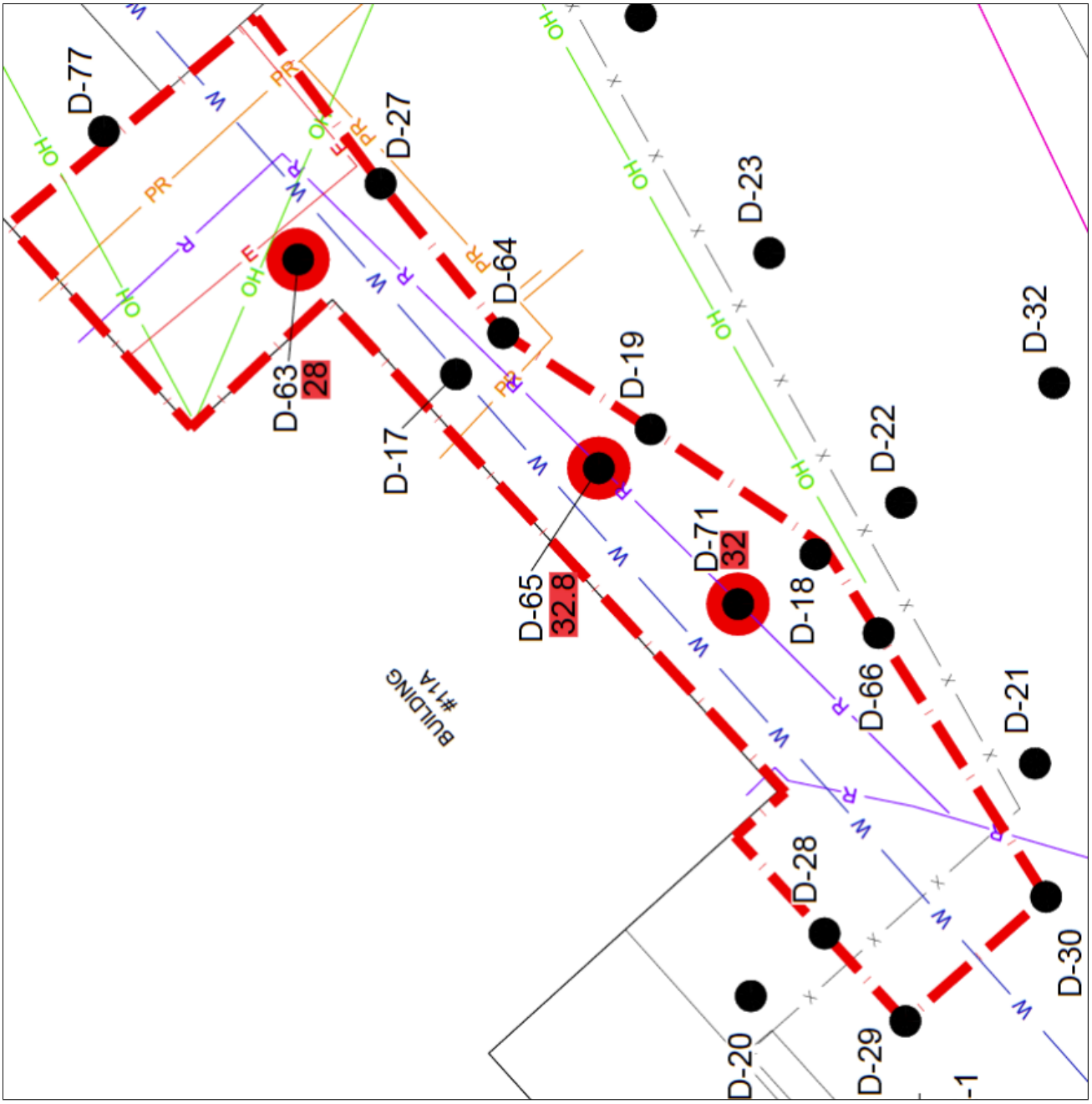


Figure 2.3.: Chemical distribution in the treatment area (Area B).

2.1.2. Geology

The conceptual description of the geology used in this study was provided by Arcadis. The soil at the Seneca Falls Areas A and B site is characterized by stratigraphic units which tend to be generally consistent across the site.

The geologic features as used in this study are:

1. Hydraulic conductivity ranges from 6.6E-05 cm/s to 1.2E-03 cm/s.

2. The total porosity in the treatment volume is approximately 30%. Only accounting for some of the interstitial water will underestimate the energy calculations.

3. The resistivity data for the site was measured by McMillan-McGee as part of earlier investigations in 2011. From the provided range, the average static electrical resistivity of the soil was assumed to be 55.80 Ωm and ranges in value from 14.20 Ωm to 92.10 Ωm.

4. The soils are assumed to have a uniform average bulk permeability with the upper interval being more hydraulically conductive than the lower interval. Heating will dramatically increase the permeability of soils, especially low permeability layers, and thus a higher value, but representative value, is used for the sandy silt unit.

2.2. Assumptions

2.2.1. General Assumptions

Some of the more general project assumptions captured in the simulation are:

1. The input energy estimates are for electrode and extraction well operations only. Additional energy for the project is required to run the equipment treating extracted groundwater and condensed vapour (herein referred to as the treatment plant) and / or for contingency operations. From experience, the ancillary and contingent energy for a project of this size can be an additional 9.55 percent. Our best estimate of the ancillary energy is 103 $MW \cdot h$ and can be used for estimating the energy budget.
2. The heated volume surrounds the treatment volume in all dimensions by design. The heated volume is larger than the treatment volume in order to ensure complete thermal treatment of the contaminants.
3. The *Recycle Supply* is water supplied from the onsite treatment plant that is collected from the extraction wells, treated, and re-injected into the electrodes.
4. Each multiphase extraction well is assumed to extract liquids and vapours at the same rates as all the other extraction wells within the area provide it's the same well depth. For example, all shallow extraction wells have the same extraction rates as other shallow extraction wells. For effective and economic remediation, the extraction wells should be operated with this strategy. At steam temperatures, a component of the vapour will be steam. It is important to maintain hydraulic control and not over extract liquids relative to liquid injection into the electrodes.
5. Water injection and current delivery to the electrodes will vary for each electrode as determined by this simulation study. Boundary electrodes will operate with 1.14 times more current than interior electrodes to compensate for heat losses.
6. The chemical mass is *uniformly* distributed throughout the vertical interval.
7. To achieve the minimum temperature target early in the project, an aggressive ramp-up with increased peak power to each electrode is necessary.
8. The water saturation distribution, S_w, is assumed to be 100%. This is appropriate given water injection into the electrodes to maximize heat transfer. The chemical saturation is comparatively small.

2.2.2. Specific Assumptions

1. The soil electrical resistivity values used in the simulation were provided by Arcadis. Depth-weighted resistivity values were calculated in each vertical layer of grid blocks, using the provided range and typical resistivity depth profiles.

2. It is assumed that power control to the electrodes dominates the energy input to the soil. Actual electrode currents will be controlled during the project to maintain the recommended power levels.

3. The electrode current is regulated to less than 120 A. The soil is moderately conductive and current regulation may be necessary. Water injection rates into the upper and lower electrodes are operated in a balance so that the rates are the same.

4. Extracted water and condensed vapour will be treated and re-injected back into the electrodes. A heat exchanger may be used to recover the energy in extracted water to pre-heat the electrode injection water. The model assumes the average temperature of 15.00 °C for the injected water.

5. It is assumed that the groundwater velocity is less than 0.3 meters (1 foot) per day, and will have a negligible affect on heating. As such, groundwater flow velocities are assumed to be zero.

   Note that groundwater, having a large heat capacity, is a key element in uniform heat transfer, and high groundwater flow velocities can result in energy penalties within the heated volume. Typically, local groundwater flow velocities greater than 1 meter per day become problematic for attaining the target temperatures.

   If high flows or cooling effects are noted during the remedial action, mitigation actions should be evaluated in a timely fashion.

2.2.3. Resistivity

Soil resistivity was measured on soil samples collected by Arcadis and for the purposes of the simulation, the resistivity data was simplified over the vertical extent of the treatment volume. The static resistivity data used in this study is summarized in Figure 2.4. The dynamic and static soil resistivity used in this study are shown in Figures 2.5 and 2.6 respectively.

The supplied resistivity data extended through the vertical extent of the treatment volume.

Heating the soil using electricity operates by applying a voltage across installed electrodes to induce current in the soil itself. Therefore, the design of the ERH system for site treatability depends on knowing the electrical resistivity profile of the treatment volume.

Another key property of the soil in determining its electrothermal treatability is the electrical resistivity as a function of temperature. Generally, as water saturated soils are heated to boiling temperature, the electrical resistivity will decrease to one third of its initial value.

Power controls for the electrical heating process must be capable of adjusting for the variations in electrical conductivity as a function of water saturation and temperature. The temperature dependence for this site was estimated as a linear multiplier of 1.89 for a 93.73 °C increase in temperature based on past experience and values. The conductivity of the interstitial water, σ_w, used in Equation 2.1 is estimated similarly.

The overall average resistivity data, $\hat{\rho}$, adjacent to each electrode, for example, 55.80 Ωm, can be used to estimate the electrode resistance, R_e using Equation 2.2. Equation 2.2 has been used extensively and accurately predicts the electrode resistance measured in the field.

$$\sigma_s\left(S_w, T\right) = \underbrace{\sigma_w \frac{\phi^m}{a} S_w^2}_{Salinity\ Effects} \cdot \underbrace{\sum_{i=0}^{N} a_i \cdot \left(T - T_o\right)^i}_{Temperature\ Effects} \tag{2.1}$$

$$R_e = \frac{1}{2\pi\sigma_s h_e}\left[\frac{r_w}{h_e} + \sinh^{-1}\left(\frac{h_e}{r_w}\right) - \sqrt{1+\left(\frac{r_w}{h_e}\right)^2}\right] \tag{2.2}$$

Water is injected into the electrodes and/or electrode boreholes to ensure that ohmic contact is maintained between the electrode, the graphite back fill and the soil during electrical heating. As well, the injection of water greatly helps in the rate of heat transfer into the soil.

The injection rate must be carefully managed and depends on the input power and the electrical properties of the soil. For the Seneca Falls Areas A and B project, the value for the average injection rate is 0.284 L/min per electrode.

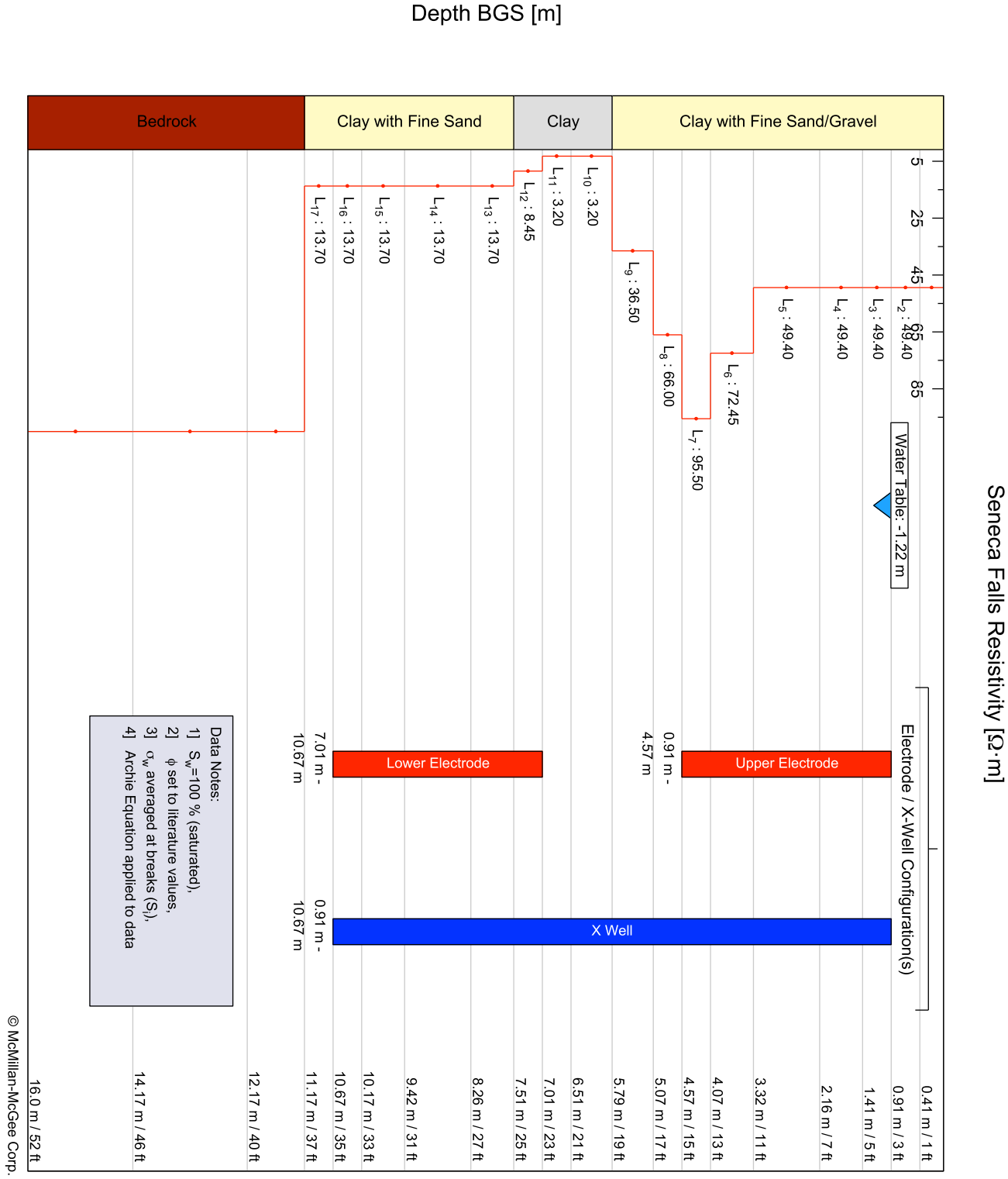
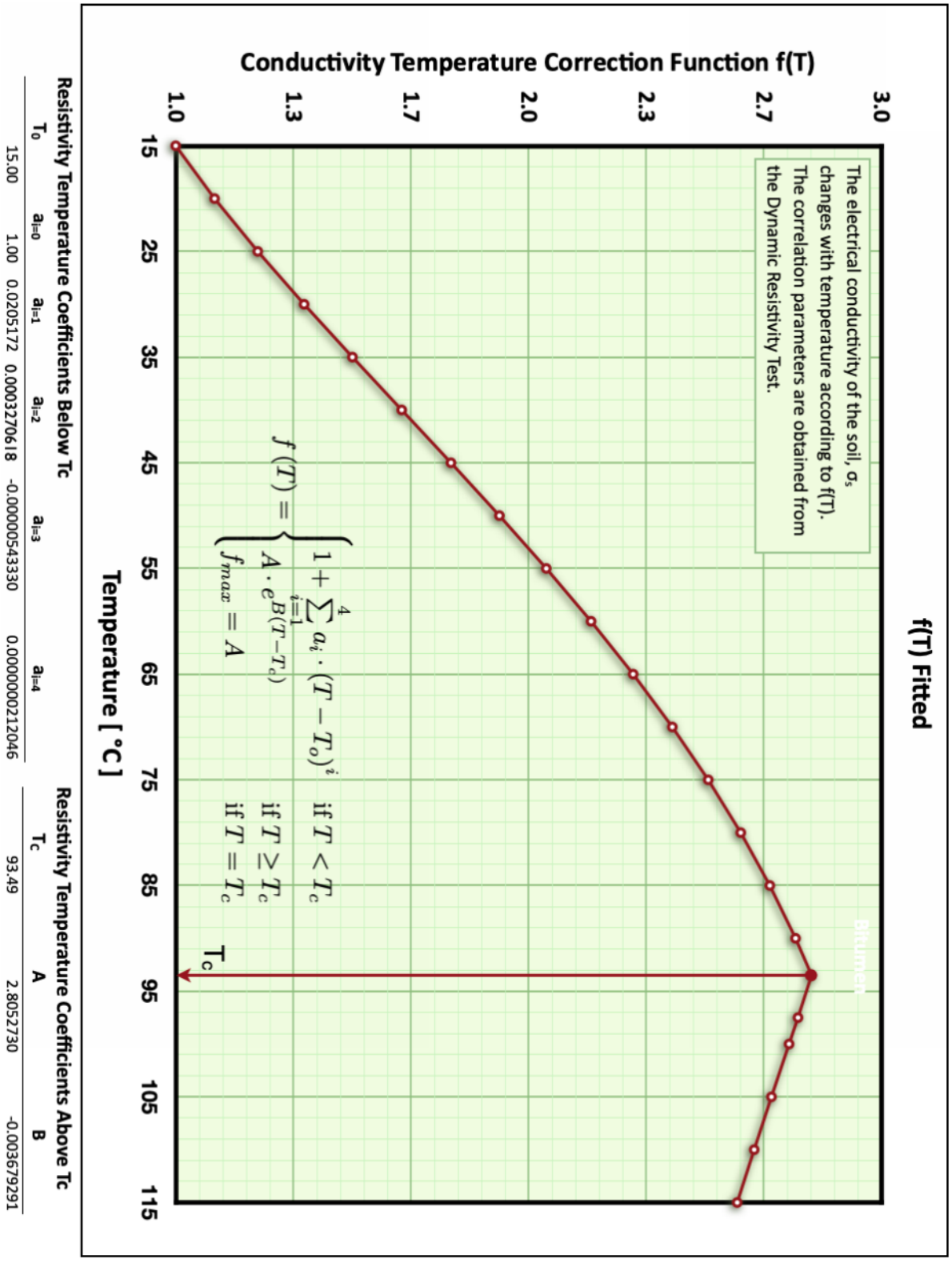


Figure 2.4.: Resistivity profile plot for the site.



Resistivity Temperature Coefficients Below Tc

T_o	$a_{i=0}$	$a_{i=1}$	$a_{i=2}$	$a_{i=3}$	$a_{i=4}$
15.00	1.00	0.0205172	0.000327061 8	-0.000005433 30	0.000000021 2046

Resistivity Temperature Coefficients Above Tc

Tc	A	B
93.49	2.8052730	-0.003679291

Figure 2.5.: Dynamic resistivity as a function of temperature.

Resistivity / Sigma

Grid Layer		Mid-Depth [bgs m]	Mid-Depth [bgs ft]	$\rho_{m,s}$ [Ω•m]	σ_s [S/m]	σ_w [S/m]
1	0.0000	-0.207	-0.68	49.400000 ,	0.020243	0.092704
2	0.4144	-0.664	-2.18	49.400000 ,	0.020243	0.092704
3	0.9144	-1.164	-3.82	49.400000 ,	0.020243	0.092704
4	1.4144	-1.789	-5.87	49.400000 ,	0.020243	0.092704
5	2.1644	-2.743	-9.00	49.400000 ,	0.020243	0.092704
6	3.3220	-3.697	-12.13	72.450000 ,	0.013803	0.063210
7	4.0720	-4.322	-14.18	95.500000 ,	0.010471	0.047954
8	4.5720	-4.822	-15.82	66.000000 ,	0.015152	0.069388
9	5.0720	-5.432	-17.82	36.500000 ,	0.027397	0.125468
10	5.7912	-6.151	-20.18	3.200000 ,	0.312500	1.431122
11	6.5104	-6.760	-22.18	3.200000 ,	0.312500	1.431122
12	7.0104	-7.260	-23.82	8.450000 ,	0.118343	0.541963
13	7.5104	-7.885	-25.87	13.700000 ,	0.072993	0.334277
14	8.2604	-8.839	-29.00	13.700000 ,	0.072993	0.334277
15	9.4180	-9.793	-32.13	13.700000 ,	0.072993	0.334277
16	10.1680	-10.418	-34.18	13.700000 ,	0.072993	0.334277
17	10.6680	-10.918	-35.82	13.700000 ,	0.072993	0.334277
18	11.1680	-11.668	-38.28	100.000000 ,	0.010000	0.045796
19	12.1680	-13.168	-43.20	100.000000 ,	0.010000	0.045796
20	14.1680	-15.168	-49.76	100.000000	0.010000	0.045796
			Averages	**45.0400**	**0.0550**	**0.2519**

Values from lab resistivity testing range from 21 to 138 ohm-m. No data past 6.3 m.

Figure 2.6.: Resistivity profile data for both areas.

2.2.4. Hydraulic Conductivity

Hydraulic conductivity, (K) is a property of the soil or rock that is a measure of the ease with which a fluid (water in this case) can move through the pore space. It depends on the intrinsic permeability of the material, the viscosity of the fluid, the density of the fluid, and in cases of multiphase flow, the degree of fluid saturation. For this study values of saturated hydraulic conductivity, which describes water movement through saturated media, are provided by Arcadis. This information was provided by Arcadis, based on their review of data collected by others. The hydraulic conductivity used in the simulation study was estimated from the available geologic data for the site. To convert units of hydraulic conductivity in cm/s to units of Darcy, refer to Appendix D.

Typical values for the hydraulic conductivity (in cm/s) for different soil types are summarized in Table 2.1[FC79]. The permeability can vary over several orders of magnitude for a particular soil type. Darcy's law is used to convert the units of hydraulic conductivity to permeability units for input into the numerical simulation program (see details in Appendix D). For water, to convert from 1 cm/s to Darcys multiply by 1,034. For example, from Table 2.1 clean sand has a hydraulic conductivity to water of 10^{-4} cm/s, which is equivalent to 0.1034 D or 103.4 mD (input units for the numerical model). The resulting permeability estimates used in this study are in the range of typical values as shown in Table 2.1.

When very large or small permeabilities are input into the numerical model, simulation calculations can become problematic to compute. In order to improve the efficiency and stability of the numerical model and to provide conservative engineering design, the higher range of permeabilities from typical values are used. Figure 2.7 shows how the permeability can be affected (increased) by transformation of the lithology as a result of heating and creating steam within the porosity of the clay.

The hydraulic conductivity profile in the model was estimated to range from 50.00 mD to 5,000.00 mD as summarized in Table 2.2.

Hydraulic Conductivity	
Material	K [cm/s]
Gravel	10^{-1} to 10^{2}
Clean sand	10^{-4} to 10^{0}
Silty sand	10^{-5} to 10^{-1}
Silt	10^{-7} to 10^{-3}
Glacial till	10^{-10} to 10^{-4}
Clay	10^{-10} to 10^{-6}
Limestone	10^{-7} to 10^{0}
Fractured basalt	10^{-5} to 10^{0}
Sandstone	10^{-8} to 10^{-3}
Igneous rock	10^{-11} to 10^{-2}
Shale	10^{-14} to 10^{-8}

Table 2.1.: Typical Values of Hydraulic Conductivity.

Permeabilty [mD]				
Layer	Depth [m]	k_x	k_y	k_z
1	0.71	1,240	1,240	248
2	1.16	1,240	1,240	248
3	1.66	1,240	1,240	248
4	2.29	1,240	1,240	248
5	3.24	1,240	1,240	248
6	4.20	1,240	1,240	248
7	4.82	1,240	1,240	248
8	5.32	1,240	1,240	248
9	5.93	1,240	1,240	248
10	6.65	68	68	13
11	7.26	68	68	13
12	7.76	68	68	13
13	8.39	496	496	99
14	9.34	496	496	99
15	10.29	496	496	99
16	10.92	496	496	99
17	11.42	496	496	99
18	12.17	250	250	50
19	13.67	50	50	10
20	15.67	50	50	10
	Average	710	710	142
	Maximum	1,240	1,240	1,240
	Minimum	50	50	50

Table 2.2.: Input permeability, k_x, k_y, and k_z data.

2.2.5. Saturation, Porosity, and σ

It is convenient to discuss these three data input sets (saturation, S_w porosity, ϕ and σ) in one section since they are interrelated in accordance with Equation 2.3, the equation we use for modelling the electrical conductivity of the soil.

$$\sigma_s\left(S_w, T\right) = \underbrace{\sigma_w \frac{\phi^m}{a} S_w^2}_{Salinity\,Effects} \cdot \underbrace{\sum_{i=0}^{N} a_i \cdot \left(T - T_o\right)^i}_{Temperature\,Effects} \tag{2.3}$$

The pore space compressibility C_p is 1.1500 $10^{-}6$ /kPa and is estimated from Van der Knaap's correlation $C_p = \frac{A}{\phi}$. The reference pressure, P_{ref}, and temperature, T_{ref} for calculating the porosity are 101 kPa and 20 °C respectively (typically, initial pressure and temperature are used for the reference values). A positive and typical value, 0.0005 1 /°C is used for the pore space thermal expansion, E that causes the porosity to decrease with temperature. The porosity is calculated using Equation 2.4. The base porosity on average is 0.30.

$$\phi \simeq \frac{1 + C_p \cdot \left(P - P_i\right)}{1 + E \cdot \left(T - T_i\right)} \tag{2.4}$$

In Equation 2.4 P_i and T_i are the initial pressure and temperature. As the temperature increases the porosity of the soil changes at a thermal expansion rate defined by E. As the temperature of the liquids filling the pore space increase they will tend to expand in accordance with E_t, the coefficient of thermal expansion of the liquid (water). As the pressure increases, the liquid will compress in accordance with C_p. Our experience has been that the change in porosity with temperature and pressure has resulted in a dramatic increase in the permeability of the soil, especially if that soil is a clay. Figure 2.7 shows how the texture of the clay changes during thermal treatment. It is obvious from the figure that the permeability increases, partly as a result of thermal expansion.

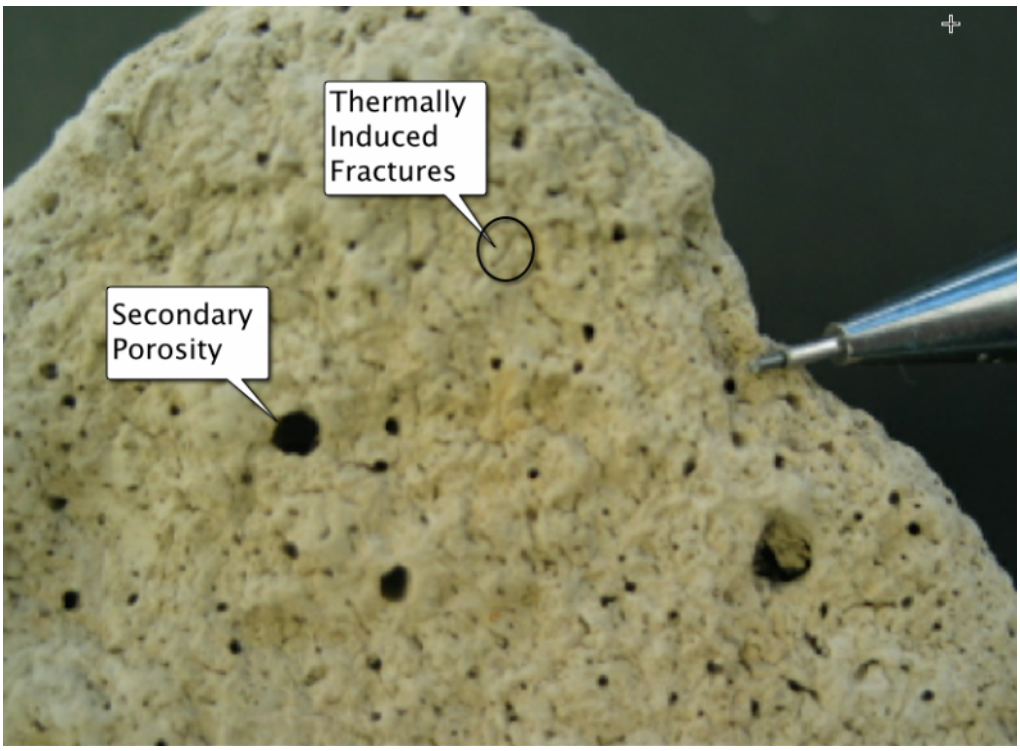


Figure 2.7.: Clay removed from a project post heating.

Δ Z

Geology	IZ	ΔZ [m]		Top [m]	Top [ft]	Mid [m]	K [mD]	$\rho_{m,s}$ [Ω•m]	Φ [-]	P [kPa]	T_s [°C]	Well Types: E- Wells	Well Types: X-Wells
												E	X
	1	0.414400	,	0.0000	0.0000	0.2072	1,240.71	49.40	0.3000	101.325	99.85	26	14
	2	0.500000	,	0.4144	1.3596	0.6644	1,240.71	49.40	0.3000	101.325	99.85		
	3	0.500000	,	0.9144	3.0000	1.1644	1,240.71	49.40	0.3000	101.325	99.85		
	4	0.750000	,	1.4144	4.6404	1.7894	1,240.71	49.40	0.3000	106.917	101.36		
	5	1.157600	,	2.1644	7.1010	2.7432	1,240.71	49.40	0.3000	116.270	103.75		
	6	0.750000	,	3.3220	10.8990	3.6970	1,240.71	72.45	0.3000	125.624	105.99		
	7	0.500000	,	4.0720	13.3596	4.3220	1,240.71	95.50	0.3000	131.753	107.38		
	8	0.500000	,	4.5720	15.0000	4.8220	1,240.71	66.00	0.3000	136.656	108.46		
	9	0.719200	,	5.0720	16.6404	5.4316	1,240.71	36.50	0.3000	142.635	109.73		
	10	0.719200	,	5.7912	19.0000	6.1508	68.24	3.20	0.3000	149.687	111.17		
	11	0.500000	,	6.5104	21.3596	6.7604	68.24	3.20	0.3000	155.666	112.35		
	12	0.500000	,	7.0104	23.0000	7.2604	68.24	8.45	0.3000	160.569	113.29		
	13	0.750000	,	7.5104	24.6404	7.8854	496.29	13.70	0.3000	166.698	114.43		
	14	1.157600	,	8.2604	27.1010	8.8392	496.29	13.70	0.3000	176.052	116.11		
	15	0.750000	,	9.4180	30.8990	9.7930	496.29	13.70	0.3000	185.405	117.72		
	16	0.500000	,	10.1680	33.3596	10.4180	496.29	13.70	0.3000	191.534	118.74		
	17	0.500000	,	10.6680	35.0000	10.9180	496.29	13.70	0.3000	196.438	119.53		
	18	1.000000	,	11.1680	36.6404	11.6680	50.00	100.00	0.3000	203.793	120.69		
	19	2.000000	,	12.1680	39.9213	13.1680	50.00	100.00	0.3000	218.503	122.92		
	20	2.000000		14.1680	46.4829	15.1680	50.00	100.00	0.3000	238.116	125.70		

Geology Legend	
Type	Key
Clay with Fine Sand	
Clay	
Weathered Limestone	

Figure 2.8.: Electrode Configuration showing the distinct lithologies.

2.2.6. Thermal Properties

Component Properties

The properties for the chemicals, water, soil (rock), and gas phases are obtained from the public domain. The *base* physical and thermal property data are summarized in Table 2.3. The density of the liquids and solids change as a function of pressure and temperature, which are accounted for in the model.

Physical Properties

Saturation Input Data		
Chemical	S_c	$S_c < 0.000448$, $\hat{S}_c = 0.00$
Water	S_w	$\hat{S}_w = 1.00$
Compressibility Input Data [kPa^{-1}]		
Chemical	cp_c	$4.63 \cdot 10^{-7}$
Water	cp_w	$4.64 \cdot 10^{-7}$
Rock	cp_r	$1.15 \cdot 10^{-6}$
Coefficient of Thermal Expansion [$°C^{-1}$]		
Chemical	ct_c	$7.85 \cdot 10^{-4}$
Water	ct_w	$2.66 \cdot 10^{-4}$
Rock	ct_r	$5.00 \cdot 10^{-4}$
Specific Heat Input Data [$kJ/(kg\,°C)$]		
Chemical	C_c	0.837
Water	C_w	4.180
Rock	C_r	2.430
Thermal Conductivity Input Data [$W/(m\,°C)$]		
Chemical	λ_c	0.21
Water	λ_w	0.79
Rock	λ_r	2.56
Overburden	λ_{ob}	2.56
Underburden	λ_{ub}	2.56

Table 2.3.: Fluid and thermal data for the model.

A semi-analytic heat loss model is attached to the sides of the grid to eliminate grid

blocks that may otherwise be needed to model the heat losses outside the heated volume. Table 2.4 summarizes the input data used to determine the heat losses.

Table 2.4.: Thermal properties for the heat loss model.

Direction	ΔT_t °C	λ W/m/°C	ρc J/cm^3°C	T_i °C
-3	2.00	33.00	4.50	20.00
+3	2.00	153.00	4.50	20.00
-2	2.00	153.00	4.50	20.00
+2	2.00	153.00	4.50	20.00
-1	2.00	153.00	4.50	20.00
+1	2.00	153.00	4.50	20.00

Thermal Conductivity

Temperature, saturation, and dry density are parameters that determine the thermal conductivity of soils. An increase in any of these parameters will result in an increase in thermal conductivity of the soil, with temperature having the least influence of the three [Ker49] and saturation having the most significant impact. Saturation is a measure of the moisture contained within the pore space of the soil and dry density is the mass per unit volume with the pore space void of moisture.

Several correlations for predicting the thermal conductivity of soils are available in the literature. The correlations are generally developed for five soil types; gravels, sands, silts, clays, and peats. These soil types correspond to those used in the Unified Soil Classification System (USCS)[Cas47].

A unified approach has been developed by Fricke et. al. [FMSB00] for estimating the thermal conductivity for different soil types at different water saturations. Table 2.5 provides mid-value correlation parameters for five soil types. The water saturation implicitly accounts for the density of the soil as indicated in Equation 2.5. The Fricke approach is used here to estimate the thermal conductivity of the various lithologies in the subsurface. The calculations for the lithologies shown in Figure 2.8; Bedrock, Clay, and Clay+Fine Sand; are summarized in Figures 2.9, 2.10, and 2.11, respectively.

Using the Fricke method and correlations, the input data for thermal conductivity of all the lithologies are summarized in Figure 2.12.

$$S_w = \frac{\rho_d \, w}{\rho_w \left[1 - \frac{\rho_d}{\rho_S}\right]} \tag{2.5}$$

The dry density is $\rho_d = \frac{M_S}{V_T}$ and the solid density is $\rho_S = \frac{M_S}{V_S}$, where M_S is the mass of solid soil particles, V_S is the volume of the solid particles (no porosity), and V_T is the total volume (with porosity).

The model developed by Fricke et. al. to describe the behaviour of changing thermal conductivity as a function of moisture content is as follows:

$$S_w = \beta_1 \left[\sinh\left(\beta_2 \, \lambda + \beta_3\right) - \sinh\left(\beta_4\right)\right] \tag{2.6}$$

Table 2.5.: Fricke Mid-Value Correlation Coefficients.

Soil Type	β_1	β_2	β_3	β_4
Clay	27.0	0.27	-1.5	-0.97
Gravel	6.5	0.38	-3.0	-1.48
Peat	28.0	0.86	-1.9	-1.47
Sand	6.8	0.40	-2.9	-1.55
Silt	17.0	0.40	-2.6	-1.61

Fricke Thermal Conductivity Correlation Parameters for Bedrock

	β_1			β_2			β_3			β_4		
Soil Type	**Low**	**Mid**	**High**	**Low**	**Mid**	**High**	**Low**	**Mid**	**High**	**Low**	**Mid**	**High**
Clay	33.500	27.000	14.000	0.290	0.265	0.320	-1.600	-1.500	-3.000	-1.310	-0.970	-1.720
Gravel	16.500	6.500	8.300	0.320	0.380	0.200	-1.900	-3.000	-1.800	-1.100	-1.480	-0.800
Peat		28.000			0.865			-1.900			-1.468	
Sand	6.400	6.800	6.800	0.800	0.400	0.500	-3.200	-2.900	-7.500	-2.000	-1.500	-2.000
Silt	28.000	17.000	22.000	0.400	0.400	0.250	-1.000	-2.600	-2.200	-0.600	-1.600	-0.950

λ_{GUESS}	24.5375	**3.5390**	**W/m °C**	**Fricke Calculation**	Clay	High	Sw in %	100.00

Result ↑

$$S_w = \beta_1 \left[\sinh\left(\beta_2 \lambda + \beta_3\right) - \sinh\left(\beta_4\right)\right]$$

Figure 2.9.: Correlation is used to determine the thermal conductivity of the Bedrock.

Fricke Thermal Conductivity Correlation Parameters for Clay

	β_1			β_2			β_3			β_4		
Soil Type	**Low**	**Mid**	**High**	**Low**	**Mid**	**High**	**Low**	**Mid**	**High**	**Low**	**Mid**	**High**
Clay	33.500	27.000	14.000	0.290	0.265	0.320	-1.600	-1.500	-3.000	-1.310	-0.970	-1.720
Gravel	16.500	6.500	8.300	0.320	0.380	0.200	-1.900	-3.000	-1.800	-1.100	-1.480	-0.800
Peat		28.000			0.865			-1.900			-1.468	
Sand	6.400	6.800	6.800	0.800	0.400	0.500	-3.200	-2.900	-7.500	-2.000	-1.500	-2.000
Silt	28.000	17.000	22.000	0.400	0.400	0.250	-1.000	-2.600	-2.200	-0.600	-1.600	-0.950

λ_{GUESS}	11.9790	**1.7277**	**W/m °C**	**Fricke Calculation**	Clay	High	Sw in %	100.00

Result ↑

$$S_w = \beta_1 \left[\sinh\left(\beta_2 \lambda + \beta_3\right) - \sinh\left(\beta_4\right)\right]$$

Figure 2.10.: Correlation is used to determine the thermal conductivity of the Clay.

Fricke Thermal Conductivity Correlation Parameters for Clay + Fine Sand

	β_1			β_2			β_3			β_4		
Soil Type	**Low**	**Mid**	**High**	**Low**	**Mid**	**High**	**Low**	**Mid**	**High**	**Low**	**Mid**	**High**
Clay	33.500	27.000	14.000	0.290	0.265	0.320	-1.600	-1.500	-3.000	-1.310	-0.970	-1.720
Gravel	16.500	6.500	8.300	0.320	0.380	0.200	-1.900	-3.000	-1.800	-1.100	-1.480	-0.800
Peat		28.000			0.865			-1.900			-1.468	
Sand	6.400	6.800	6.800	0.800	0.400	0.500	-3.200	-2.900	-7.500	-2.000	-1.500	-2.000
Silt	28.000	17.000	22.000	0.400	0.400	0.250	-1.000	-2.600	-2.200	-0.600	-1.600	-0.950

λ_{GUESS}	16.2385	**2.3420**	**W/m °C**	**Fricke Calculation**	Clay	Mid	Sw in %	100.00

Result

$$S_w = \beta_1 \left[\sinh\left(\beta_2 \lambda + \beta_3\right) - \sinh\left(\beta_4\right)\right]$$

Figure 2.11.: Correlation is used to determine the thermal conductivity of the Clay Fine Sand.

Thermal Conductivity

Grid	Depth [bgs m]	ρ [kg/m³]	T_{ref} [°C]	C_r [J/gm/°C]	B	λr [W/m/°C]	D
1	-0.21	2179.0000	15.0000	0.830000	0	2.342045	0.01171022
2	-0.66	2179.0000	15.0000	0.830000	0	2.342045	0.01171022
3	-1.16	2179.0000	15.0000	0.830000	0	2.342045	0.01171022
4	-1.79	2179.0000	15.0000	0.830000	0	2.342045	0.01171022
5	-2.74	2179.0000	15.0000	0.830000	0	2.342045	0.01171022
6	-3.70	2179.0000	15.0000	0.830000	0	2.342045	0.01171022
7	-4.32	2179.0000	15.0000	0.830000	0	2.342045	0.01171022
8	-4.82	2179.0000	15.0000	0.830000	0	2.342045	0.01171022
9	-5.43	2179.0000	15.0000	0.830000	0	2.342045	0.01171022
10	-6.15	2179.0000	15.0000	0.830000	0	1.727706	0.00863853
11	-6.76	2179.0000	15.0000	0.830000	0	1.727706	0.00863853
12	-7.26	2179.0000	15.0000	0.830000	0	1.727706	0.00863853
13	-7.89	2179.0000	15.0000	0.830000	0	2.342045	0.01171022
14	-8.84	2179.0000	15.0000	0.830000	0	2.342045	0.01171022
15	-9.79	2179.0000	15.0000	0.830000	0	2.342045	0.01171022
16	-10.42	2179.0000	15.0000	0.830000	0	2.342045	0.01171022
17	-10.92	2179.0000	15.0000	0.830000	0	2.342045	0.01171022
18	-11.67	2179.0000	15.0000	0.830000	0	3.538992	0.01769496
19	-13.17	2179.0000	15.0000	0.830000	0	3.538992	0.01769496
20	-15.17	2179.0000	15.0000	0.830000	0	3.538992	0.01769496
Average		**2,179**	**15**	**1**			

Dry ρ (max in range) : http://structx.com/Soil_Properties_002.html

λ (average in range) : https://www.engineeringtoolbox.com/thermal-conductivity-d_429.html

Figure 2.12.: Thermal properties by layer.

Table 2.6 summarizes the typical values of thermal conductivity.

Table 2.6.: Base Case Thermal Conductivity.

Component	Symbol	Thermal Conductivity $\frac{W}{m°C}$
Oil	λ_o	.13889
Water	λ_w	.67083
Rock	λ_r	7.40000
Steel Pipe	λ_q	50.00000
Fluid	λ_f	.27188
Reservoir	λ_r	2.04100

2.2.7. Well Layout and Grid

The treatment area along with the well field layout is shown in Figure 2.13. The well layout and grid are designed so that electrodes and extraction wells are located to ensure complete vertical and areal heating of the treatment volumes in accordance with the remediation objectives. This simulation study is comprised of 65 grid blocks in the x direction, 27 grid blocks in the y direction, and 20 grid blocks in the z direction, for a total of 35,100 grid blocks.

Figure 2.12 shows the *base* vertical grid profile used in the simulation study along with values for porosity, permeability, and thermal conductivity values by layer.

Figures 2.13 and 2.14 shows the location of the 100 electrodes in alignment with the simulation grid for the thermal treatment area.

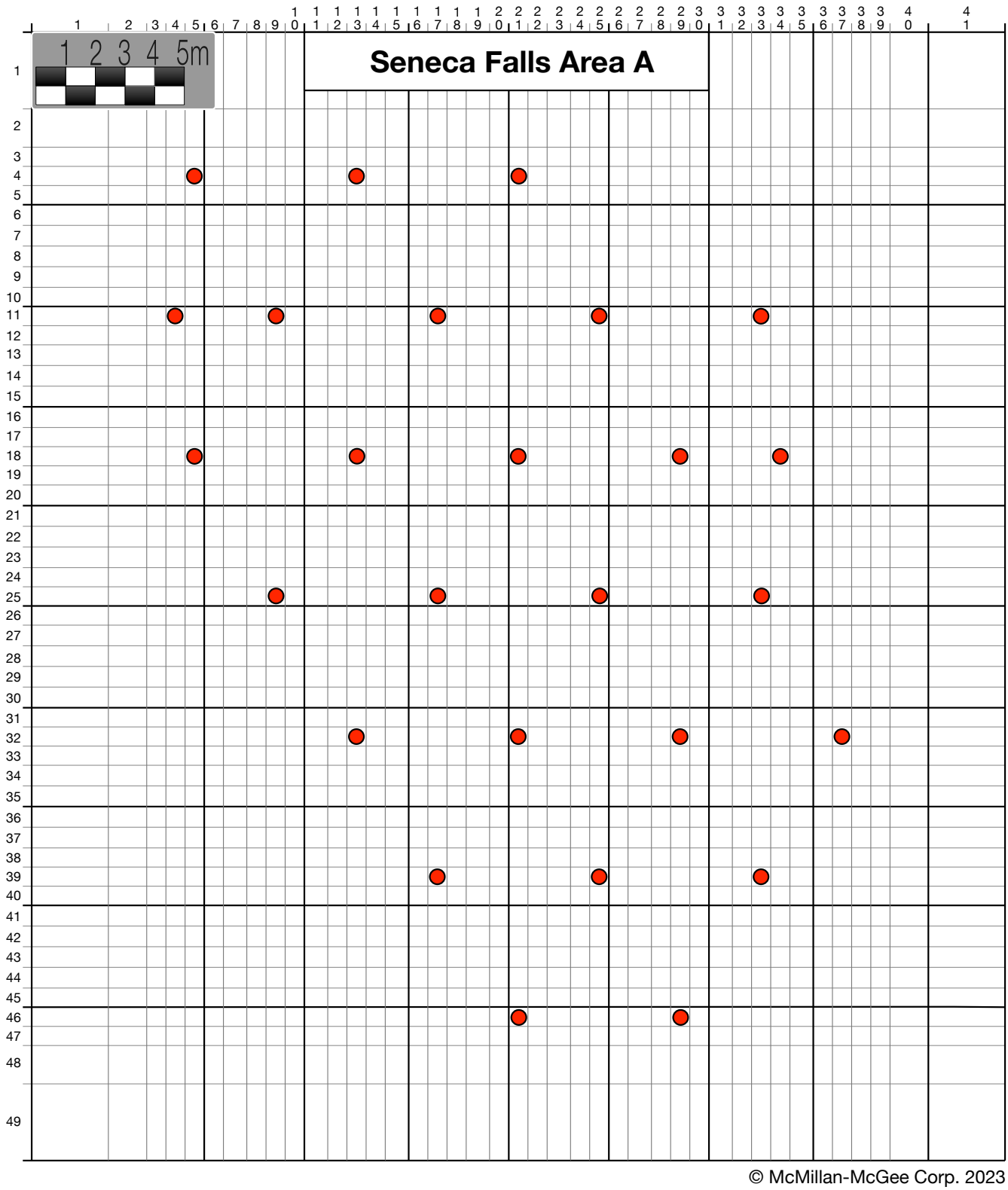


Figure 2.13.: Electrode well grid layout Area A.

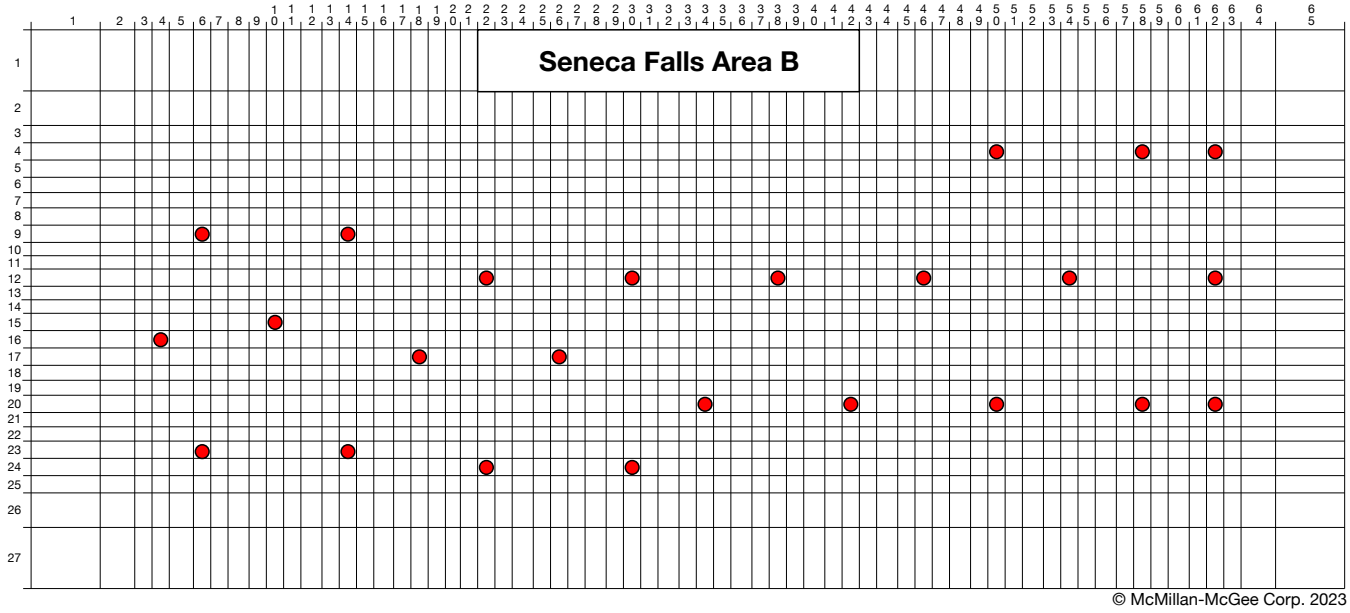


Figure 2.14.: Electrode well grid layout Area B.

3 Results

This section presents the results of the study (Seneca Falls Areas A and B Simulation Study) for the treatment areas and electrode configuration shown in Figures 3.1, 3.2, and 3.3[1].

Target temperatures[2] throughout the treatment volume can be reached in approximately 69 to 76 days of thermal operations (assuming 100% operational uptime). Although target temperatures will be achieved in this time frame, the simulation study along with previous experience indicates that approximately 180 days of operations is needed to achieve the cleanup goals.

Table 3.1 is a summary for the total project. It is noted that:

1. The depth to the bottom of the treatment volume is relatively uniform throughout the site as indicated in Figure 3.4. Therefore so is the length and relative placement of the electrodes in each wellbore. The length of the extraction wells is also uniform. The length and vertical placement of each electrode and extraction well are shown in Tables B.1 and B.2 in Appendix B.

2. The estimate of the treatment volume is calculated using the client provided data as it is distributed throughout the grid. It is approximately equal to the average depth to the bottom over the treatment area of the site; $V_{tv} = A \cdot \Delta Z_{ave}$.

[1] Naming of the electrodes shown in the figure may change. The naming convention used in this report is for convenience.

[2] The duration is determined by the average temperature at the extraction wells, which are typically the last location to reach target temperatures.

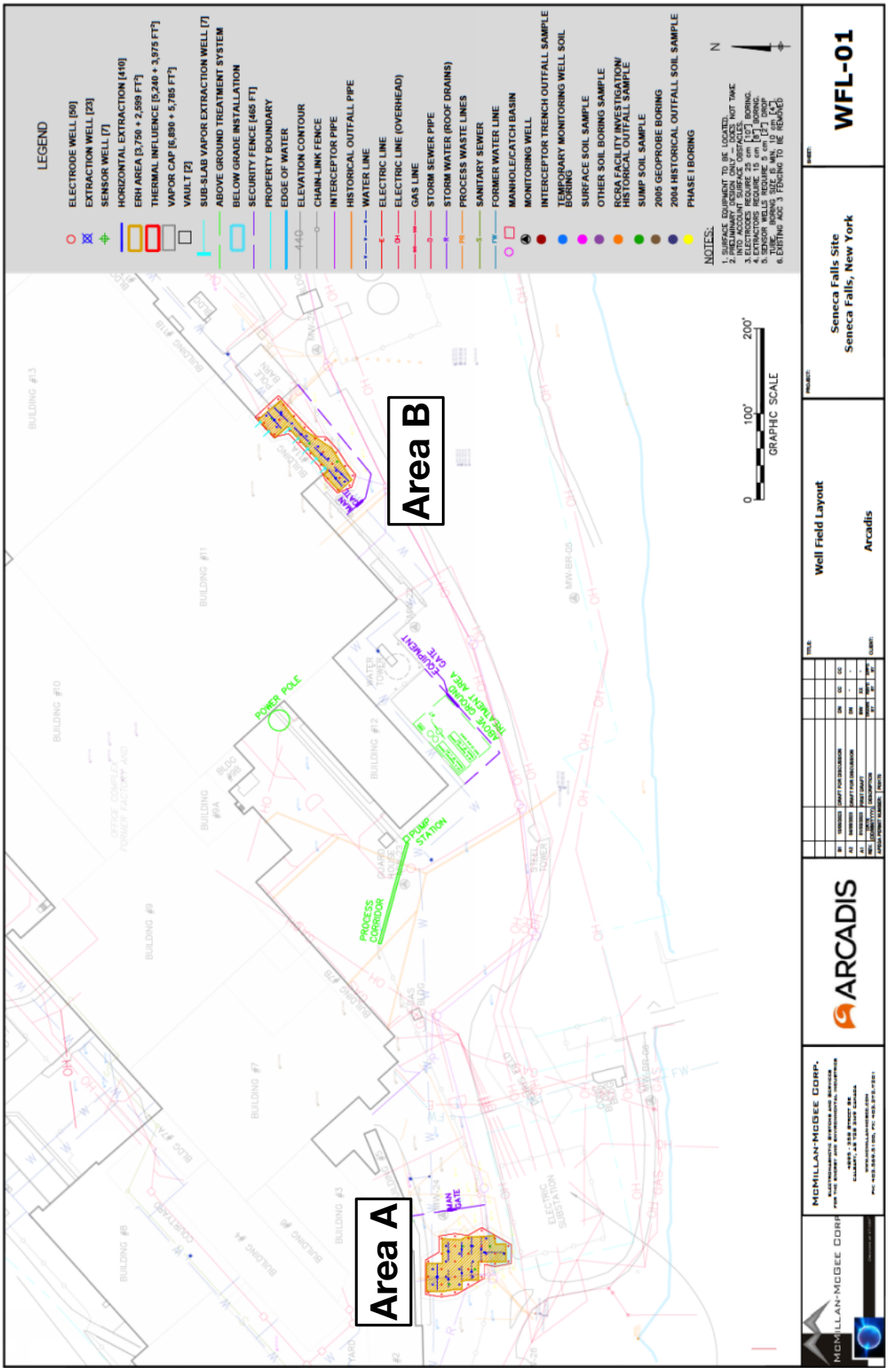


Figure 3.1.: Project study areas.

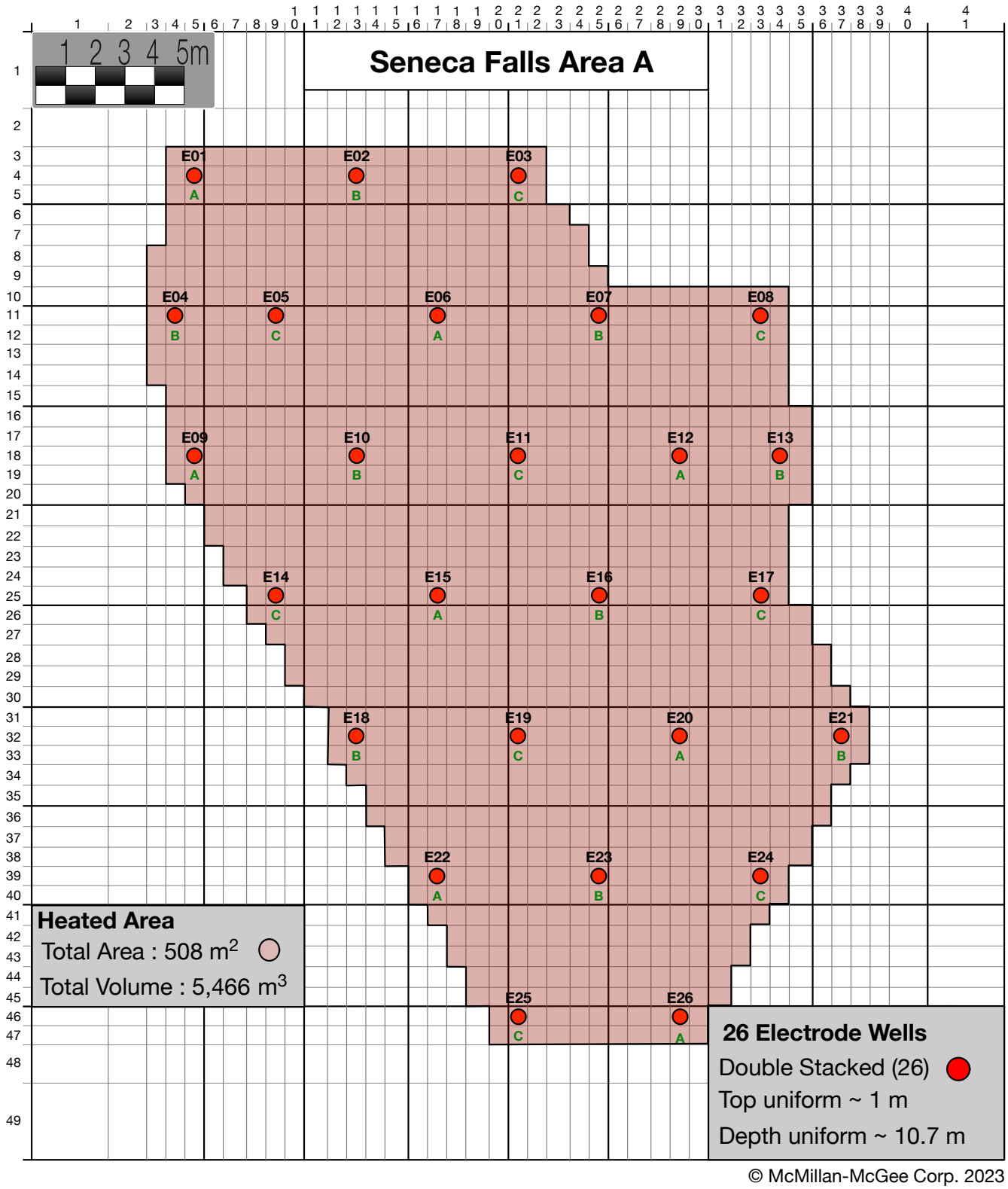


Figure 3.2.: Area A electrode layout.

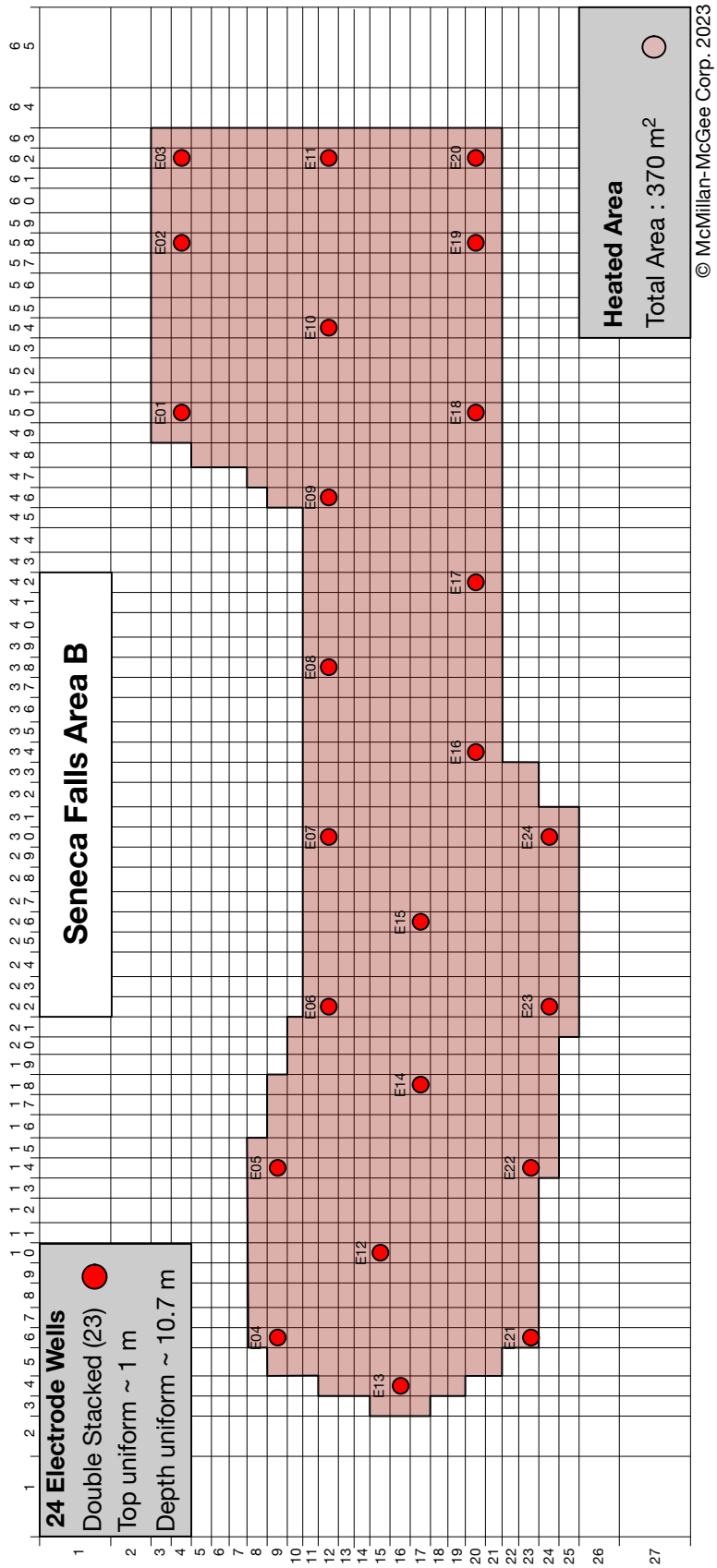


Figure 3.3.: Area B electrode layout.

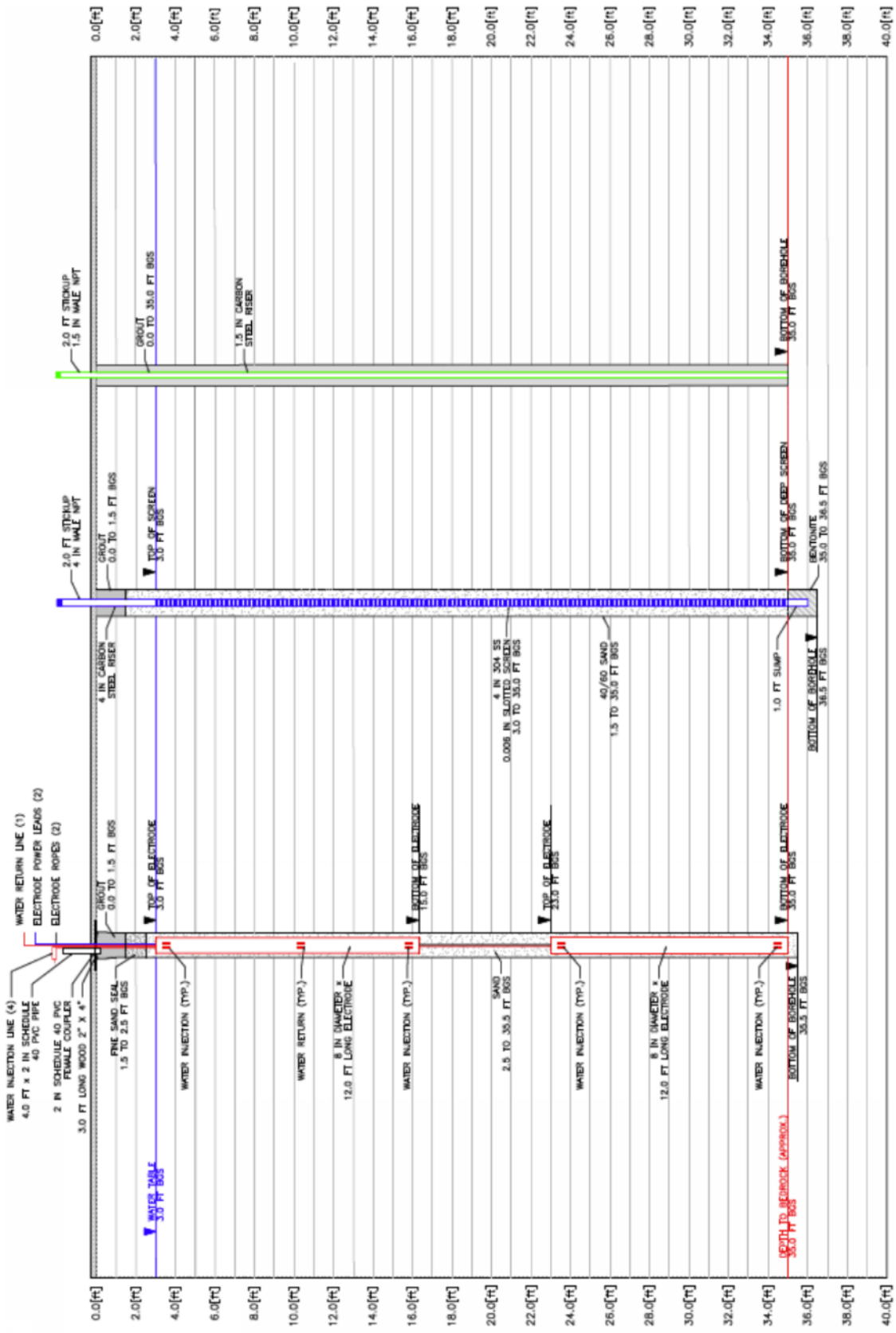


Figure 3.4.: Well construction in the treatment volume (both areas).

3. A high energy density strategy reaches target temperatures uniformly throughout the heated volume in the shortest period of time. This is achieved using closely spaced electrodes and maximum power to the electrodes. Aggressive and focused heating of the lower electrodes is assumed to ensure rapid development of a *hot floor* at the bottom of the treatment volume. Aggressive heating of the lower electrodes also compensates for the possibility of cooling effects from below the treatment volume. In this simulation, the current to the lower electrodes is approximately 1.13 times that of the shallow electrodes.

4. The ancillary energy is an estimate of the energy used to run the treatment system and other surface facilities. It is based on the design of the treatment plant and experience with other projects this size.

5. A non-permeable surface cap will be installed at ground level to mitigate heat losses from the heated volume. The R-factor for the surface cap is assumed to be $1.76 \left[\frac{\mathrm{m}^2\,^\circ K}{\mathrm{W}}\right]$.

6. Maximum temperatures in the soil is achieved at the boiling temperature of water. Factors that influence the boiling temperature are depth (pressure), dissolved salts, and co-boiling of water with contaminants. In the 3D graphical presentation of the temperature data, the maximum has been limited to 90 °C to visually identify regions that reach target temperature from those regions that do not.

7. The maximum limit of the applied vacuum is based on the design of the treatment plant. The operating vacuum will need to overcome piping pressure drops, varying vadose zone intervals and soil properties at the extraction wells, and thermodynamic effects. These parameters are not accounted for in this study.

8. Heated and treated water from the treatment plant can be used for injection into the electrodes. This provides advantages with respect to thermal efficiency. If the temperature of the injected water is greater than ambient, less energy input is required to reach target temperatures.

9. When average values are presented in tables they are weighted averages unless specified. Any weighted averages are performed on a volumetric basis.

Table 3.2 provides a summary of the technical approach for the total project.

The water balance calculations for the project are provided in Figures 3.5, 3.6, 3.7, and 3.8.

Table 3.3 summarizes the water balance calculations. Note that water is supplied from the treatment system, which will recycle the treated water. In some occasions, local utility water may be required to supplement the initial water demand for the startup of the system. The energy balance calculations for the project are provided in Figure 3.10.

Figures 3.11 and 3.12 shows a plot of the temperature response at the extraction wells alongside the average electrode power (averaged on an incremental 30 day basis).

Project Summary

Item		Comments
Location	Seneca Falls	
Heated Area	877 m^2	
	9,435 ft^2	
Heated Deep Vertical Extent	11.17 m	
	36.64 ft	
Heated Volume	9,791 m^3	
	12,806 yd^3	
Electrical Energy	2,251 MW · h	ET-DSP™ subsurface
	230 kWh/m^3	Per heated volume
	176 kWh/yd^3	
Ancillary Energy	103 MW · h	Estimate
Duration	180 days	
Primary Target Chemical	Multiple	
Mass Estimate	5,000 kg	Estimate
	11,023 lbs	
	739 g/m^3	Per unit of treatment volume
Target Temperature	90 °C	
	194 °F	
Time to Reach Temperature	69 to 76	Pays on average based on optimal conditions
Energy Chemical Ratio	450 kWh/kg	
Average Resistivity	55.80 Ωm	average at T_o
Dynamic Resistivity Ratio	1.89	$\frac{\rho_o}{\rho(T_{max})}$

Table 3.1.: Summary of the Seneca Falls Areas A and B project.

Technical Approach

Item		Detail
Electrodes	100	
Electrode Spacing	5.49 m	$\pm$ 0.6 m
Electrode Wells	50	
Extraction Wells	23	dedicated extraction wells
Sensor Wells	7	36 individual temperature sensors
Electrode Well Depth	10.82 m	
Average Electrode Power	5.21 kW	changes with time
Peak Electrode Power	7.98 kW	$S_f = 1.53$
Total Average Power	521 kW	without ancillary power
Total Peak Power	799 kW	
Electrode Injection Rate	0.284 L/min	can vary
	0.075 gal/min	
Total Injection Rate	28.39 L/min	
	2.63 gal/min	
XWell Extraction Rate	1.265 L/min	can vary
	0.334 gal/min	
Total Extraction Rate	29.10 L/min	
	7.69 gal/min	
XWell Vapour Extraction Rate	0.09 sm^3/min	excludes steam
	3.35 scfm	
Vapour Extraction Rate	2.06 sm^3/min	no contingency
	77 scfm	
Applied Vacuum (up to)	12 inHg	estimate
	40.6 kPa	

Table 3.2.: Technical approach and design basis for Seneca Falls Areas A and B.

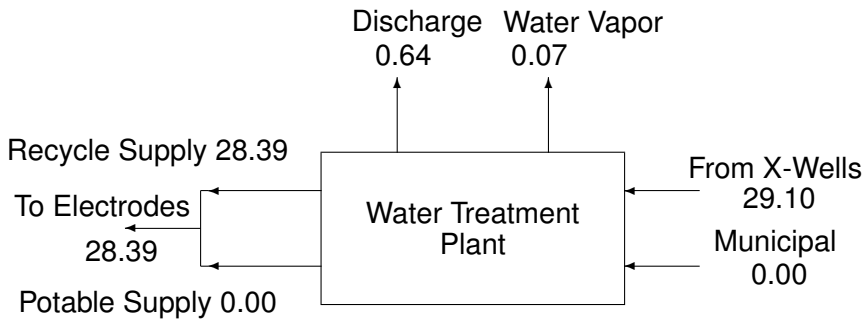


Figure 3.5.: Seneca Falls Areas A and B water balance in l/min.

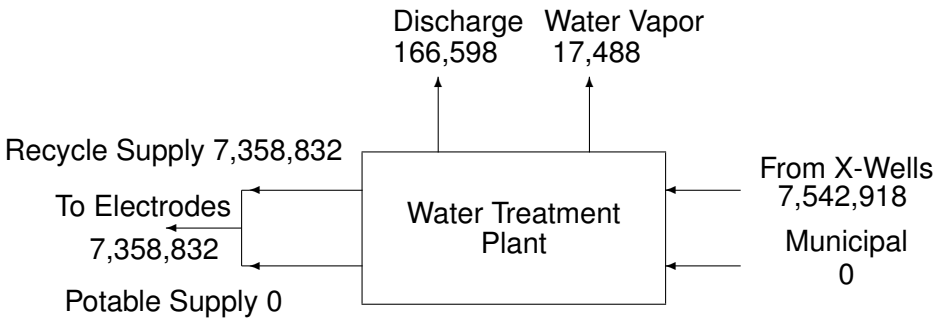


Figure 3.6.: Seneca Falls Areas A and B water balance in litres.

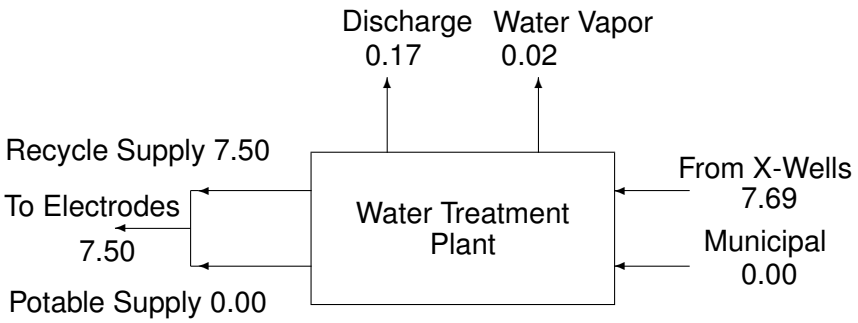


Figure 3.7.: Seneca Falls Areas A and B water balance in gpm.

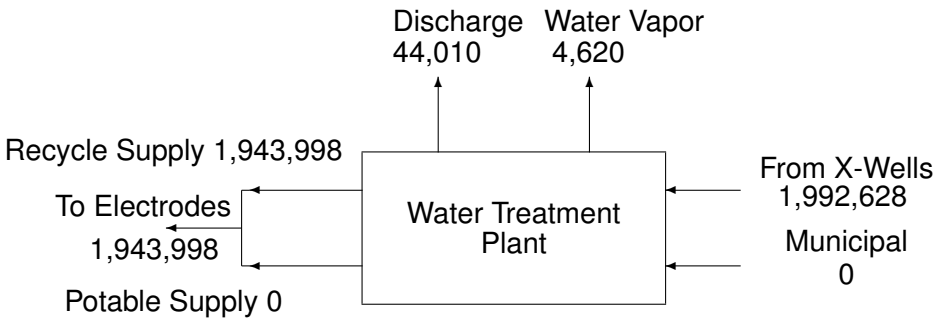
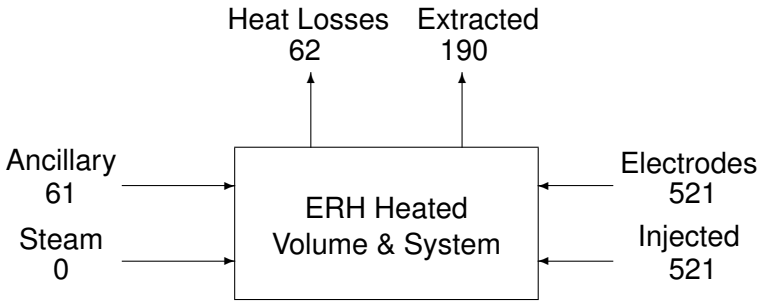


Figure 3.8.: Seneca Falls Areas A and B water balance in gallons.

Water Balance

Item	Rate		Volume	
Water Plant Effluent	**L/min**	**gal/min**	**L**	**gal**
Recycle Supply	28.39	7.50	7,358,832	1,943,998
Potable Supply	0.00	0.00	0	0
To Electrodes	28.39	7.50	7,358,832	1,943,998
Discharge to Sewer	0.64	0.17	166,598	44,010
Vapour (CWE)	0.07	0.02	17,488	4,620
Total Effluent	29.10	7.69	7,542,918	1,992,628
Water Plant Influent	**L/min**	**gal/min**	**L**	**gal**
From X-Wells	29.10	7.69	7,542,918	1,992,628
Hydraulic Ratio				$\frac{Q_X}{Q_E} = 1.025$
From Municipal	0.00	0.00	0	0
Total Influent	29.10	7.69	7,542,918	1,992,628

Table 3.3.: Water balance estimates for treatment plant design.



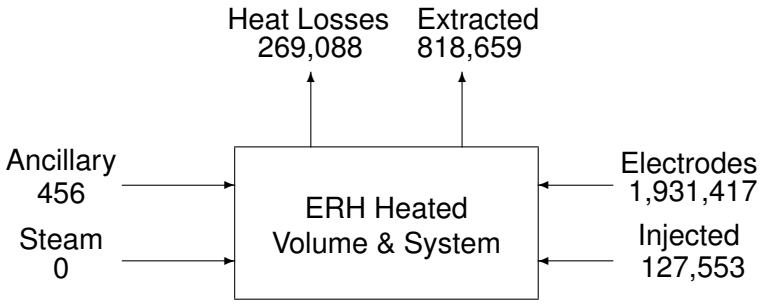
Notes:

① Ancillary power is an estimate.

② Heat loss power is determined on heat leaving the grid providing a conservative estimate for heat losses.

③ Steam is for contingency only.

Figure 3.9.: Seneca Falls Areas A and B average power flow in kW.



Notes:

① Injected energy based on water temperature of 15.00 °C (59.00 °F).

② Calculated energy density is 230 kWh/m^3 (176 kWh/yd^3).

③ Fraction of heat loss to electrode energy is 0.30 percent.

Figure 3.10.: Seneca Falls Areas A and B energy balance in kWh.

3.1. Results Summary

Installation and operational parameters for individual subsurface components determined for the treatment area from the model are adapted for the contaminants of concern and assume equitable distribution. The total estimated mass in place is 5,000 kg, (11,023 lbs)[3] and is assumed to be uniformly distributed in the treatment volume (a conservative approach) of 6,294 m^3, (8,232 yd^3). The chemical concentration on a volumetric basis is 739 g/m^3. The consultant's (Arcadis) summary of the chemical distribution in the soil are shown in Figures 3.13 and 3.14 .

The study focuses on performance goals some of which may include the following:

1. Maintaining system uptime of 95% or more;

2. Attaining a temperature goal of 90 °C in a predetermined percentage of the temperature sensors in the treated volume; and,

3. Reaching CVOC concentration shutdown criteria in the treatment system influent, and verifying that soil and groundwater sample data indicate performance criteria have been met in accordance with the afore-mentioned goals.

[3]This mass estimate is for the purposes of the simulation only and is not calculated or interpolated from site data

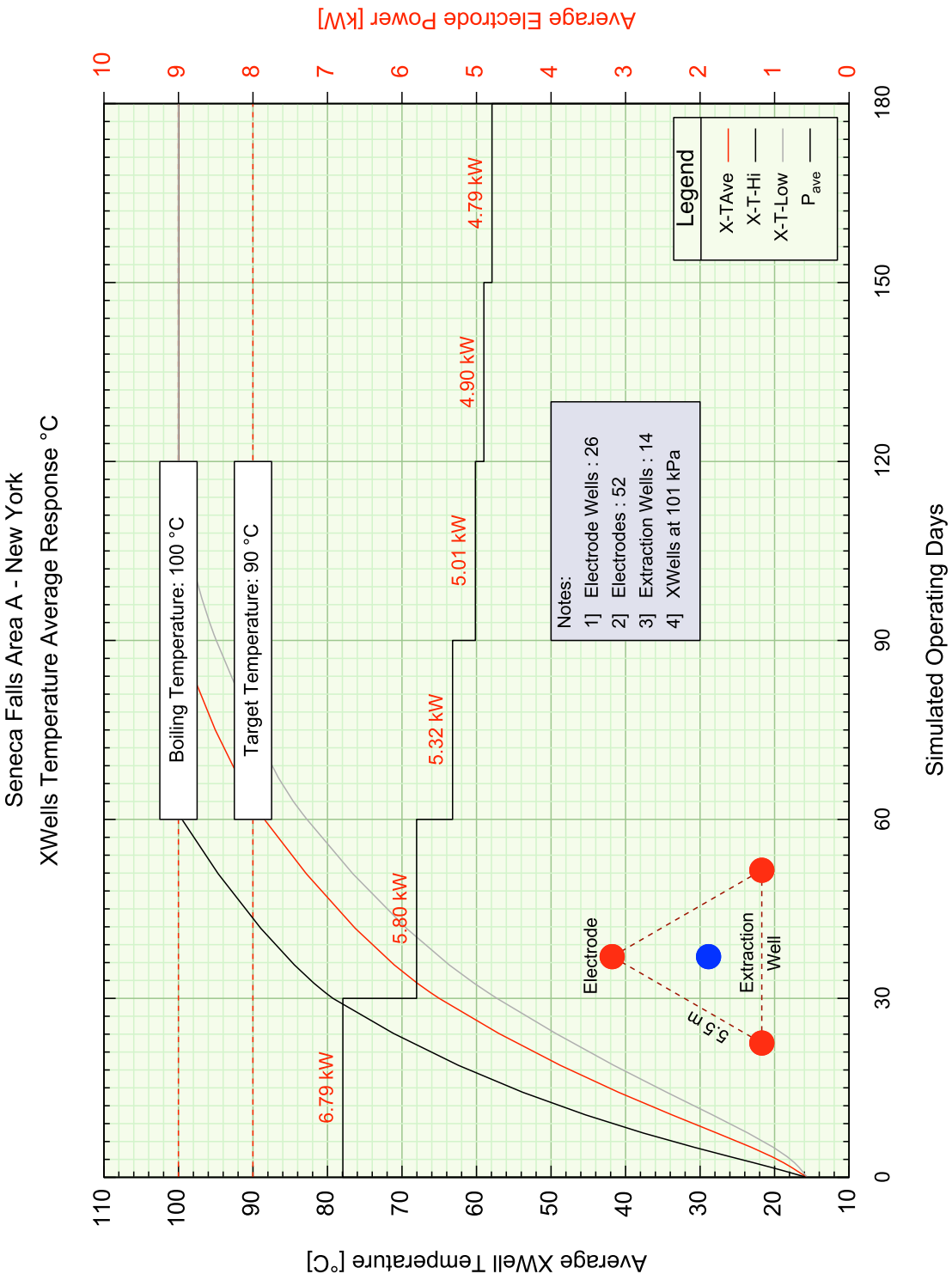


Figure 3.11.: Temperature and electrode power response for Area A.

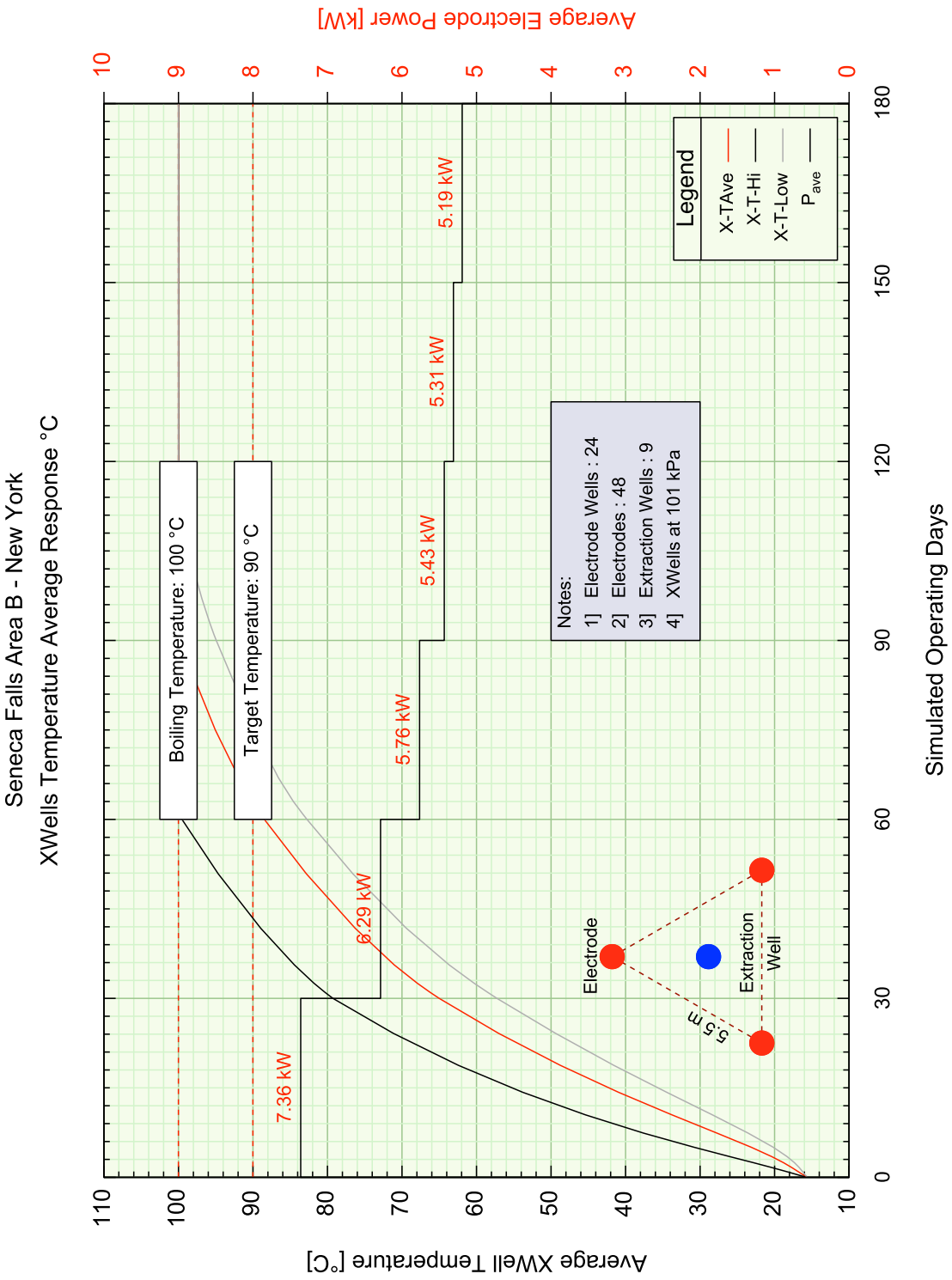


Figure 3.12.: Temperature and electrode power response for Area B.

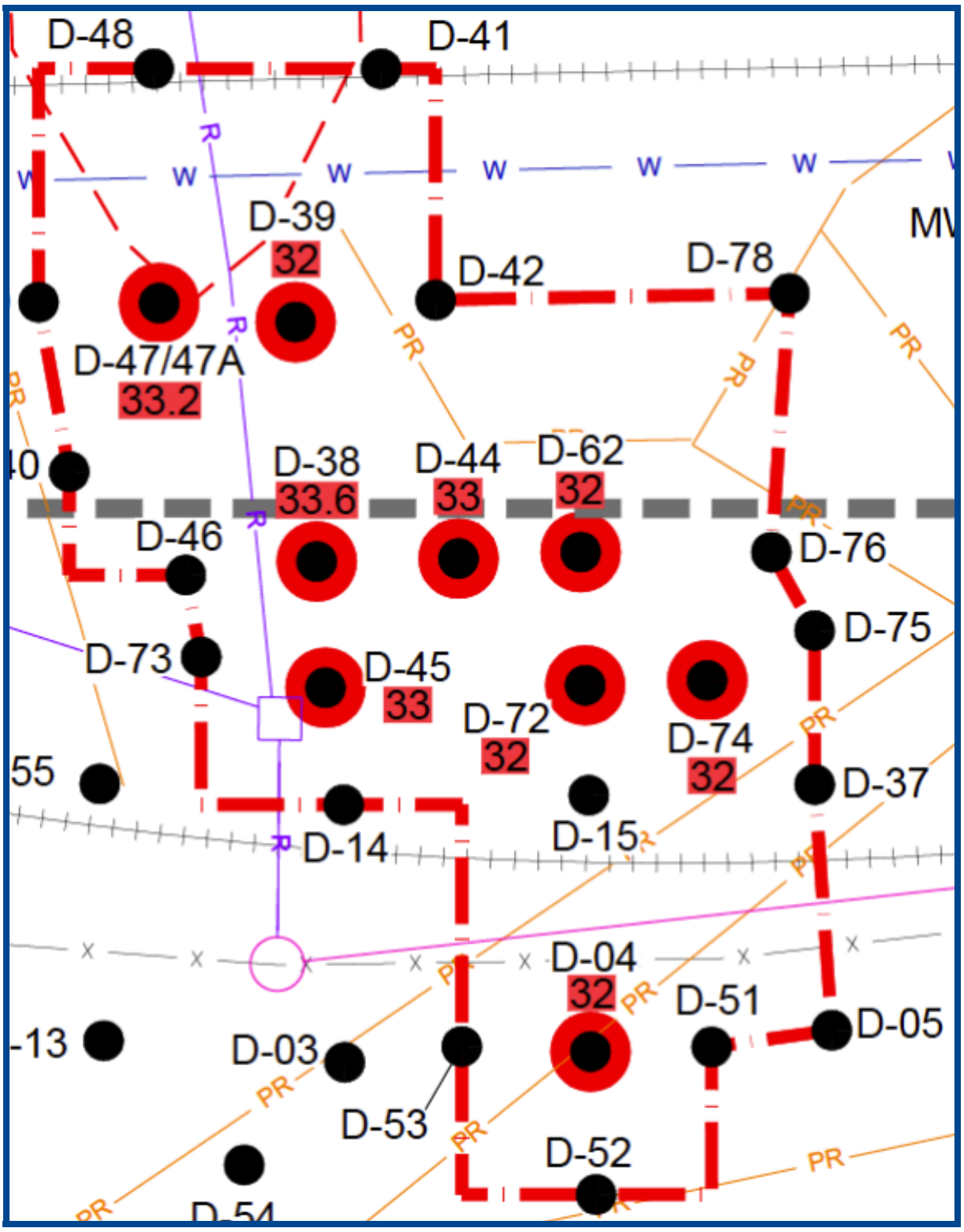


Figure 3.13.: Chemical distribution in Area A.

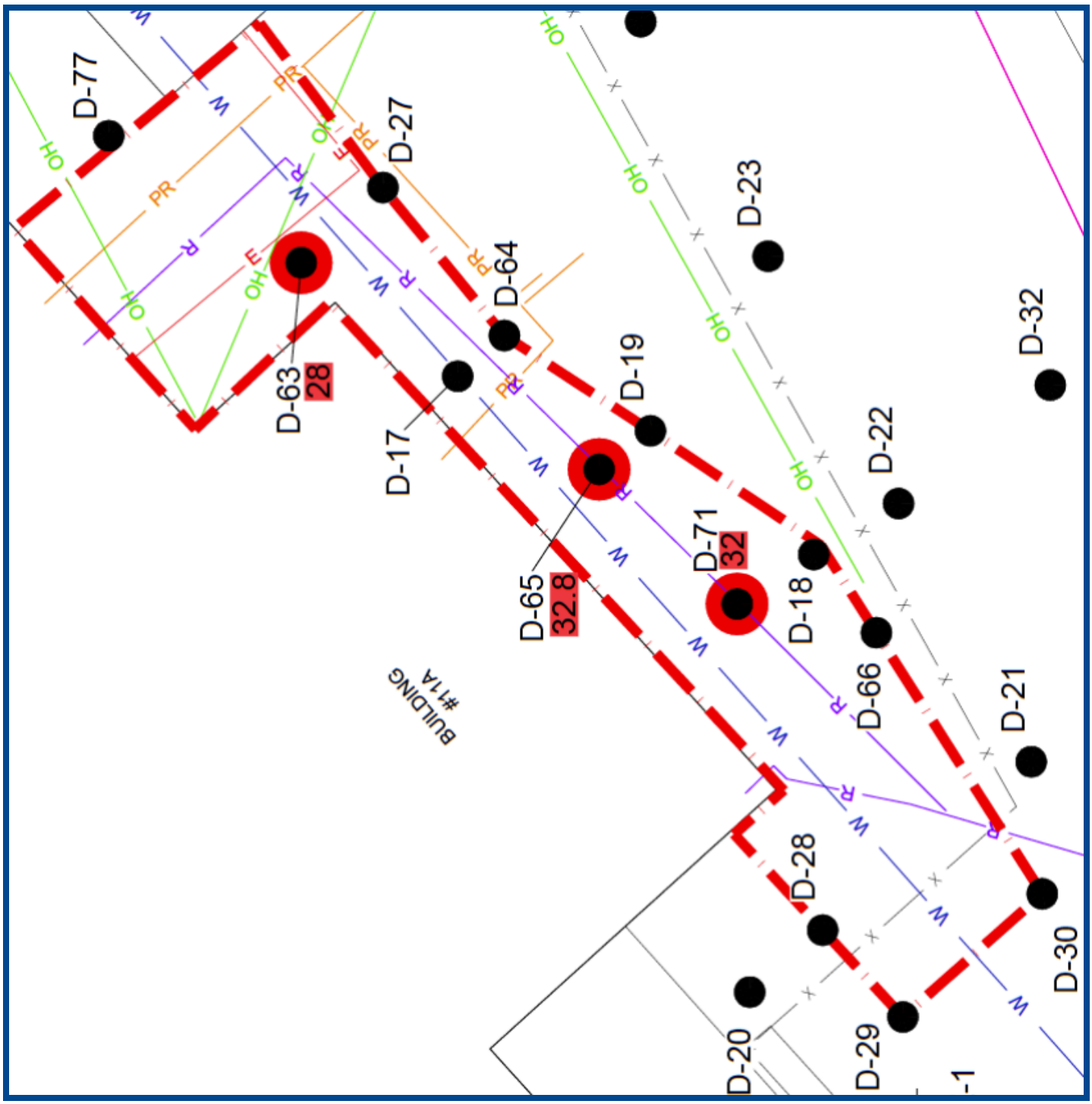


Figure 3.14.: Chemical distribution in Area B.

The study resulted in the following technical approach for the remediation of the treatment volume at Seneca Falls Areas A and B:

1. The project consists of a single operational unit utilized over two treatment areas. The total heated area is 877 m^2 (9,435 ft^2) in size with an estimated heated volume of 9,791 m^3 (12,806 yd^3).

2. The estimated electrical energy delivered to the electrodes is 2,251 $MW \cdot h$ resulting in an energy density of 230 kWh/m^3 (176 kWh/yd^3).[4] The electrical energy accounts for heat losses and energy produced with the water. The ancillary energy used for the treatment plant and other electrical facilities is estimated from experience at 103 $MW \cdot h$. In comparison, the ancillary energy is 9.55 % of the total estimated energy used in the project. Energy balance calculations are provided in Figure 3.10.

3. The time to reach target temperature is between 69 and 76 days. This is based on reaching the target temperature at the extraction wells[5].

4. 100 electrodes each 3.0 m long in 50 boreholes are required to provide thermal remediation of the impacted area. The electrode wellbore configuration is summarized in Figure 3.15.

   Tables B.1 and B.2 provided in Appendix B gives the x and y co-ordinates for each wellbore relative to the centre co-ordinates of the simulation grid. Positive $+x$ indicates a displacement relative West (assumes relative North is up), $+y$ indicates a displacement to the South ($-x$ to the East and $-y$ to the North). For example, referring to the co-ordinates for E001-U in Table B.1, this electrode well is 31.88 m to the right and 4.88 m down from the origin of the simulation grid.

   This configuration of electrodes will provide the heat transfer to heat the soil to a target temperature of approximately 90 °C but can reach the boiling temperature of water below the water table at hydrostatic pressure. The peak temperature will vary depending on depth and will be based on the azeotrope of remaining CVOC's as well as the boiling temperature of water in the subsurface.

5. The power to each electrode will vary with its location in the well field. The average power to an electrode is approximately 5.21 kW with a peak power of 7.98 kW.

[4] Thermal efficiencies are gained by re-injection of heated water produced from the extraction wells.
[5] The extraction wells are typically located farthest from the electrodes and therefore these are the last locations to reach target temperature.

Δ Z

Geology	IZ	ΔZ [m]		Top [m]	Top [ft]	Mid [m]	K [mD]	$\rho_{m,s}$ [Ω•m]	Φ [-]	P [kPa]	T_s [°C]	Well Types: E- Wells E	Well Types: X-Wells X
	1	0.414400	,	0.0000	0.0000	0.2072	1,240.71	49.40	0.3000	101.325	99.85	26	14
	2	0.500000	,	0.4144	1.3596	0.6644	1,240.71	49.40	0.3000	101.325	99.85		
	3	0.500000	,	0.9144	3.0000	1.1644	1,240.71	49.40	0.3000	101.325	99.85		
	4	0.750000	,	1.4144	4.6404	1.7894	1,240.71	49.40	0.3000	106.917	101.36		
	5	1.157600	,	2.1644	7.1010	2.7432	1,240.71	49.40	0.3000	116.270	103.75		
	6	0.750000	,	3.3220	10.8990	3.6970	1,240.71	72.45	0.3000	125.624	105.99		
	7	0.500000	,	4.0720	13.3596	4.3220	1,240.71	95.50	0.3000	131.753	107.38		
	8	0.500000	,	4.5720	15.0000	4.8220	1,240.71	66.00	0.3000	136.656	108.46		
	9	0.719200	,	5.0720	16.6404	5.4316	1,240.71	36.50	0.3000	142.635	109.73		
	10	0.719200	,	5.7912	19.0000	6.1508	68.24	3.20	0.3000	149.687	111.17		
	11	0.500000	,	6.5104	21.3596	6.7604	68.24	3.20	0.3000	155.666	112.35		
	12	0.500000	,	7.0104	23.0000	7.2604	68.24	8.45	0.3000	160.569	113.29		
	13	0.750000	,	7.5104	24.6404	7.8854	496.29	13.70	0.3000	166.698	114.43		
	14	1.157600	,	8.2604	27.1010	8.8392	496.29	13.70	0.3000	176.052	116.11		
	15	0.750000	,	9.4180	30.8990	9.7930	496.29	13.70	0.3000	185.405	117.72		
	16	0.500000	,	10.1680	33.3596	10.4180	496.29	13.70	0.3000	191.534	118.74		
	17	0.500000	,	10.6680	35.0000	10.9180	496.29	13.70	0.3000	196.438	119.53		
	18	1.000000	,	11.1680	36.6404	11.6680	50.00	100.00	0.3000	203.793	120.69		
	19	2.000000	,	12.1680	39.9213	13.1680	50.00	100.00	0.3000	218.503	122.92		
	20	2.000000		14.1680	46.4829	15.1680	50.00	100.00	0.3000	238.116	125.70		

Geology Legend

Type	Key
Clay with Fine Sand	
Clay	
Weathered Limestone	

Figure 3.15.: Electrode wellbore configuration.

This results in a total average and peak power to the well field of 521 kW and 799 kW respectively. The operating strategy will deliver maximum power to the electrodes while the temperature is increasing and reduce power while at target temperature to maintain temperatures.

6. The average water injection rate to each electrode is estimated at 0.284 L/min (0.075 gal/min). The water balance calculations for the project are provided in Figure 3.8 and Table 3.3. The *Recycle Supply* is water supplied from the onsite treatment plant.

7. The electrodes will be connected to a sufficient number of Power Delivery System (PDS) units needed to deliver the necessary power, using power values summarized in Table 3.2 as a guideline.

8. Boundary electrodes are operated at higher current by a factor of 1.14 . The water injection rate into the boundary electrodes is the same as for interior electrodes.

9. The cumulative water injected during thermal operations is 7,358,832 L with an average injection rate of 28.39 L/min or 0.284 L/min per electrode.

10. The average liquid phase extraction rate per well is 1.265 L/min (0.334 gal/min) which accumulates into a total volume of extracted water of 7,542,918 L, (1,992,628 gal). It is noted the water will be re-circulated and heat recovery may be used to reduce operating costs. The temperature of the injected water is assumed to be 15.00 °C, (59.00 °F).

11. The targeted hydrodynamic control factor, the ratio of extracted water to injected water rate is, 1.025. Operating the water balance close to this control factor will ensure hydraulic control during the thermal treatment.

12. 23 extraction wells have been included for capturing vaporized contaminants from the soil and groundwater. The expected average vapor extraction rate from each well is 0.09 sm^3/min (3.35 scfm) at a vacuum pressure of less than 12 inHg (40.6 kPa). Once target temperatures are achieved we expect the vacuum needed to achieve the vapor flow rates to decrease. The liquid extraction rates from the wells will be similar as all extraction wells are the same length.

13. The total minimum[6] Investigation-Derived Waste (IDW) for all types of wells drilled is approximately 35.96 m^3. This does not include the water used in the drilling process.

[6]It is understood that the volume of IDW depends on the drilling method. The estimate given in this study indicates a minimum volume for the IDW based on the minimum interior diameter needed for well installation.

3.2. Radius of Capture Calculations

The calculations in this section provide an estimate for the maximum spacing between extraction wells recommended in the design of an electro-thermal system and for this simulation study. It is based on the approach detailed in Appendix C.

Based on this approach, the radius of capture, therefore the spacing between extraction wells for Area A and Area B, are shown in Figures 3.16 and 3.17. The supporting calculations are shown in Figures 3.18 and 3.19. The calculations assume the vertical permeability is half the horizontal resulting in the **maximum** spacing between extraction wells. The maximum spacing is not exceeded in this simulation study. Figures 3.20 and 3.21 provides a 3D perspective of the radius of capture for the different well types in Area A and Area B.

The mass recovery model detailed in Appendix C is a simple approach for estimating the transport of DNAPL contaminants during thermal remediation. Based on the model, the maximum spacing between extraction wells is calculated and its value is within the practical range. This simple model does not address the effect of temperature variation in the vertical direction and near the edge of the heated zone. The effect of possible condensation near the cold region is not examined, however it is believed that condensed DNAPL would find a path back into the heated volume and with time be removed at the extraction wells. The possibility that bubbles may be trapped in the isolated pore space has been assumed negligible in comparison to the mobile bubbles that are extracted. The behaviour of bubble flow in porous media, as assumed in this analysis, is further described in Hunt et. al.[HM03].

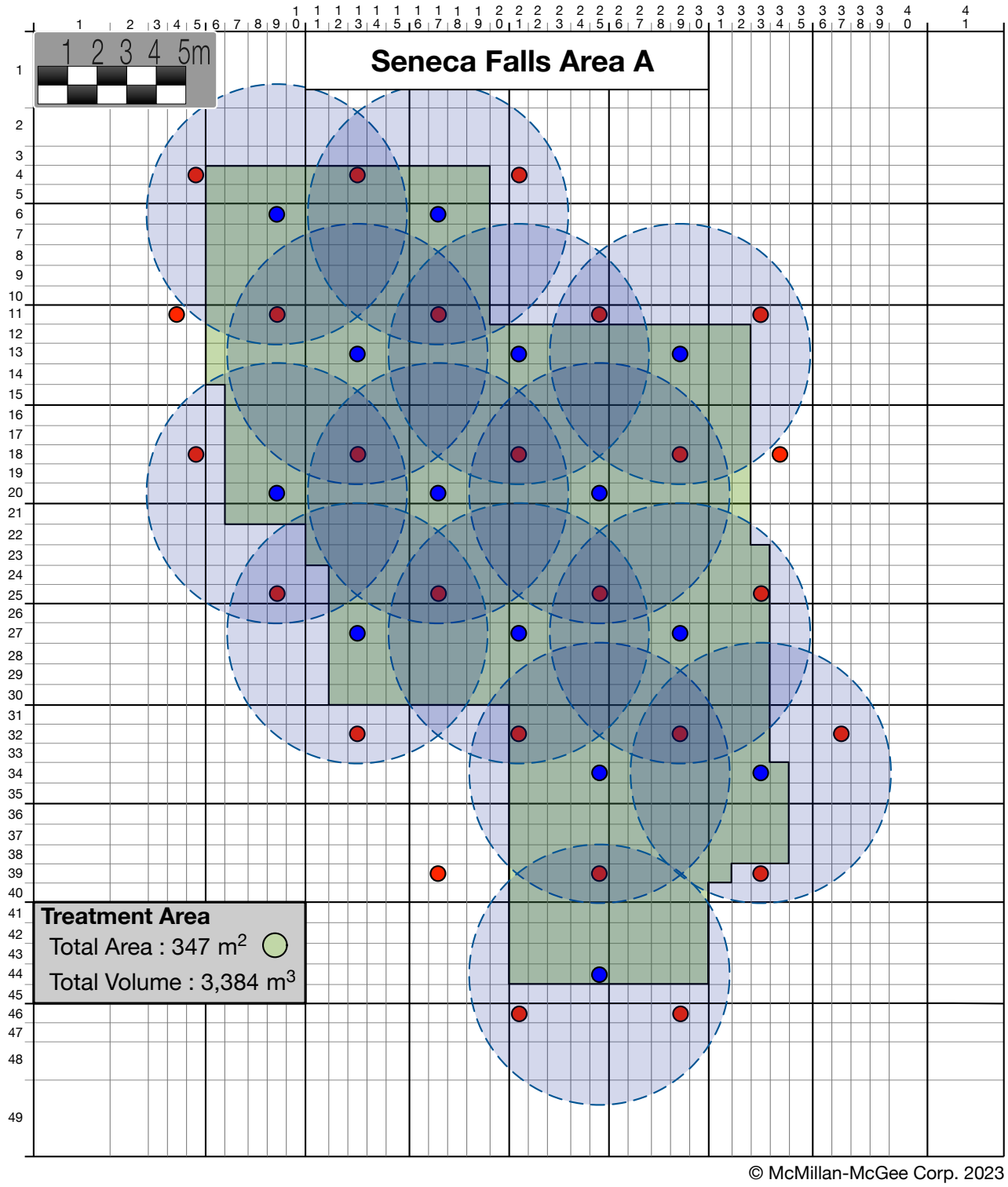


Figure 3.16.: Radius of capture r_c for the XWells in Area A.

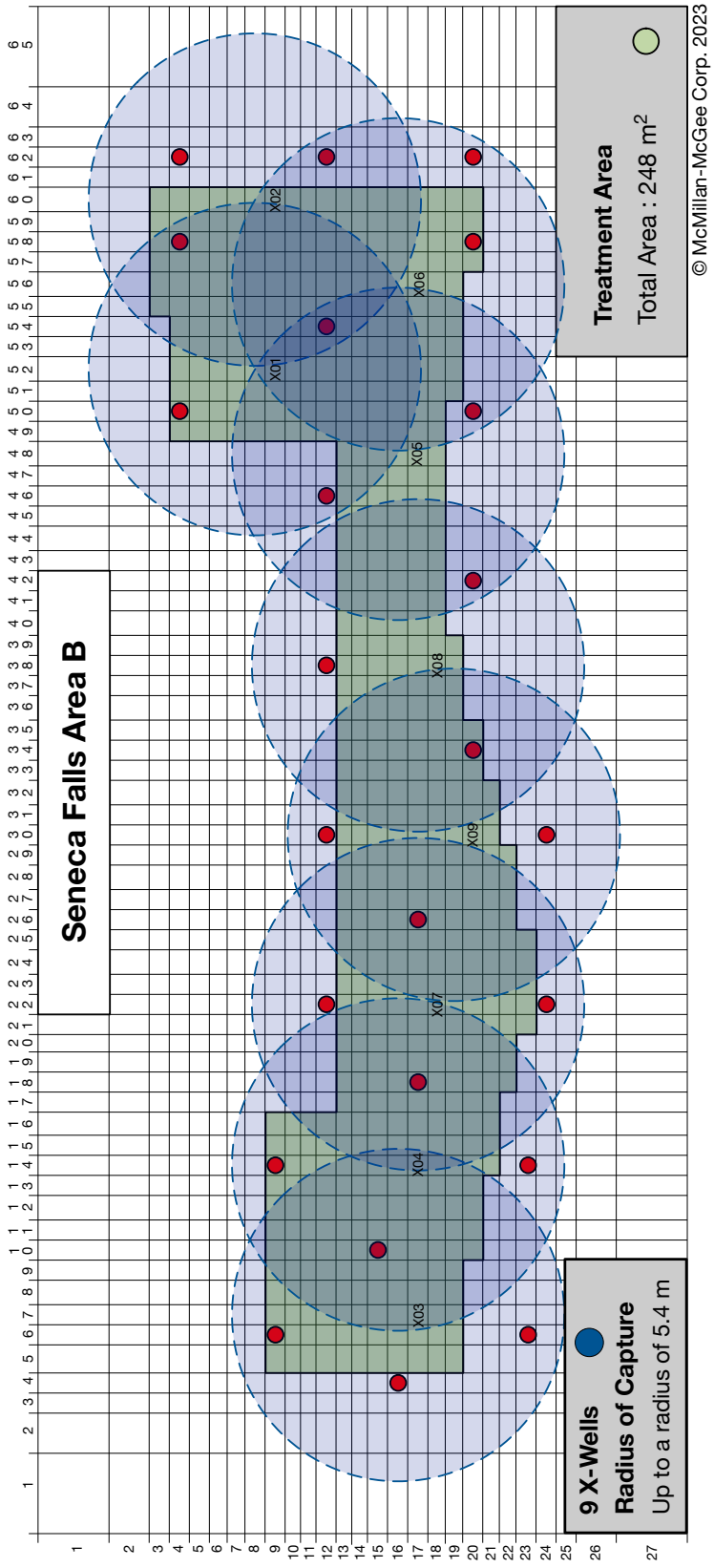


Figure 3.17.: Radius of capture r_c for the XWells in Area B.

Extraction Well Spacing Analytical Model

Parameter	Symbol	Value	Unit
Surface Tension Coefficient	γ	0.0717	[N/m]
Liquid Viscosity	μ_l	1.0000	[mPa•sec]
Acceleration due to Gravity	g	9.8100	[m/s^2]
Ideal Gas Constant	R	0.008319	[kPa•m^3/°K/mol]
Average Pressure	P_{ave}	101.3250	[kPa]
Average Temperature	T_{ave}	360.90	[°K]
Treatment Zone Thickness	H	9.7536	[m]
Characteristic Thickness	h	0.25	[m]
Normalized Vertical Permeability	k_v	0.20	[D]
Normalized Horizontal Permeability	k_h	1.00	[D]
Extraction Well Radius	r_w	0.0508	
Molecular Weight Chemical	M_w	133.10	[g/mol]
Density of Water	ρ_w	958.35	[kg/m^3]
Density of Bubble	ρ_v	4.4921	[kg/m^3]
Minimum Pore Throat Size	d_{min}	458	[µm]
Mean Pore Throat Size	d	458	[µm]
Tortuosity	λ	0.1500	[-]
Porosity	ϕ	0.30	[-]
Eötvös Number	Eo	0.027380	[-]
COC K-Value	K	1.0201	
Liquid Fraction	α	0.0000	
c_1	c_1	6.6870E-05	[-]
c_2	c_2	2.2560E-05	[-]
d_1	d_1	1.0276	[-]
d_2	d_2	2.6108	[-]
Capillary Number	Ca	1.6597E-06	[-]
Flow Factor	F	1.1911E-04	[-]
Liquid Extraction Rate	q	1.5565	[m^3/D]
		1.8015E-05	[m^3/sec]
Radius of Capture	r_e	4.46	[m]
Maximum XWell Spacing		**8.93**	**[m]**

Figure 3.18.: Radius of capture calculation summary for the XWells in Area A.

Extraction Well Spacing Analytical Model

Parameter	Symbol	Value	Unit
Surface Tension Coefficient	γ	0.0717	[N/m]
Liquid Viscosity	μ_l	1.0000	[mPa•sec]
Acceleration due to Gravity	g	9.8100	[m/s^2]
Ideal Gas Constant	R	0.008319	[kPa•m^3/°K/mol]
Average Pressure	P_{ave}	101.3250	[kPa]
Average Temperature	T_{ave}	360.90	[°K]
Treatment Zone Thickness	H	9.7536	[m]
Characteristic Thickness	h	0.25	[m]
Normalized Vertical Permeability	k_v	0.20	[D]
Normalized Horizontal Permeability	k_h	1.00	[D]
Extraction Well Radius	r_w	0.0508	
Molecular Weight Chemical	M_w	133.10	[g/mol]
Density of Water	ρ_w	958.35	[kg/m^3]
Density of Bubble	ρ_v	4.4921	[kg/m^3]
Minimum Pore Throat Size	d_{min}	458	[µm]
Mean Pore Throat Size	d	458	[µm]
Tortuosity	λ	0.1500	[-]
Porosity	ϕ	0.30	[-]
Eötvös Number	Eo	0.027380	[-]
COC K-Value	K	1.0201	
Liquid Fraction	α	0.0000	
c_1	c_1	6.6870E-05	[-]
c_2	c_2	2.2560E-05	[-]
d_1	d_1	1.0276	[-]
d_2	d_2	2.6108	[-]
Capillary Number	Ca	1.6597E-06	[-]
Flow Factor	F	1.1911E-04	[-]
Liquid Extraction Rate	q	2.2349	[m^3/D]
		2.5867E-05	[m^3/sec]
Radius of Capture	r_e	5.35	[m]
Maximum XWell Spacing		**10.70**	**[m]**

Figure 3.19.: Radius of capture calculation summary for the XWells in Area B.

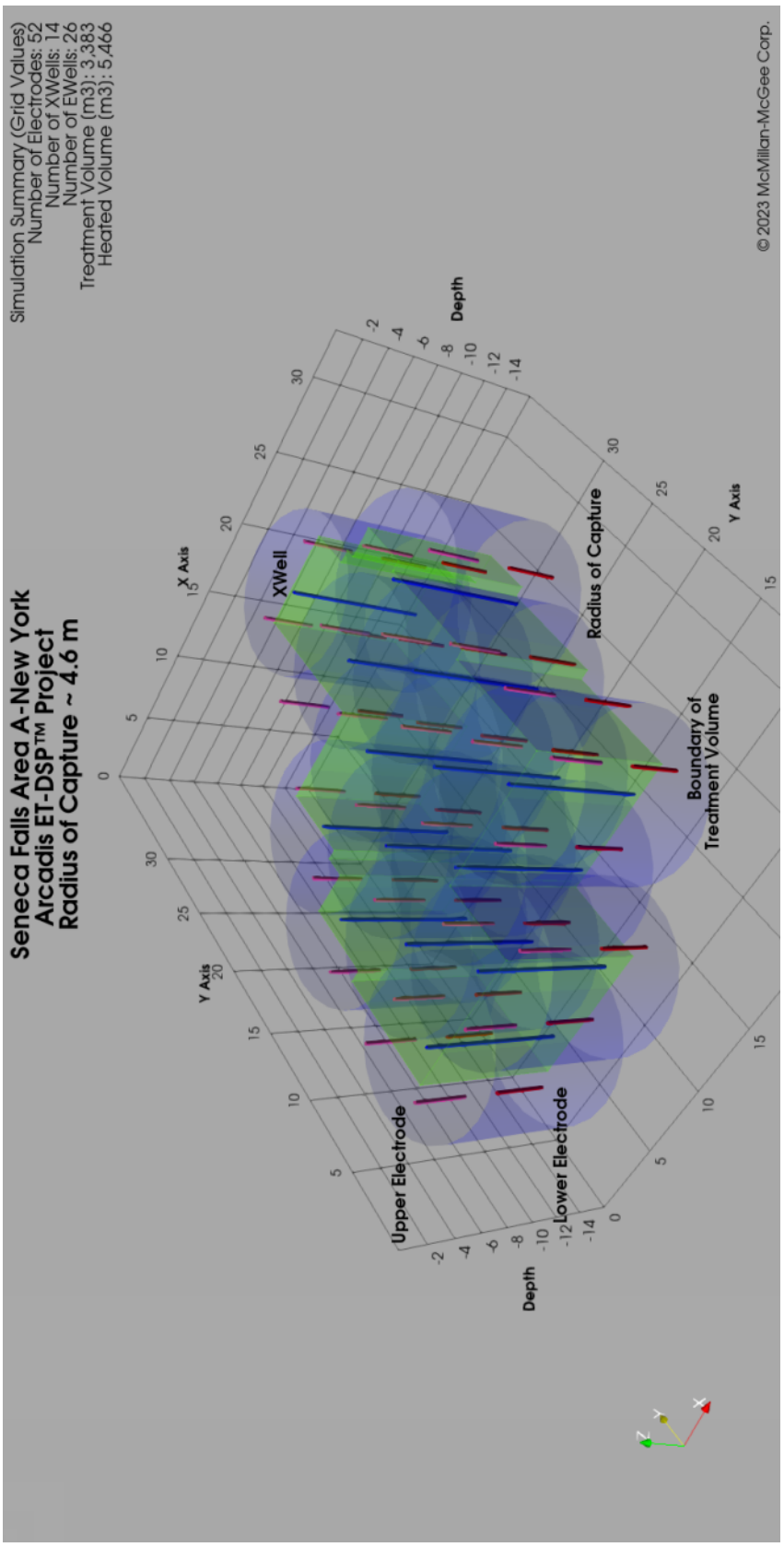


Figure 3.20.: 3D Radius of capture r_c in Area A.

3.3. Temperature and Energy Results

The results confirm that subsurface temperatures needed to volatilize the chemicals of concern can be reached. The energy balance needed to achieve the temperature goals are summarized in Table 3.4. Energy density calculations are with respect to the treatment volume. Also summarized are average power estimates to the electrodes.

Energy and Power Summary

Item	Total
Electrical Energy	2,251 MW · h
Energy Density	358 kWh/m^3
	273 kWh/yd^3
Produced Energy	402 MWh
Injected Energy	61,225 kWh
Heat Losses	354,998 MW · h
Total Average Power	521 kW
Average Electrode Power	5.21 kW
Total Peak Power	799 kW
Peak Electrode Power	7.98 kW

Table 3.4.: Energy and power summary.

3.4. Mass Recovery Curve

The chemicals of concern in the soil are initially at equilibrium and in a liquid phase (dissolved in water or as a free product). The introduction of heat by electrothermal energy raises the temperature sufficiently to separate the liquid mixture into multiple components in the vapour phase. This distillation of the compounds is a complicated thermodynamic process; however, at temperatures above the boiling point and induced vacuum, the volatile chemicals are in the vapour phase. Less volatile chemicals will not boil and will be extracted in the liquid phase.

From the temperature ramp-up, estimated mass in place, and experience from similar

projects, the treatment plant needs to be designed to accept a peak chemical extraction rate of approximately 150 kg/day (331 lbs/day).

Figure 3.22 shows the rate of contaminant mass recovery from the target volume. The results predict that after 180 days of operation, greater than 99% of the chemical mass can be removed from the soil.

Assuming an aggregate estimated mass in place of 5,000 kg[7] and that target temperatures within a significant volume of the treatment area will be achieved after 60 to 75 days of operations (to be conservative) (uniform target temperatures will be reached in 69 to 76 days) then peak chemical mass flow rates of 150 kg/day are expected during this period. The estimated peak chemical mass flow rate is part of the design basis for the operation of the multi-phase extraction system.

The mass recovery curve is the result of multi-function calculations using a thermodynamic model and the temperature response predicted by the numerical simulation. These calculations account for the concentrations of the chemicals and water in the liquid and vapour phases as a function of temperature and pressure using k-values. The initial increase in mass recovery shown in the curve is the result of increasing vapor phase saturations as the soil approaches target temperature. As this mass is then extracted from the pore space, the relative concentration of mass in the vapour phase decreases exponentially. Therefore, the curve calculated by the simulation is used to provide an estimate of the expected duration of treatment to achieve the remediation goals.

[7]This estimate is for the purposes of the simulation only and not calculated or interpolated from site data

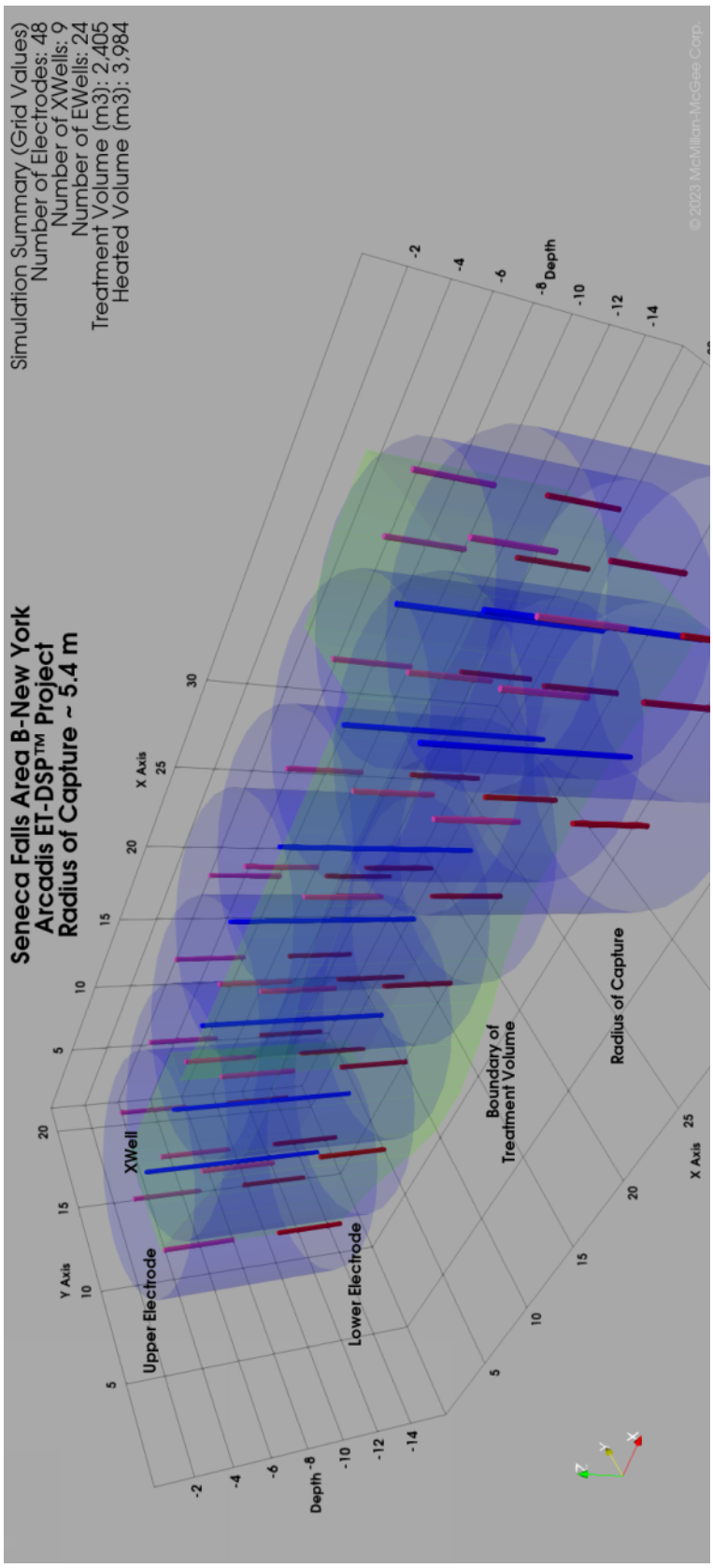


Figure 3.21.: 3D Radius of capture r_c in Area B.

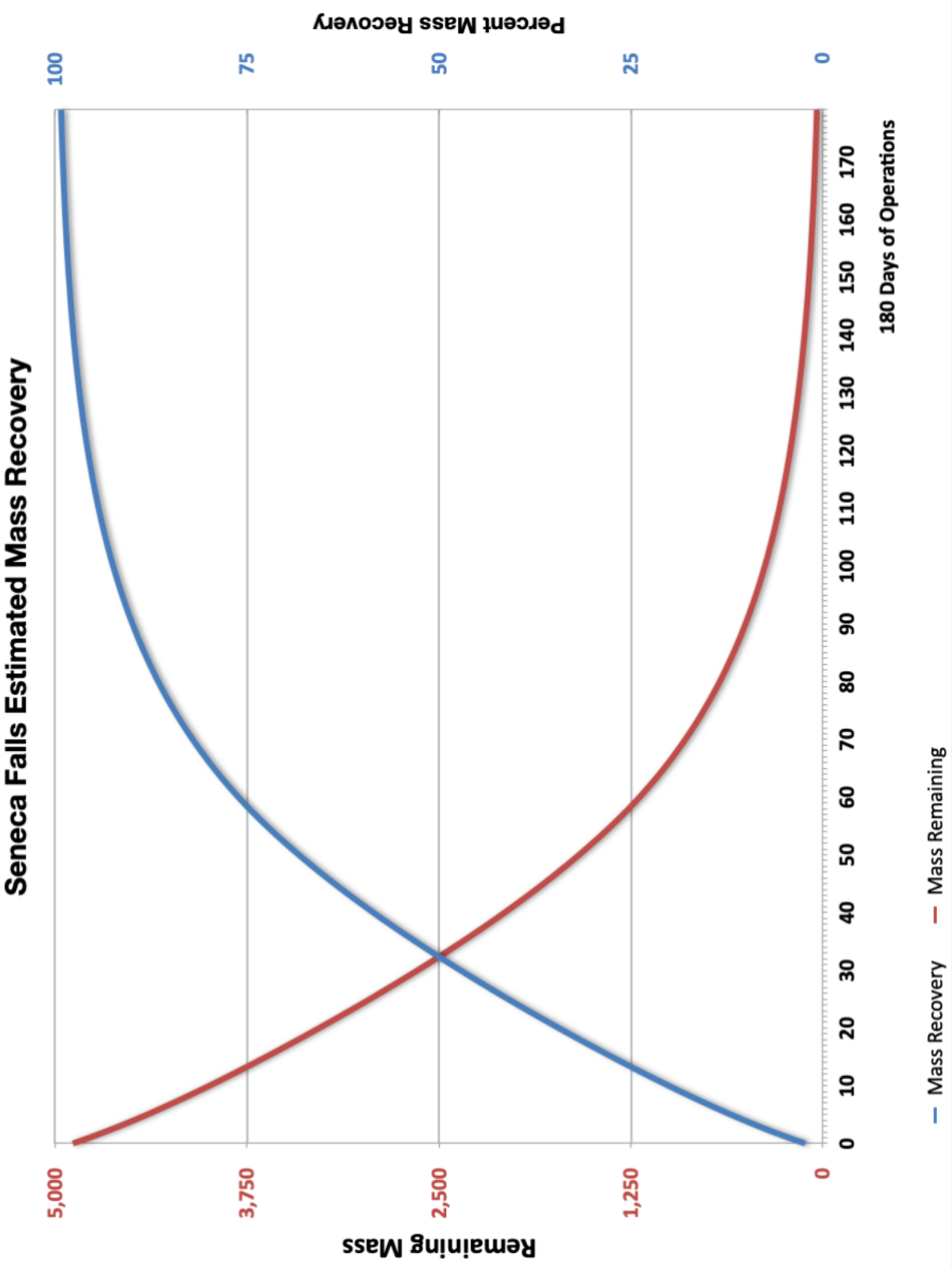


Figure 3.22.: Estimated Mass Recovery Curve

4 Conclusions

Results from the numerical simulation study are the foundation for a design basis and insight to thermal operations by quantifying several of the technical elements of the process shown in Figure 1.2 for the Seneca Falls Areas A and B project. Based on these results the following conclusions and recommendations are put forward for the design of an electro-thermal and extraction treatment system for the project:

1. Total energy input of 2,251 MW · h or 230 kWh/m^3 (176 kWh/yd^3) per unit heated volume. [1];

2. Total water extraction volume of 7,542,918 L (1,992,628 gallons);

3. Total water injection volume of 7,358,832 L (1,943,998 gallons);

4. Vapor extraction rate[2] of 2.06 sm^3/min (77 scfm);

5. Time to reach target temperatures of 69 to 76 days in greater than 90% of the treatment volume;

[1] Energy density per heated volume does not include ancillary energy;
[2] Does not include steam vapor.

6. Peak temperatures are generally limited to the boiling temperature of water as a function of depth and pressure in the soil[3];

7. An anticipated contaminant mass recovery of 5,000 kg (11,023 lbs);

8. Average electrode spacing of 5.49 m (18.00 ft)[4]; and,

9. An average extraction well spacing of 5.49 m (18.00 ft).

Treatment Region Treatment is confined to the area defined by the distribution of chemicals in the subsurface. The heated volume, which encompasses the treatment volume, extends from surface to beyond the bottom of the treatment volume, to an average depth of 11.17 m. The total treatment area is 590 m^2 and the treatment volume is 6,294 m^3 (8,232 yd^3).

Vapour Cap A thermally insulating vapor cap is designed with an R-value not less than $1.76 \left[\frac{m^2\,°K}{W}\right]$.

Electrodes The design simulation model calls for up to 2 electrodes per well as shown in Figure 1.6. The well configuration is a function of the depth of treatment interval. This design of electrode wells is needed to achieve target temperatures. In total, there are 50 electrode wells with 2 (vertically stacked) electrodes in each well.

The horizontal spacing between electrodes varies slightly as a result of site constraints but on average is 5.49 m (18.00 ft). The recommended drilling method for the electrode wellbores is Sonic. The average power per electrode is 5.21 kW over a project duration of 180 days, with an estimated peak electrode power of 7.98 kW. The average water injection rate into each electrode is 0.284 L/min. Should highly resistive soil be encountered electrolyte can be injected into the electrodes to increase power to design levels.

[3]Water in the presence of chemicals will boil at the temperature of the mixture, which can be less than the co-boiling temperature of water.
[4]Electrode spacing varies slightly over the area of the treatment volume.

Extraction Wells The simulation study resulted in 23 extraction wells which extend through the treatment volume as shown in Figure 3.4. The average extraction rate for each well is determined by taking the total project extraction rate 29.10 L/min (7.69 gal/min) and dividing by the total number of wells capable of liquid extraction with a result of 1.265 L/min (0.334 gal/min). Horizontal extraction wells will be installed below the sub-surface for mitigation and capture of fugitive vapours.

The estimated vapour extraction rate per well for achieving mass recovery is 0.09 sm^3/min (3.35 scfm) with a total vapor flow (non-condensible) into the plant of 2.06 sm^3/min (77 scfm). The maximum estimated vacuum needed to achieve the vapor flow rates is 12 inHg.

Sensors To monitor temperature and optimize electric power input, 7 temperature monitoring wells will be used.

Electrical Properties Electrical properties of the soil are variable in the treatment volume as there are different soil conditions present. The resistivity profile for the site (and assumed for this numerical simulation study) is shown in Figure 2.4. The assumed static electrical resistivity of the soil in the heated volume is 55.80 Ωm. The resistivity ranges in value from 14.20 Ωm to 92.10 Ωm. The resistivity is estimated to change (approximately) by a factor of 1.89 through the operating temperature range, based on experience with similar soils. The assumed temperature dependence on resistivity is shown in Figure 1.8. Data beyond 93.73 °C are extrapolated using methods developed by Chute and Vermeulen[CVC78].

Water Table The depth to the regional water surface averages 1.22 m BGS and varies seasonally. No perched groundwater table has been observed. The subsurface fill layer is at less than 1 m BGS. For soil above the water table, treatability will depend on maintaining moisture content in the soil during electro-thermal heating. It is also assumed that the ground water flow velocity is negligible within the treatment volume.

Simulation Study The optimization of the heating strategy and operations through detailed data monitoring is intended to minimize the overall energy consumption of the project while still achieving the clean up goals. The simulation study provides a conservative (aggressive heating) estimate of the energy use.

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A

Temperature Plots

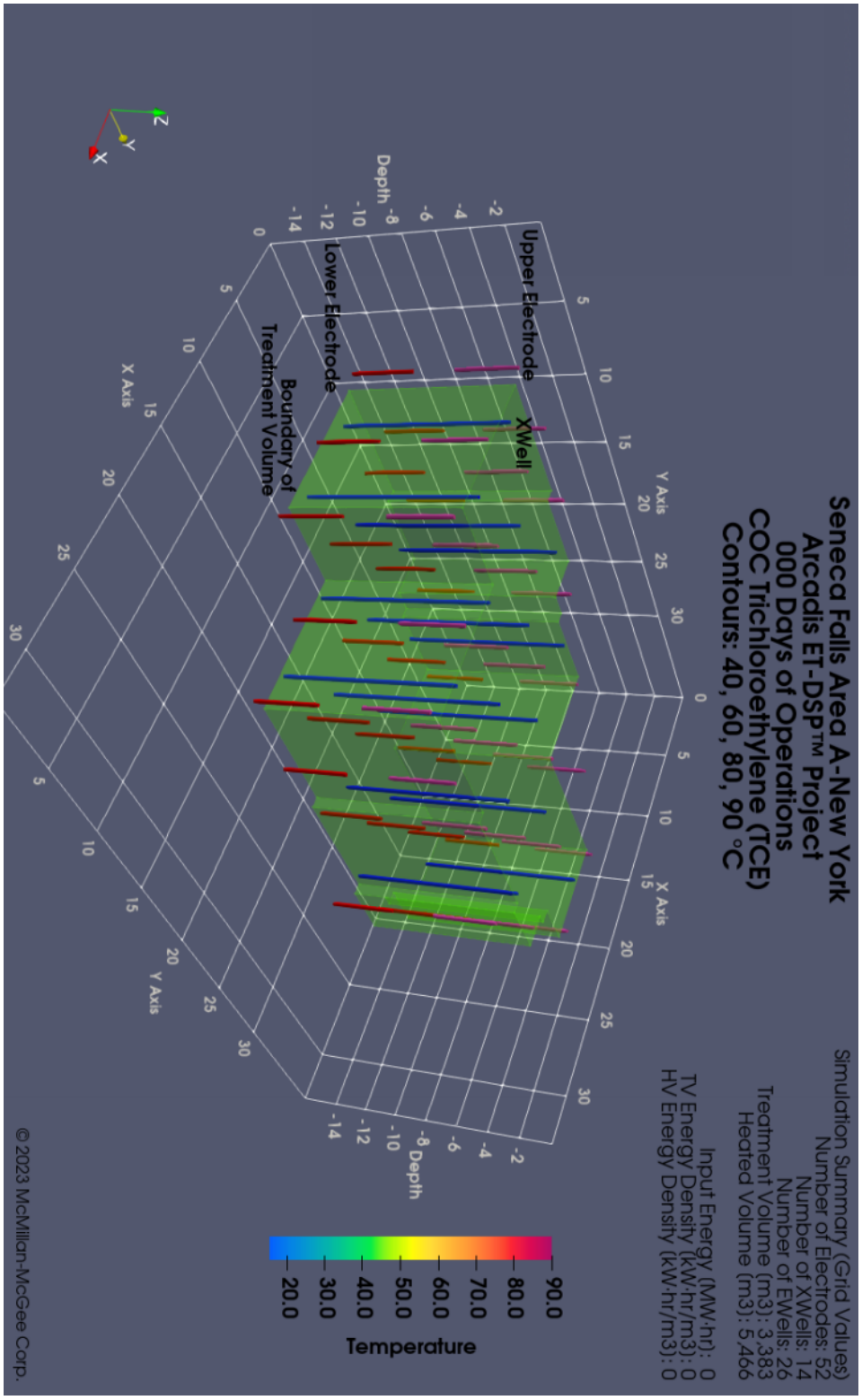


Figure A.1.: Temperature distribution at the start of heating.

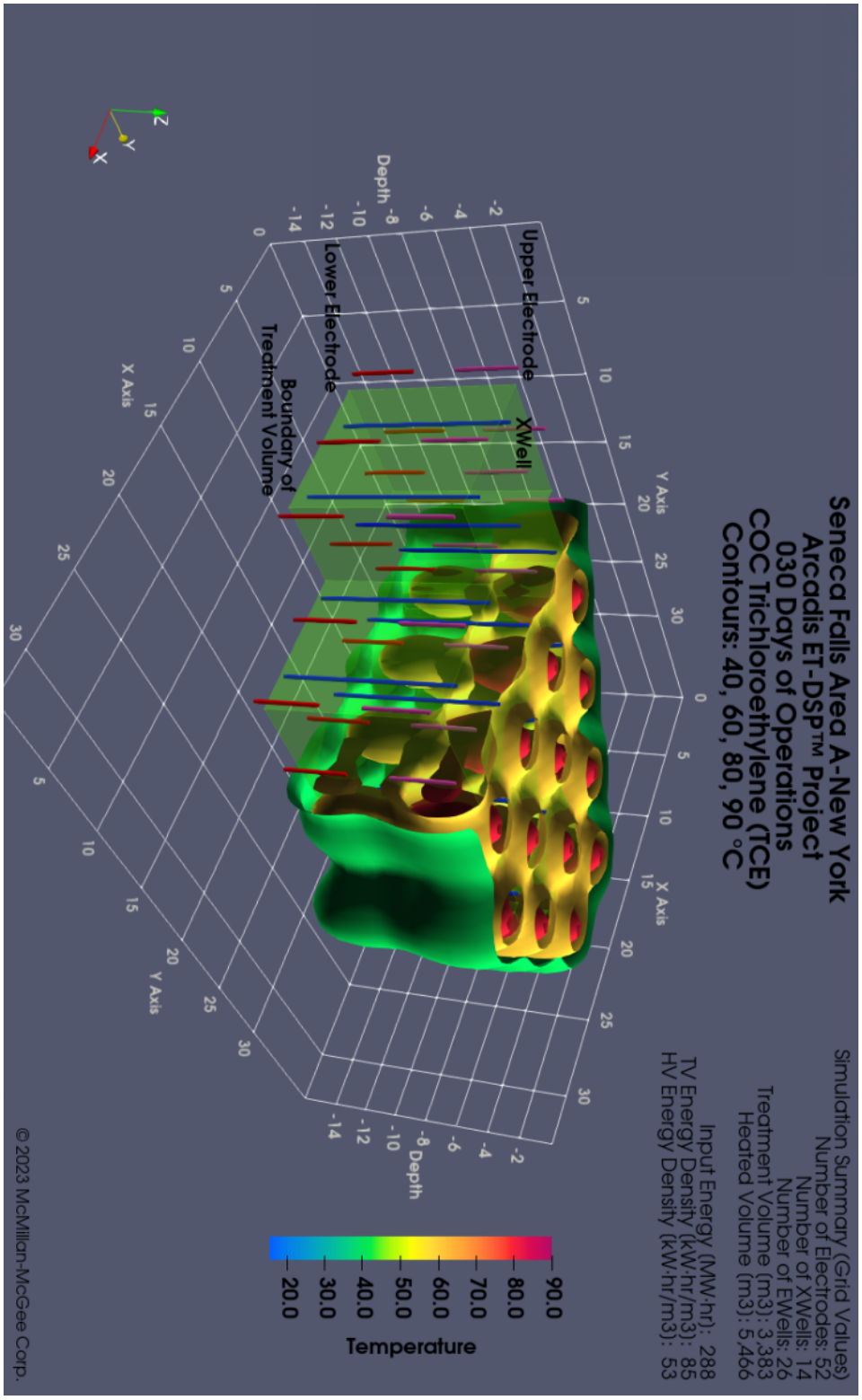


Figure A.2.: Temperature distribution after 30 days.

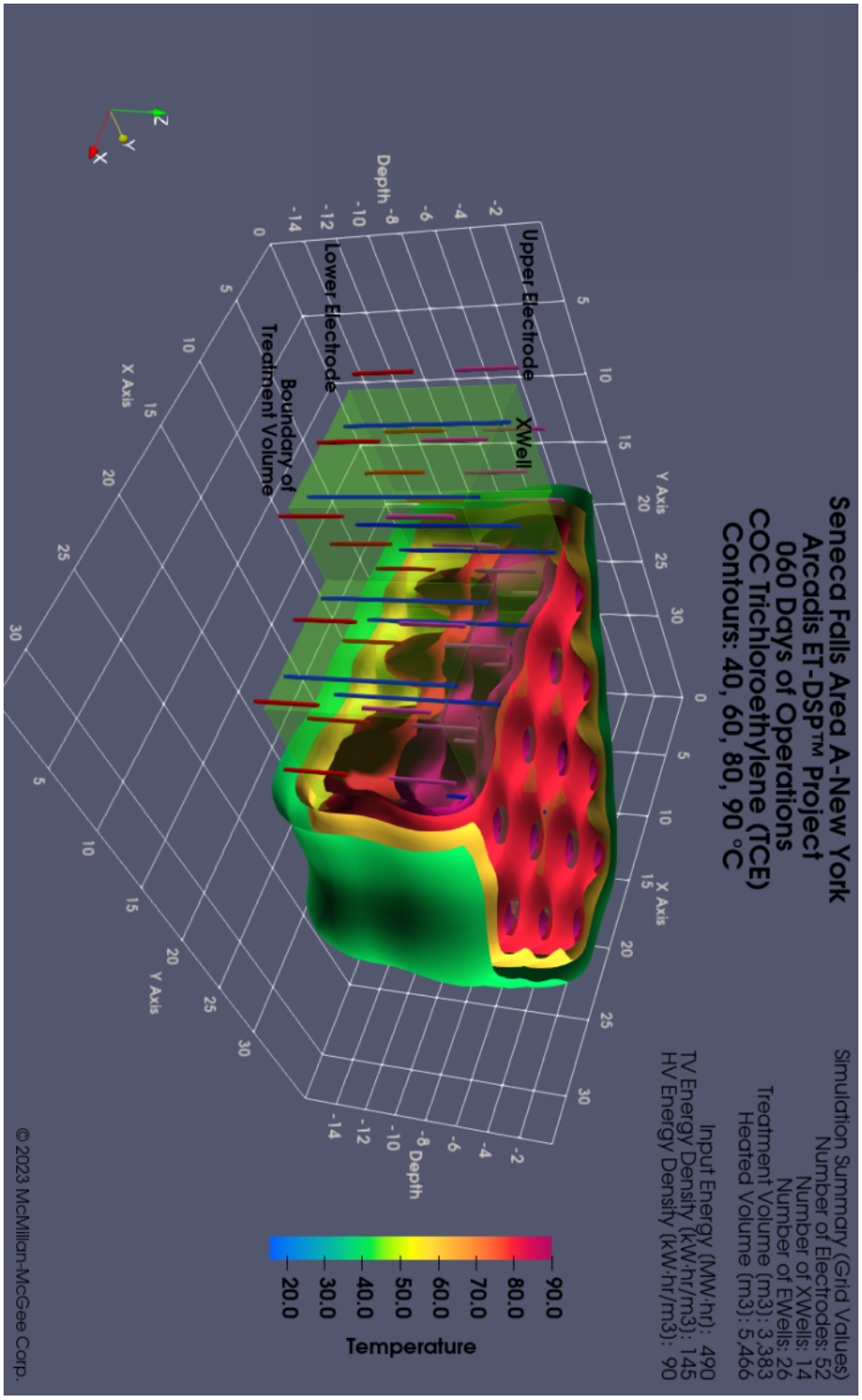


Figure A.3.: Temperature distribution after 60 days.

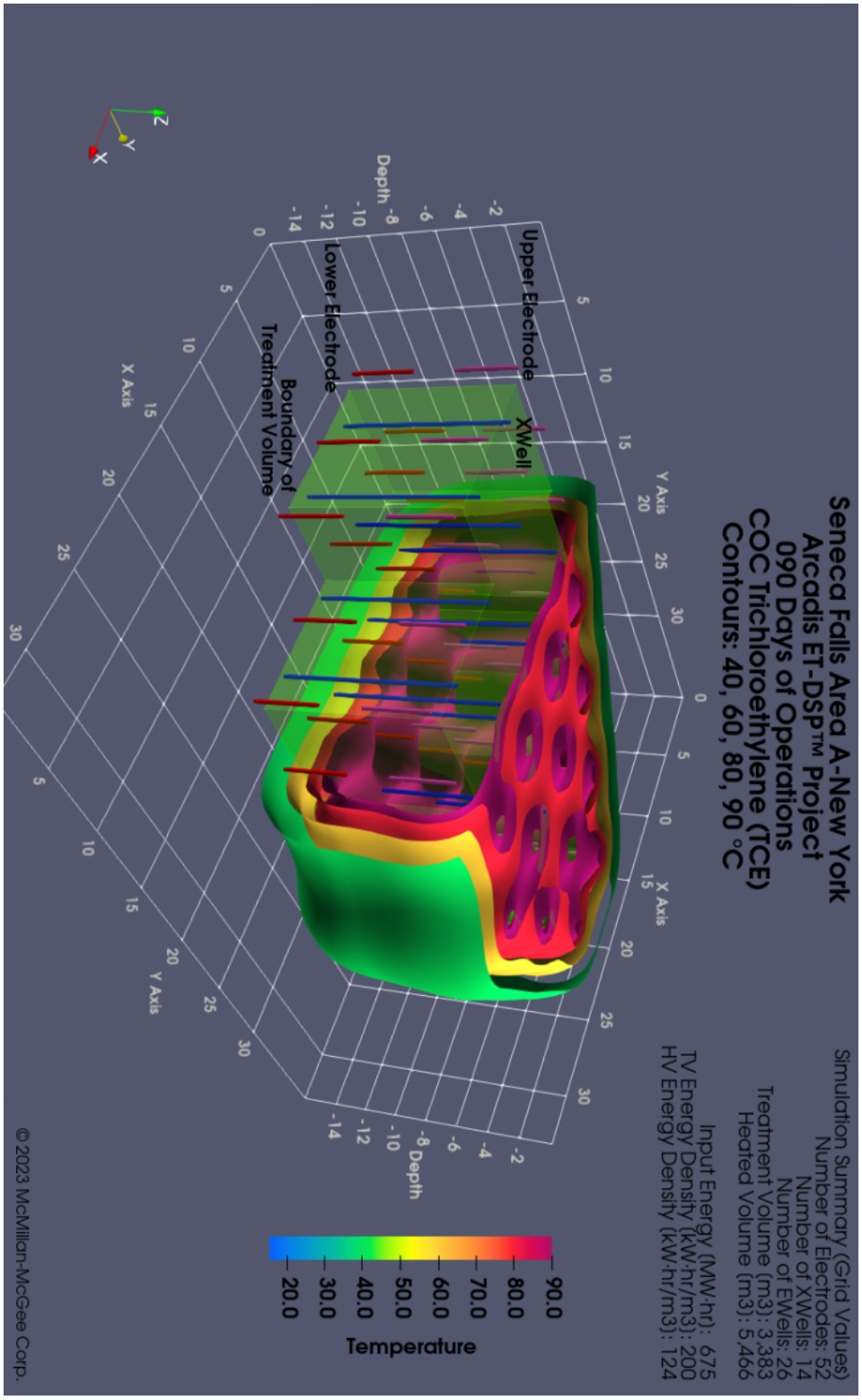


Figure A.4.: Temperature distribution after 90 days.

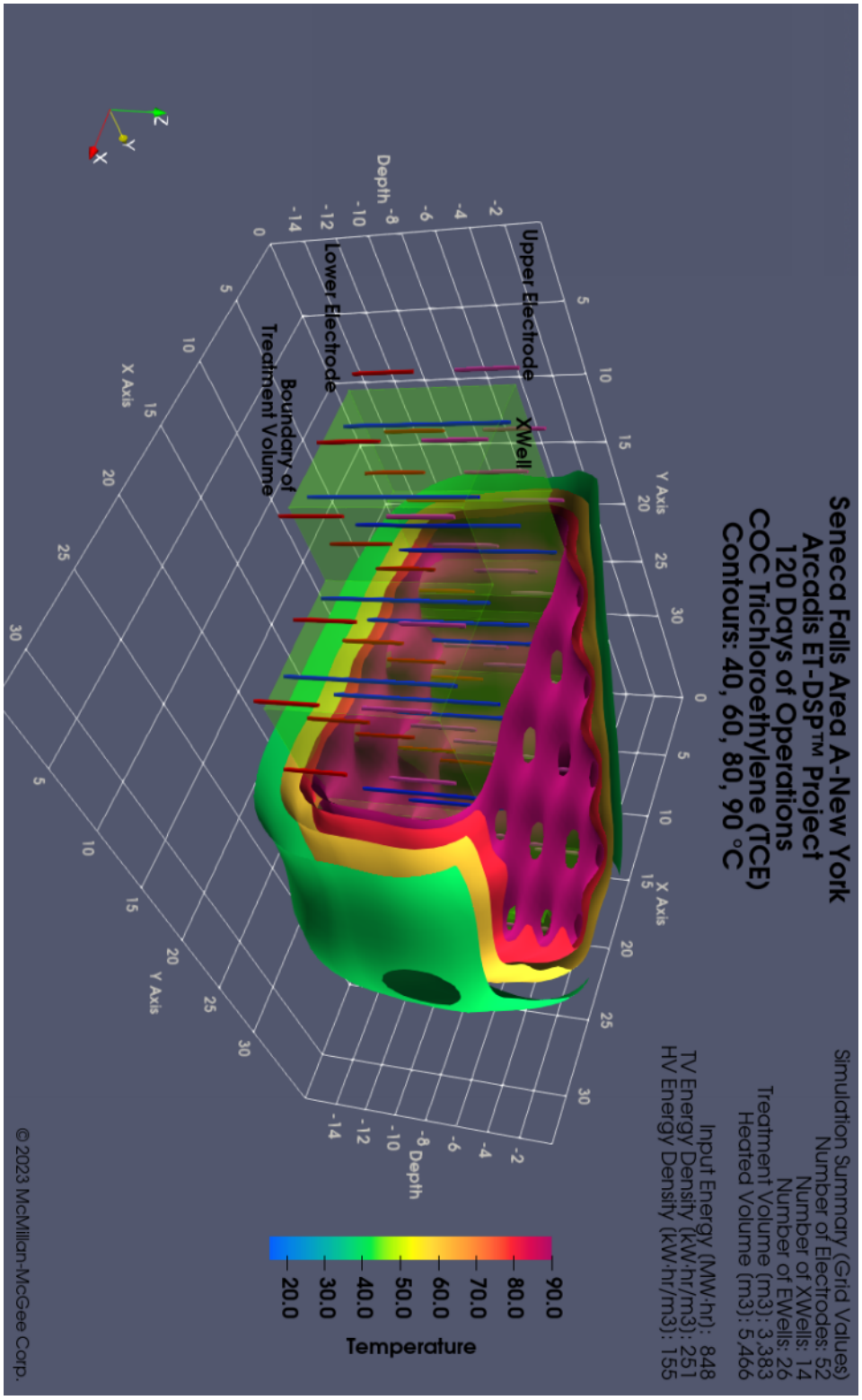


Figure A.5.: Temperature distribution after 120 days.

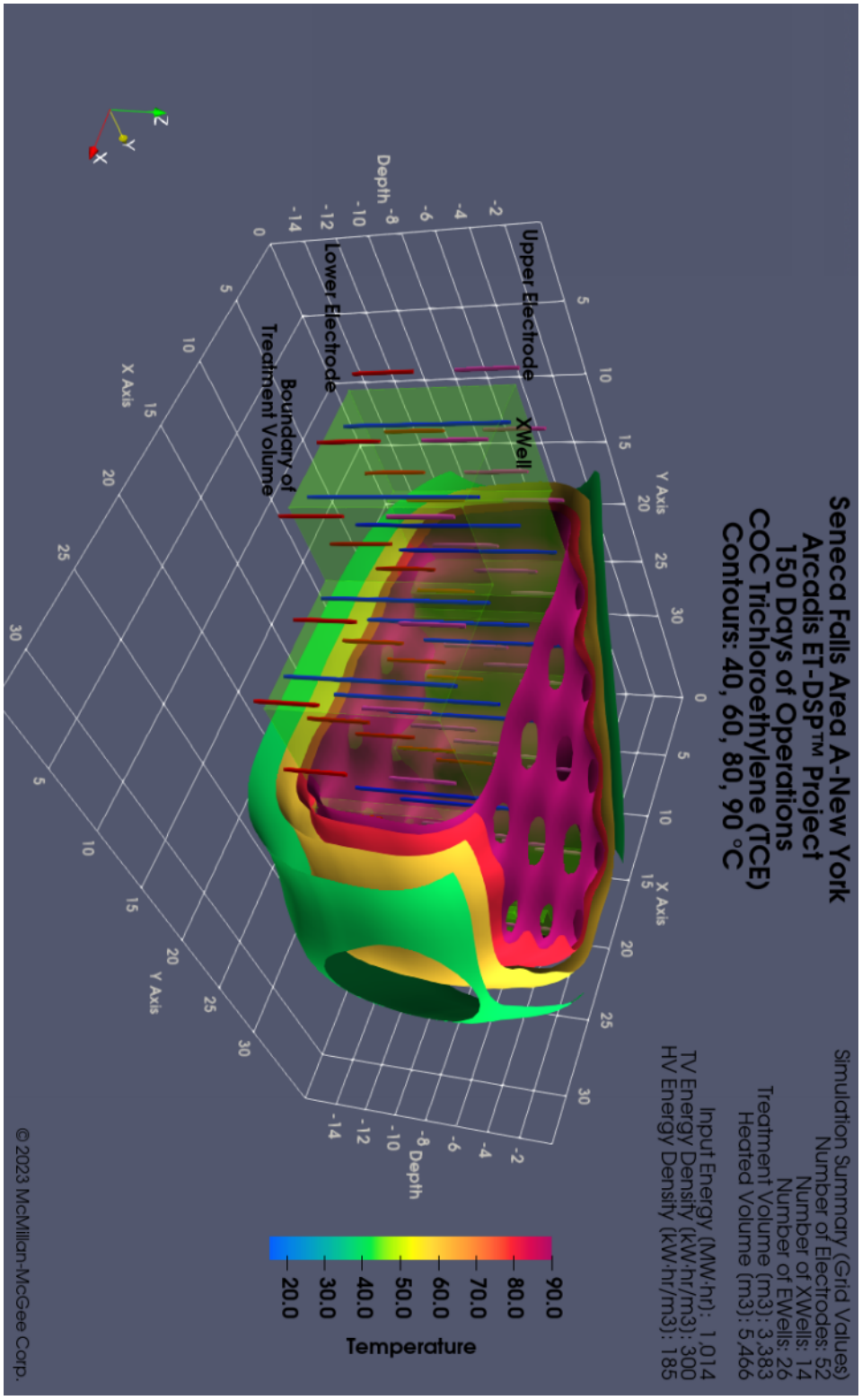


Figure A.6.: Temperature distribution after 150 days.

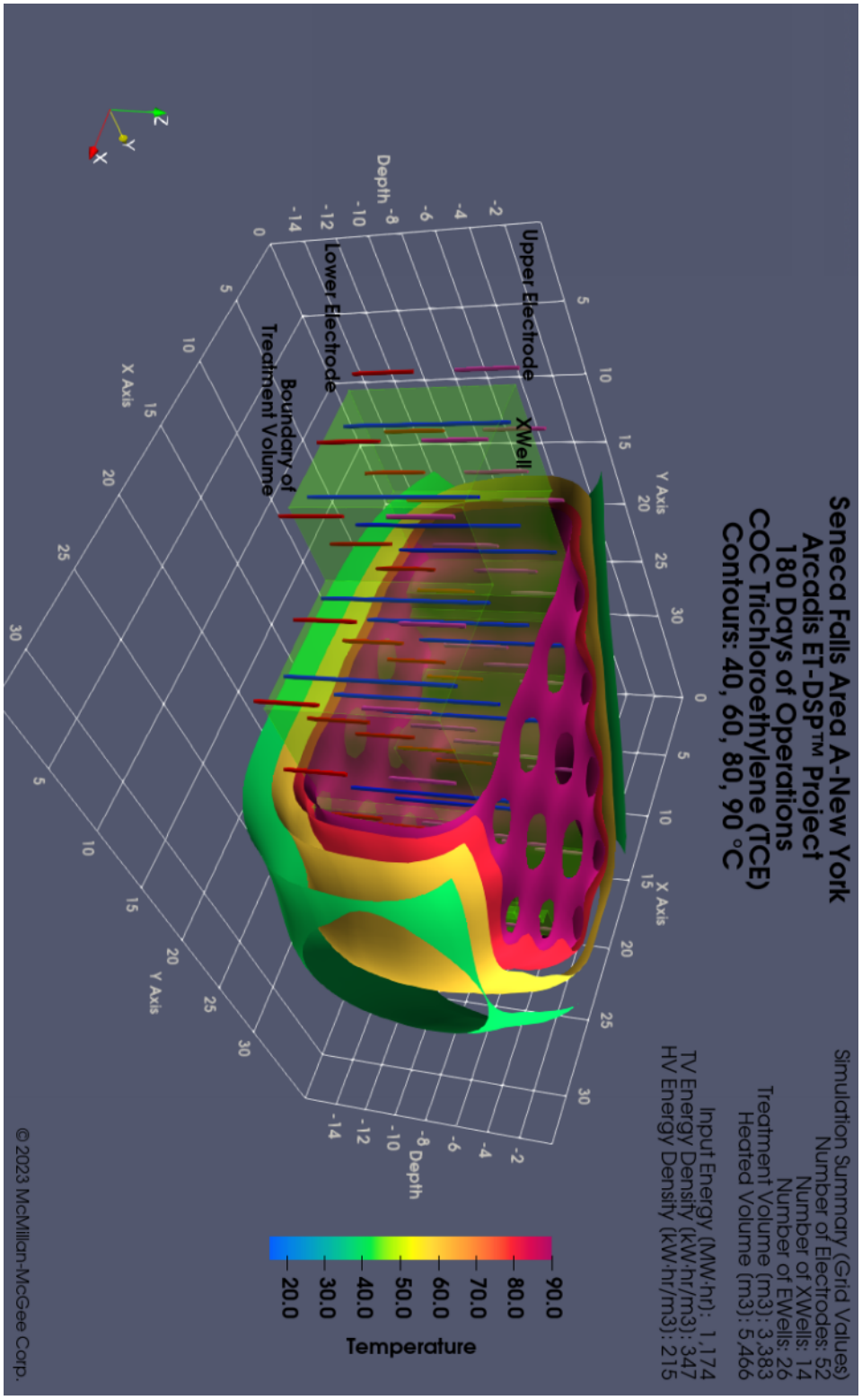


Figure A.7.: Temperature distribution after 180 days.

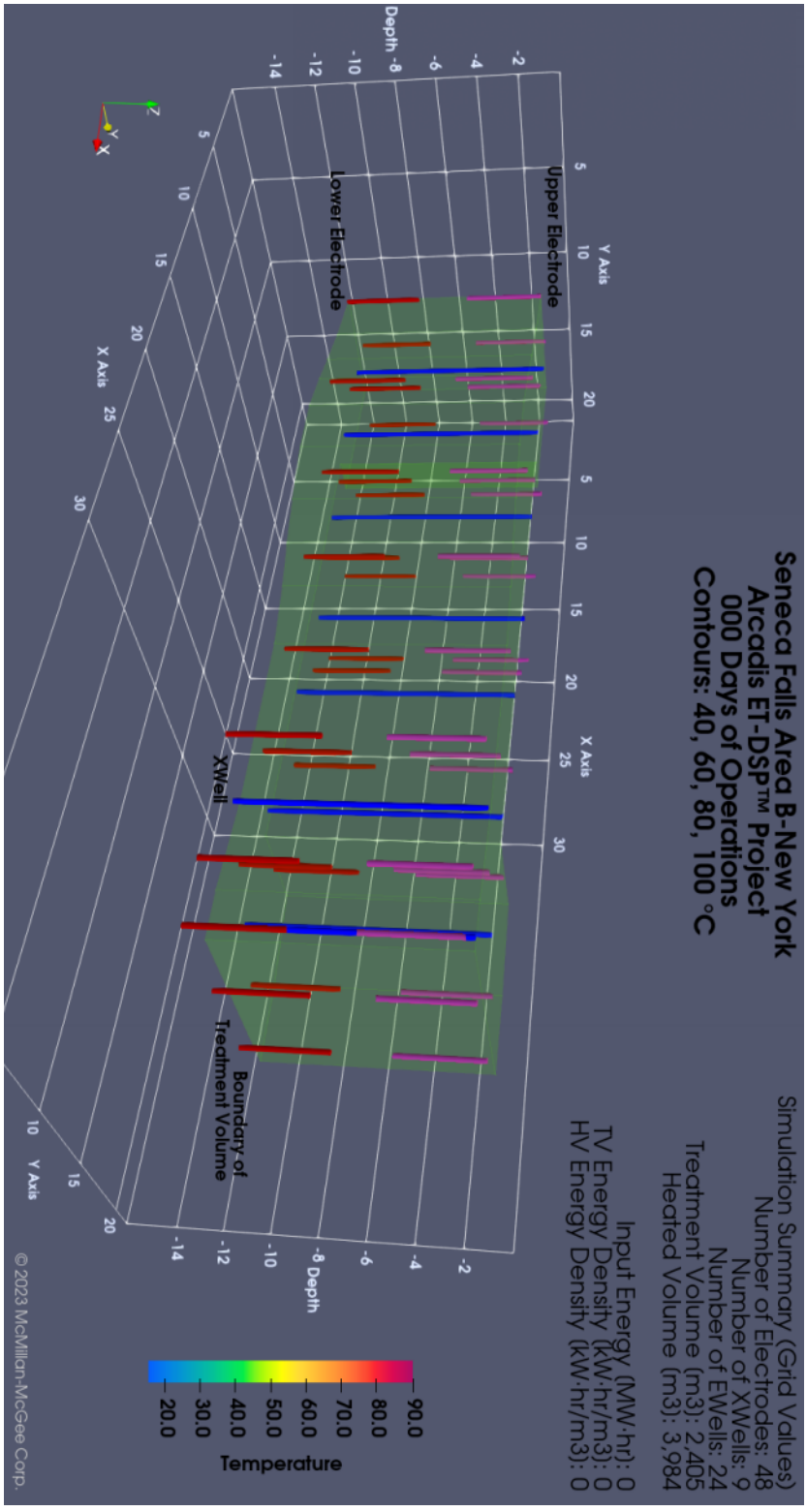


Figure A.8.: Temperature distribution at the start of heating.

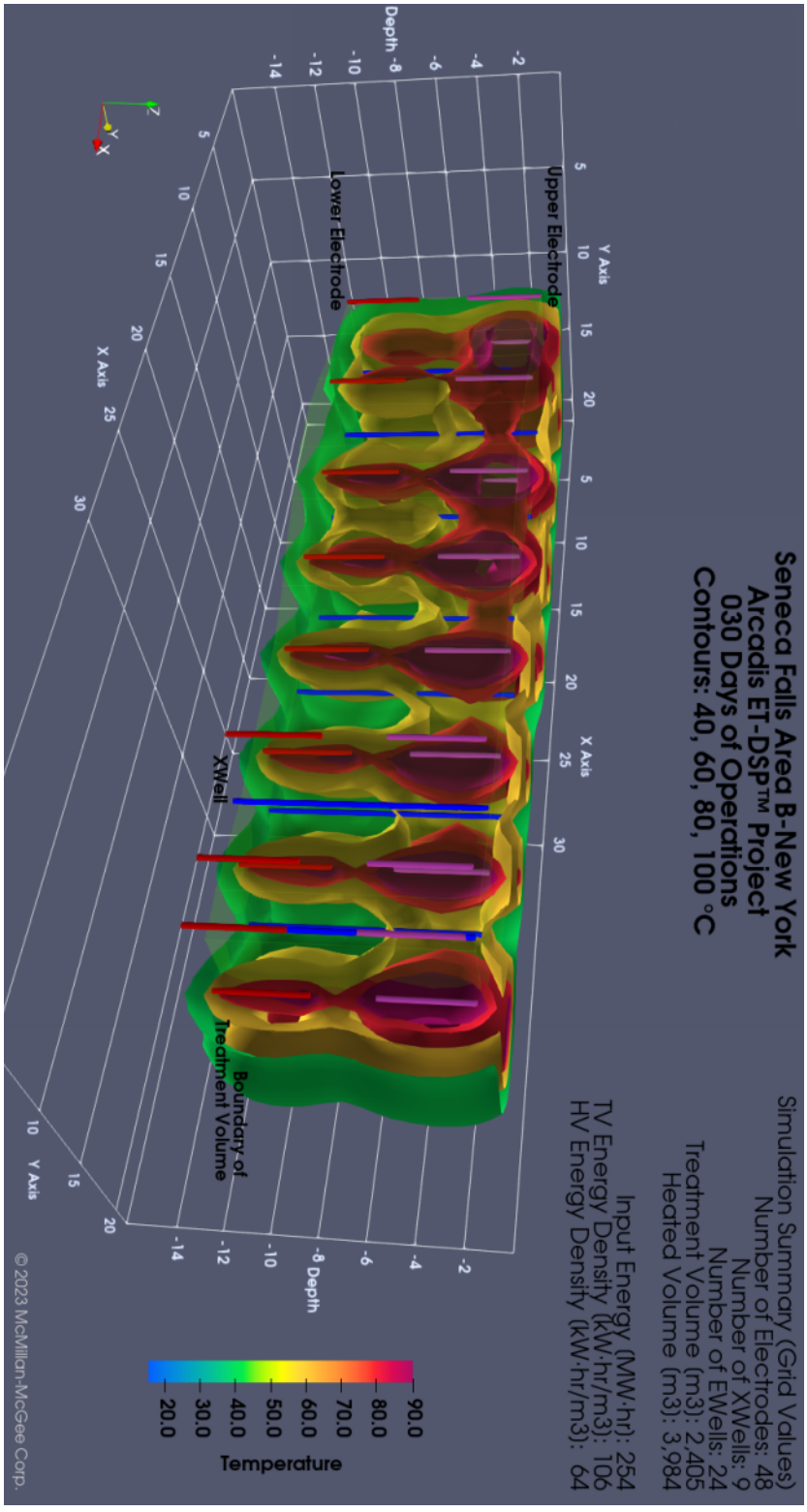


Figure A.9.: Temperature distribution after 30 days.

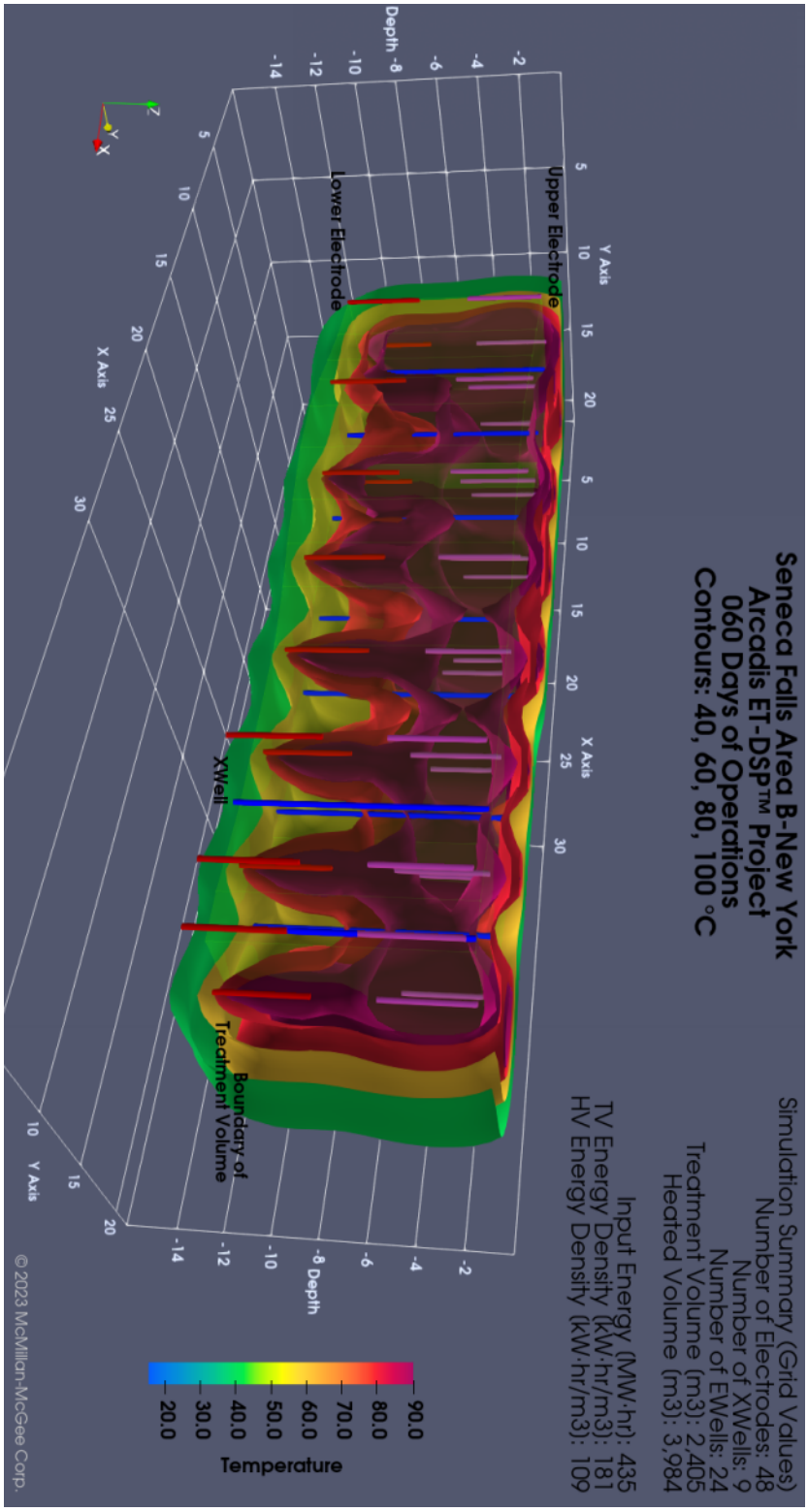


Figure A.10.: Temperature distribution after 60 days.

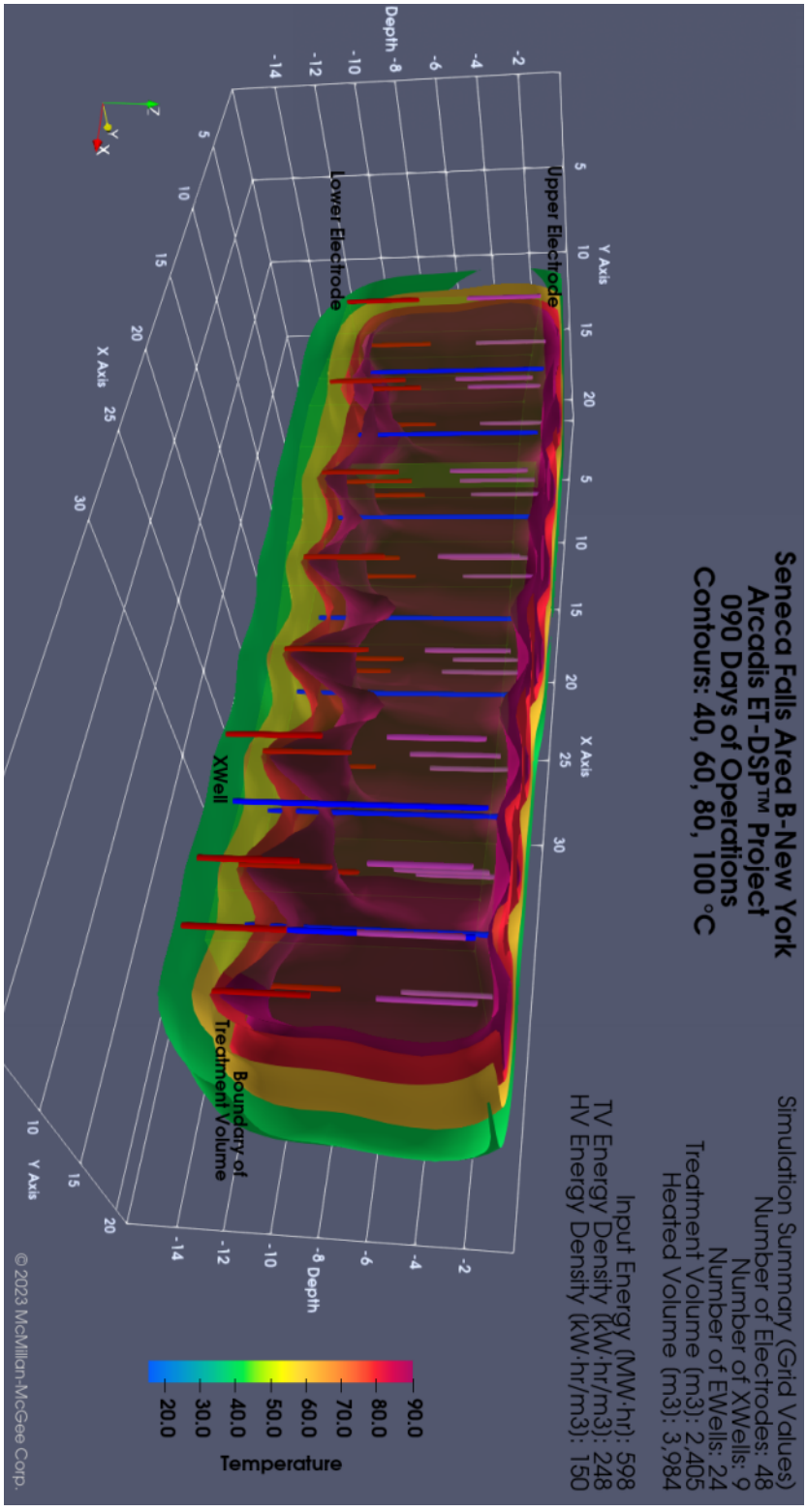


Figure A.11.: Temperature distribution after 90 days.

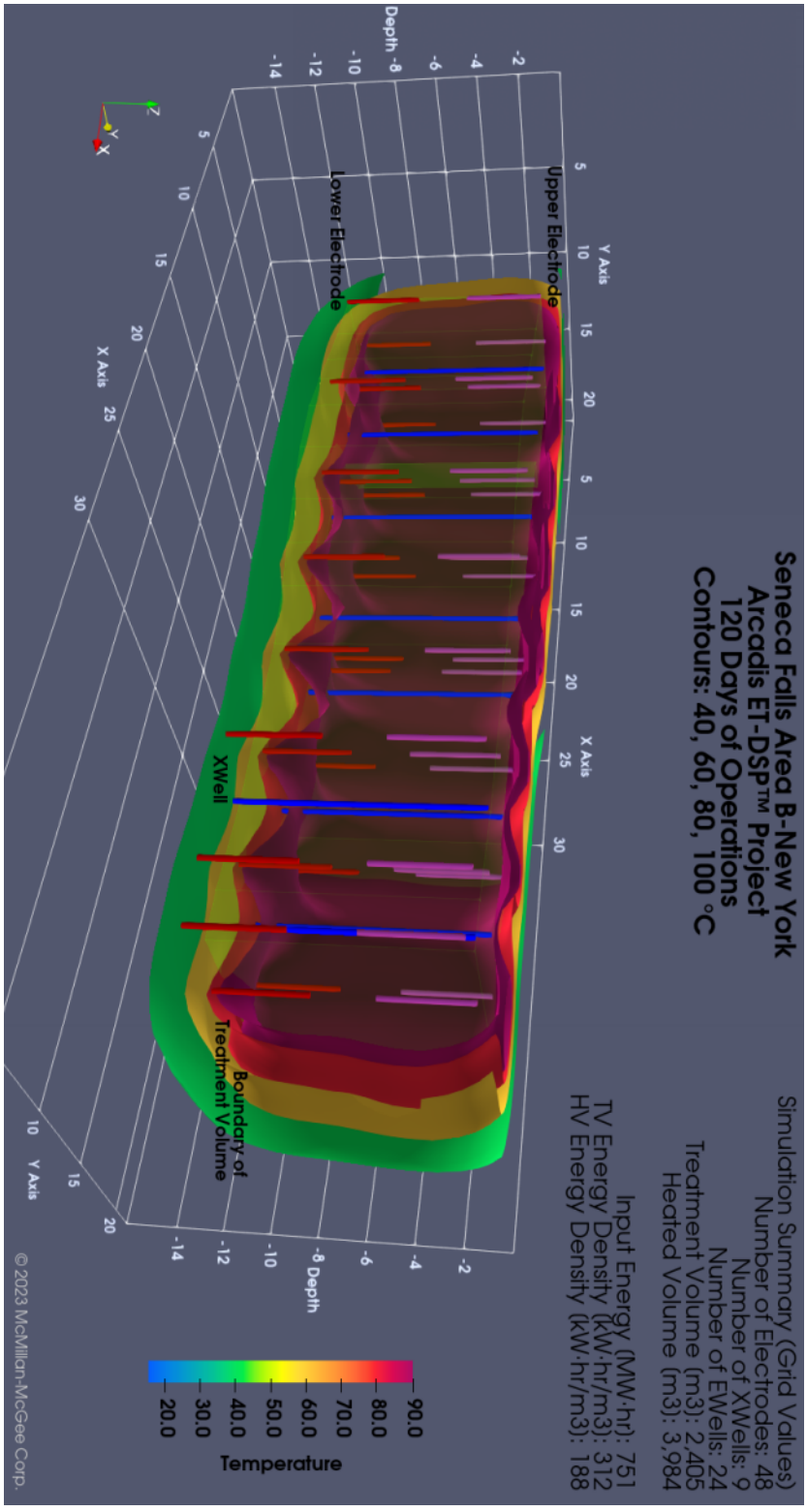


Figure A.12.: Temperature distribution after 120 days.

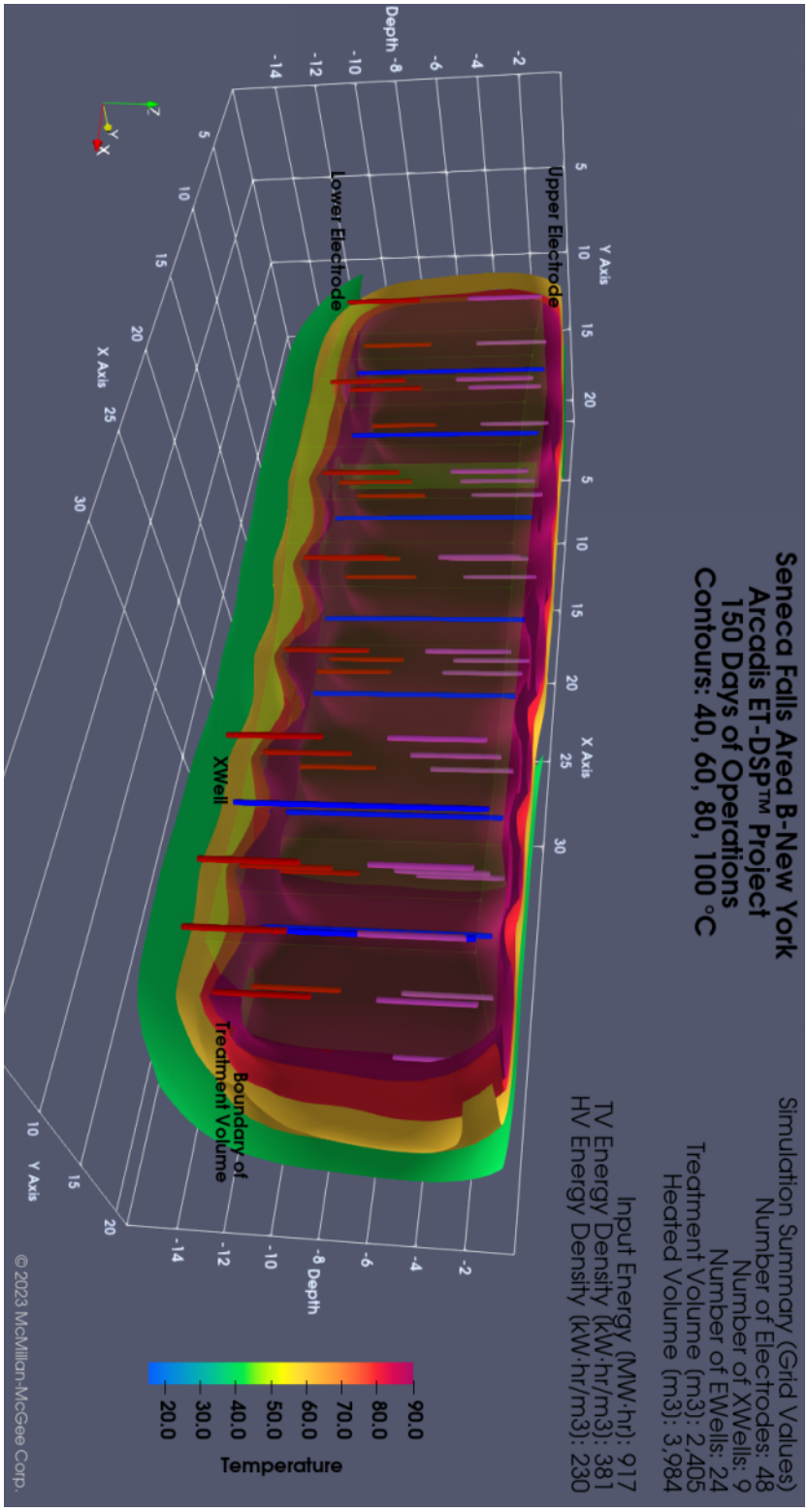


Figure A.13.: Temperature distribution after 150 days.

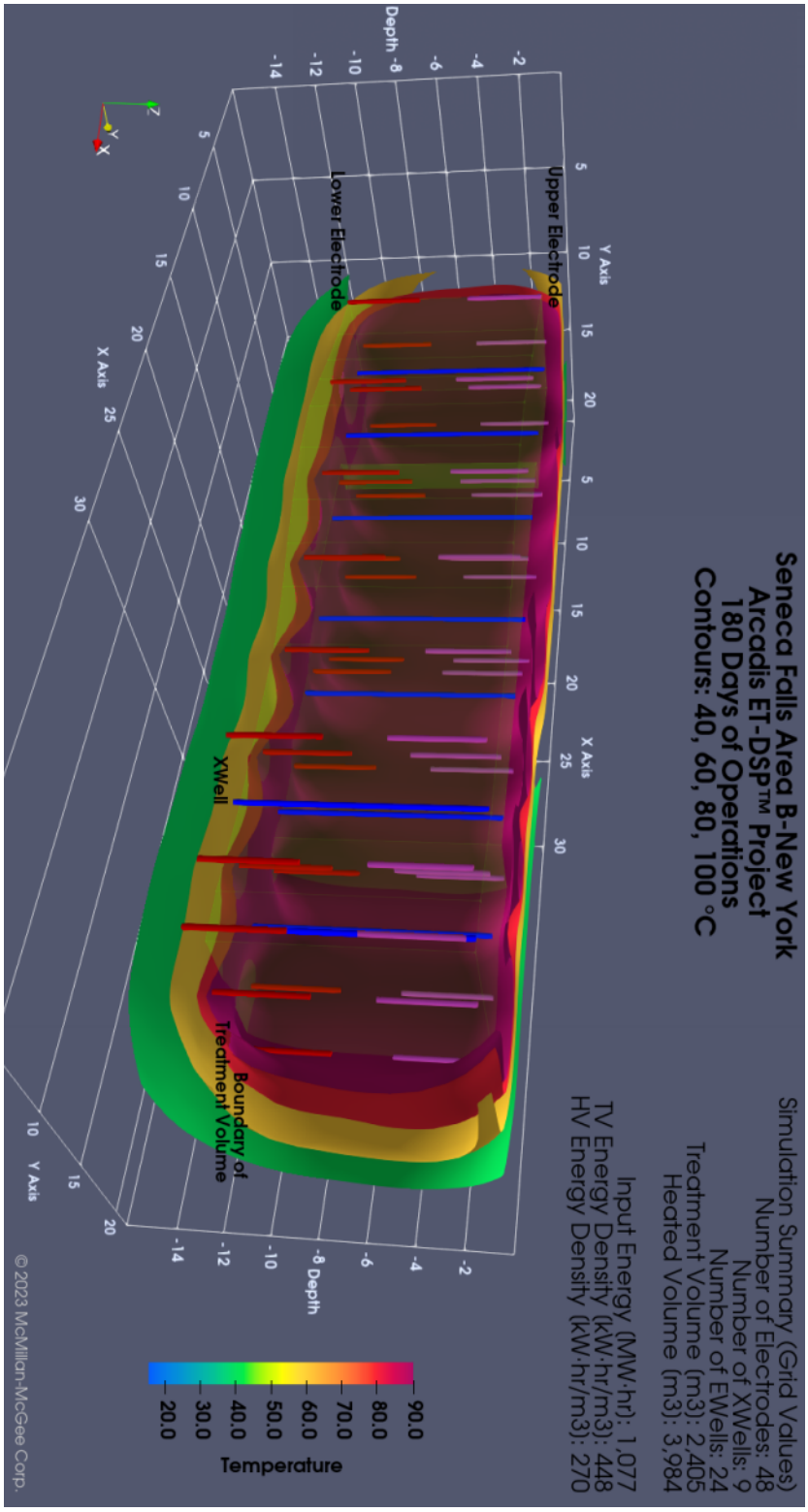


Figure A.14.: Temperature distribution after 180 days.

B

Well-field Well Locations

Seneca Falls Well Summary							
Well		*Location [m]*		*Top [m]*	*Bottom [m]*	*Length [m]*	*Completion*
Name	*Type*	*x*	*y*	*z*	*z*		*Code*
'E001-U'	Electrode	5.53	4.88	0.91	4.57	3.66	3
'E002-U'	Electrode	11.01	4.88	0.91	4.57	3.66	3
'E003-U'	Electrode	16.50	4.88	0.91	4.57	3.66	3
'E004-U'	Electrode	4.88	9.63	0.91	4.57	3.66	3
'E005-U'	Electrode	8.27	9.63	0.91	4.57	3.66	3
'E006-U'	Electrode	13.75	9.63	0.91	4.57	3.66	3
'E007-U'	Electrode	19.24	9.63	0.91	4.57	3.66	3
'E008-U'	Electrode	24.73	9.63	0.91	4.57	3.66	3
'E009-U'	Electrode	5.53	14.38	0.91	4.57	3.66	3
'E010-U'	Electrode	11.01	14.38	0.91	4.57	3.66	3
'E011-U'	Electrode	16.50	14.38	0.91	4.57	3.66	3
'E012-U'	Electrode	21.98	14.38	0.91	4.57	3.66	3
'E013-U'	Electrode	25.38	14.38	0.91	4.57	3.66	3
'E014-U'	Electrode	8.27	19.13	0.91	4.57	3.66	3
'E015-U'	Electrode	13.75	19.13	0.91	4.57	3.66	3
'E016-U'	Electrode	19.24	19.13	0.91	4.57	3.66	3
'E017-U'	Electrode	24.73	19.13	0.91	4.57	3.66	3
'E018-U'	Electrode	11.01	23.88	0.91	4.57	3.66	3
'E019-U'	Electrode	16.50	23.88	0.91	4.57	3.66	3
'E020-U'	Electrode	21.98	23.88	0.91	4.57	3.66	3
'E021-U'	Electrode	27.47	23.88	0.91	4.57	3.66	3
'E022-U'	Electrode	13.75	28.63	0.91	4.57	3.66	3
'E023-U'	Electrode	19.24	28.63	0.91	4.57	3.66	3
'E024-U'	Electrode	24.73	28.63	0.91	4.57	3.66	3
'E025-U'	Electrode	16.50	33.38	0.91	4.57	3.66	3
'E026-U'	Electrode	21.98	33.38	0.91	4.57	3.66	3
'E001-L'	Electrode	5.53	4.88	7.01	10.67	3.66	3

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Seneca Falls Well Summary							
Well		*Location [m]*		*Top [m]*	*Bottom [m]*	*Length [m]*	*Completion*
Name	*Type*	*x*	*y*	*z*	*z*		*Code*
'E002-L'	Electrode	11.01	4.88	7.01	10.67	3.66	3
'E003-L'	Electrode	16.50	4.88	7.01	10.67	3.66	3
'E004-L'	Electrode	4.88	9.63	7.01	10.67	3.66	3
'E005-L'	Electrode	8.27	9.63	7.01	10.67	3.66	3
'E006-L'	Electrode	13.75	9.63	7.01	10.67	3.66	3
'E007-L'	Electrode	19.24	9.63	7.01	10.67	3.66	3
'E008-L'	Electrode	24.73	9.63	7.01	10.67	3.66	3
'E009-L'	Electrode	5.53	14.38	7.01	10.67	3.66	3
'E010-L'	Electrode	11.01	14.38	7.01	10.67	3.66	3
'E011-L'	Electrode	16.50	14.38	7.01	10.67	3.66	3
'E012-L'	Electrode	21.98	14.38	7.01	10.67	3.66	3
'E013-L'	Electrode	25.38	14.38	7.01	10.67	3.66	3
'E014-L'	Electrode	8.27	19.13	7.01	10.67	3.66	3
'E015-L'	Electrode	13.75	19.13	7.01	10.67	3.66	3
'E016-L'	Electrode	19.24	19.13	7.01	10.67	3.66	3
'E017-L'	Electrode	24.73	19.13	7.01	10.67	3.66	3
'E018-L'	Electrode	11.01	23.88	7.01	10.67	3.66	3
'E019-L'	Electrode	16.50	23.88	7.01	10.67	3.66	3
'E020-L'	Electrode	21.98	23.88	7.01	10.67	3.66	3
'E021-L'	Electrode	27.47	23.88	7.01	10.67	3.66	3
'E022-L'	Electrode	13.75	28.63	7.01	10.67	3.66	3
'E023-L'	Electrode	19.24	28.63	7.01	10.67	3.66	3
'E024-L'	Electrode	24.73	28.63	7.01	10.67	3.66	3
'E025-L'	Electrode	16.50	33.38	7.01	10.67	3.66	3
'E026-L'	Electrode	21.98	33.38	7.01	10.67	3.66	3
'X01'	Extraction	8.27	6.20	0.91	10.67	9.75	6
'X02'	Extraction	13.75	6.20	0.91	10.67	9.75	6
'X03'	Extraction	11.01	10.95	0.91	10.67	9.75	6
'X04'	Extraction	16.50	10.95	0.91	10.67	9.75	6
'X05'	Extraction	21.98	10.95	0.91	10.67	9.75	6
'X06'	Extraction	8.27	15.70	0.91	10.67	9.75	6
'X07'	Extraction	13.75	15.70	0.91	10.67	9.75	6
'X08'	Extraction	19.24	15.70	0.91	10.67	9.75	6
'X09'	Extraction	11.01	20.45	0.91	10.67	9.75	6
'X10'	Extraction	16.50	20.45	0.91	10.67	9.75	6
'X11'	Extraction	21.98	20.45	0.91	10.67	9.75	6
'X12'	Extraction	19.24	25.21	0.91	10.67	9.75	6
'X13'	Extraction	24.73	25.21	0.91	10.67	9.75	6
'X14'	Extraction	19.24	32.06	0.91	10.67	9.75	6

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Seneca Falls Well Summary							
Well		*Location [m]*		*Top [m]*	*Bottom [m]*	*Length [m]*	*Completion*
Name	*Type*	*x*	*y*	*z*	*z*		*Code*

Table B.1.: Summary of E-Wells and X-Wells.

Seneca Falls Well Summary							
Well		*Location [m]*		*Top [m]*	*Bottom [m]*	*Length [m]*	*Completion*
Name	*Type*	*x*	*y*	*z*	*z*		*Code*
'E001-U'	Electrode	36.33	4.88	0.91	4.57	3.66	3
'E002-U'	Electrode	41.82	4.88	0.91	4.57	3.66	3
'E003-U'	Electrode	44.56	4.88	0.91	4.57	3.66	3
'E004-U'	Electrode	6.44	7.98	0.91	4.57	3.66	3
'E005-U'	Electrode	12.57	7.98	0.91	4.57	3.66	3
'E006-U'	Electrode	17.13	9.63	0.91	4.57	3.66	3
'E007-U'	Electrode	22.62	9.63	0.91	4.57	3.66	3
'E008-U'	Electrode	28.10	9.63	0.91	4.57	3.66	3
'E009-U'	Electrode	33.59	9.63	0.91	4.57	3.66	3
'E010-U'	Electrode	39.08	9.63	0.91	4.57	3.66	3
'E011-U'	Electrode	44.56	9.63	0.91	4.57	3.66	3
'E012-U'	Electrode	9.18	11.29	0.91	4.57	3.66	3
'E013-U'	Electrode	4.88	11.94	0.91	4.57	3.66	3
'E014-U'	Electrode	14.62	12.59	0.91	4.57	3.66	3
'E015-U'	Electrode	19.87	12.59	0.91	4.57	3.66	3
'E016-U'	Electrode	25.36	14.38	0.91	4.57	3.66	3
'E017-U'	Electrode	30.85	14.38	0.91	4.57	3.66	3
'E018-U'	Electrode	36.33	14.38	0.91	4.57	3.66	3
'E019-U'	Electrode	41.82	14.38	0.91	4.57	3.66	3
'E020-U'	Electrode	44.56	14.38	0.91	4.57	3.66	3
'E021-U'	Electrode	6.44	16.10	0.91	4.57	3.66	3
'E022-U'	Electrode	11.92	16.10	0.91	4.57	3.66	3
'E023-U'	Electrode	17.13	16.75	0.91	4.57	3.66	3
'E024-U'	Electrode	22.62	16.75	0.91	4.57	3.66	3
'E001-L'	Electrode	36.33	4.88	7.01	10.67	3.66	3
'E002-L'	Electrode	41.82	4.88	7.01	10.67	3.66	3
'E003-L'	Electrode	44.56	4.88	7.01	10.67	3.66	3
'E004-L'	Electrode	6.44	7.98	7.01	10.67	3.66	3
'E005-L'	Electrode	12.57	7.98	7.01	10.67	3.66	3
'E006-L'	Electrode	17.13	9.63	7.01	10.67	3.66	3
'E007-L'	Electrode	22.62	9.63	7.01	10.67	3.66	3

table continued on next page

continued from previous page

Seneca Falls Well Summary							
Well		*Location [m]*		*Top [m]*	*Bottom [m]*	*Length [m]*	*Completion*
Name	*Type*	*x*	*y*	*z*	*z*		*Code*
'E008-L'	Electrode	28.10	9.63	7.01	10.67	3.66	3
'E009-L'	Electrode	33.59	9.63	7.01	10.67	3.66	3
'E010-L'	Electrode	39.08	9.63	7.01	10.67	3.66	3
'E011-L'	Electrode	44.56	9.63	7.01	10.67	3.66	3
'E012-L'	Electrode	9.18	11.29	7.01	10.67	3.66	3
'E013-L'	Electrode	4.88	11.94	7.01	10.67	3.66	3
'E014-L'	Electrode	14.62	12.59	7.01	10.67	3.66	3
'E015-L'	Electrode	19.87	12.59	7.01	10.67	3.66	3
'E016-L'	Electrode	25.36	14.38	7.01	10.67	3.66	3
'E017-L'	Electrode	30.85	14.38	7.01	10.67	3.66	3
'E018-L'	Electrode	36.33	14.38	7.01	10.67	3.66	3
'E019-L'	Electrode	41.82	14.38	7.01	10.67	3.66	3
'E020-L'	Electrode	44.56	14.38	7.01	10.67	3.66	3
'E021-L'	Electrode	6.44	16.10	7.01	10.67	3.66	3
'E022-L'	Electrode	11.92	16.10	7.01	10.67	3.66	3
'E023-L'	Electrode	17.13	16.75	7.01	10.67	3.66	3
'E024-L'	Electrode	22.62	16.75	7.01	10.67	3.66	3
'X01'	Extraction	37.71	7.33	0.91	10.67	9.75	6
'X02'	Extraction	43.19	7.33	0.91	10.67	9.75	6
'X03'	Extraction	7.09	11.94	0.91	10.67	9.75	6
'X04'	Extraction	11.92	11.94	0.91	10.67	9.75	6
'X05'	Extraction	34.96	11.94	0.91	10.67	9.75	6
'X06'	Extraction	40.45	11.94	0.91	10.67	9.75	6
'X07'	Extraction	17.13	12.59	0.91	10.67	9.75	6
'X08'	Extraction	28.10	12.59	0.91	10.67	9.75	6
'X09'	Extraction	22.62	13.77	0.91	10.67	9.75	6

Table B.2.: Summary of E-Wells and X-Wells.

C

Radius of Capture Theory

The determination of the radius of capture r_c, is based on solving equations, C.1 through C.5. The analytic model evolved from a problem submitted by McMillan-McGee to the Pacific Institute for Mathematical Sciences annual Industrial Problem Solving Workshops[1] and is in the *PIMS Industrial Proceedings*[2] authored by Huaxiong Huang et. al.[HLW03]. Figure C.1 shows the general concept behind the model.

Electrical energy is introduced to the contaminated soil using a multitude of finite length cylindrical electrodes. Current is forced to flow though the soil by the voltage differentials at the electrodes. The soil is resistive in nature and consequently heat losses occur in accordance with the power density distribution established by the voltage gradient between the electrodes, for example, $q_e = \sigma \mathbf{E} \cdot \mathbf{E^T}$ where $\mathbf{E} = \vec{\nabla} \cdot V$.

[1] The Pacific Institute for Mathematical Sciences (PIMS) has sponsored an annual Industrial Problem Solving Workshop (IPSW) since 1997. The aim of the IPSW is to create a mutually beneficial link between researchers in industry and academic mathematical scientists. Faculty and students from the academic community study problems brought by industrial participants during the week-long workshop. Their results are presented at the end of the week.

[2] http://www.pims.math.ca/resources/publications/pims-industrial-proceedings

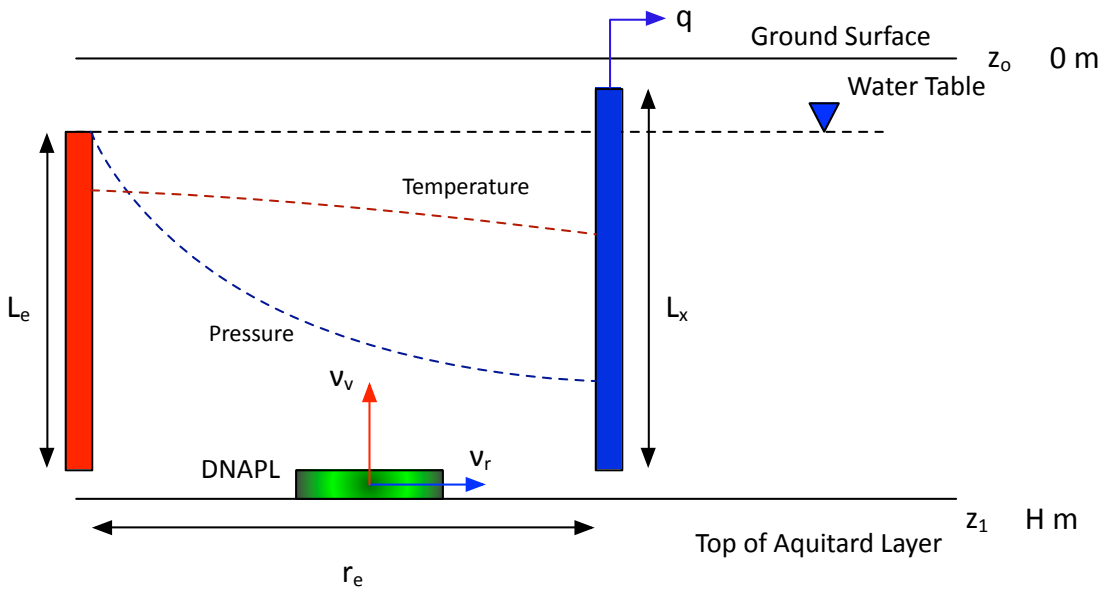


Figure C.1.: Conceptual model for the radius of capture.

As the soil heats up contaminated liquids and vapors are produced at the extraction wells. The rate of energy removed from the soil at the extraction wells is less than the electrical energy injected so that during extraction the soil will increase in temperature up to some maximum value, which is usually the boiling temperature of water.

At initial conditions the pressure and temperature in the soil are P_i and T_i respectively. Initially there is no vapour in the soil, only a liquid phase consisting of water, a dissolved chemical phase (the contaminant), and a free product DNAPL resting on the aquitard layer. As the temperature increases toward $T = T_c$, the vapourization temperature of the chemicals in the liquid, the chemical *boils* out of the water and exists in the soil as a vapour, but only to the limited extent of several bubbles. The vapour-equilibrium for the system is estimated from $k-$values.

Given the temperature and pressure conditions in the soil it is possible to approximate where the bubbles will exist. There is a pressure gradient in the soil created by the draw-down of liquids at the extraction well. This imposes a horizontal force on the bubble and accelerates it toward the extraction well. The other force on the bubble is buoyancy, and is acting in the vertical direction. The objective of the model is to determine the horizontal velocity of the bubble so that it is removed at the extraction well before it leaves the vertical extent of the heated volume. Outside the heated volume, the bubble, comprised mainly of the DNAPL, may condense back to a liquid and reduce the efficiency of the mass recovery.

Equation C.1 first determines the average velocity of bubbles, v_b, as they exit the top of heated volume. The hydraulic constant for vertical flow, F, is developed in Huaxiong Huang et. al. and incorporates soil parameters into its value as indicated in Equation

C.4. The Eötvös (or Bond number), E_o, is determined in Equation C.2 and is used to determine the capillary number, C_a, based on the correlation[BZ01] presented in Equation C.3. Finally, the minimum liquid extraction rate needed to capture the bubbles is given in Equation C.5.

$$v_b = \tau F \frac{\Delta \rho g d^2}{3\mu_l} \tag{C.1}$$

$$E_o = \frac{\Delta \rho g d^2}{\gamma} \tag{C.2}$$

$$C_a = c_1 E_o^{d_1} + c_2 E_o^{d_2} \tag{C.3}$$

$$F = \frac{3\phi\,(1-\alpha)}{d^3} \frac{\gamma \mu_l}{\Delta \rho g} \left(c_1 E_o^{d_1} + c_2 E_o^{d_2} \right) \tag{C.4}$$

$$q \geq \frac{\pi\, \tau F \Delta \rho g d^2}{3\mu_l} \cdot \frac{k_v\, H}{k_h\, h} \cdot \frac{r_e^2 - r_w^2}{1+K} \tag{C.5}$$

Equation C.5 is rearranged and solved for r_e. The value of $2 \cdot r_e$ determines the maximum spacing between extraction wells that will ensure the capture of bubbles. This spacing is used as a guideline for setting up the array of extraction wells within the heated volume.

D

Convert Hydraulic Conductivity to Darcys

$$v = \frac{k}{\mu} \cdot \frac{\Delta P}{\Delta x} = \hat{k} \cdot \frac{\Delta H}{\Delta x} \quad \left[\frac{m}{s}\right]$$

$$\Delta P = \rho g \Delta H$$

$$\frac{k\,\rho g}{\mu} \cdot \frac{\Delta H}{\Delta x} = \hat{k} \cdot \frac{\Delta H}{\Delta x}$$

$$\mathrm{k} = 9.869233 \cdot 10^{-13}\,\mathrm{m}^2 \text{ per Darcy,}$$

Assume properties for water

$$\mu = 0.001\ \mathrm{kg} \cdot \frac{\mathrm{m}}{\mathrm{s}^2} \frac{1}{\mathrm{m}^2} \cdot \mathrm{s}$$

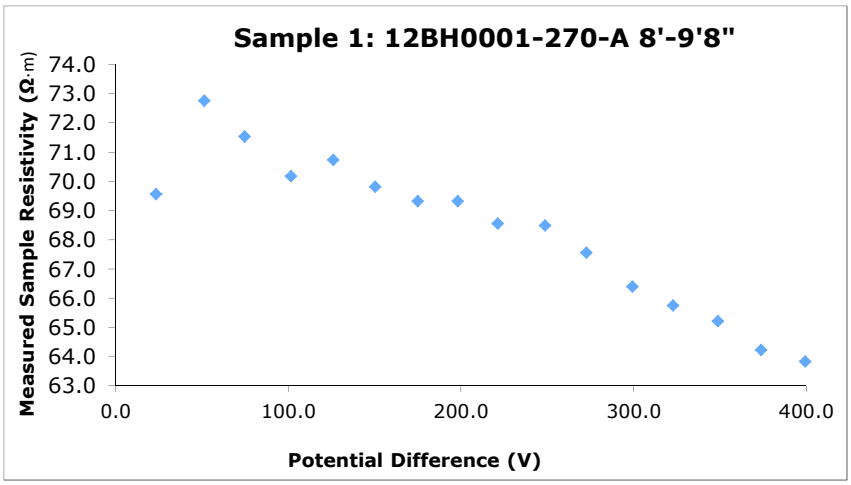
$$g = 9.8\ \frac{\mathrm{m}}{\mathrm{s}^2}$$

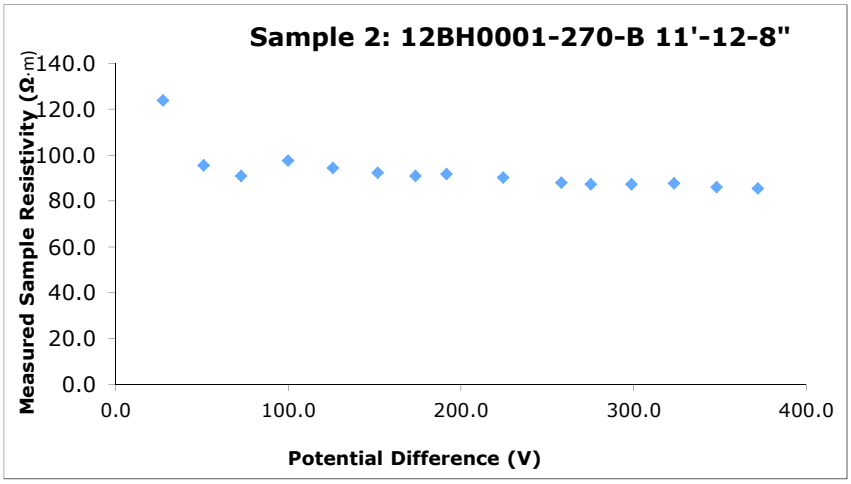
$$\rho = \rho_w = 1{,}000\ \frac{\mathrm{kg}}{\mathrm{m}^3}$$

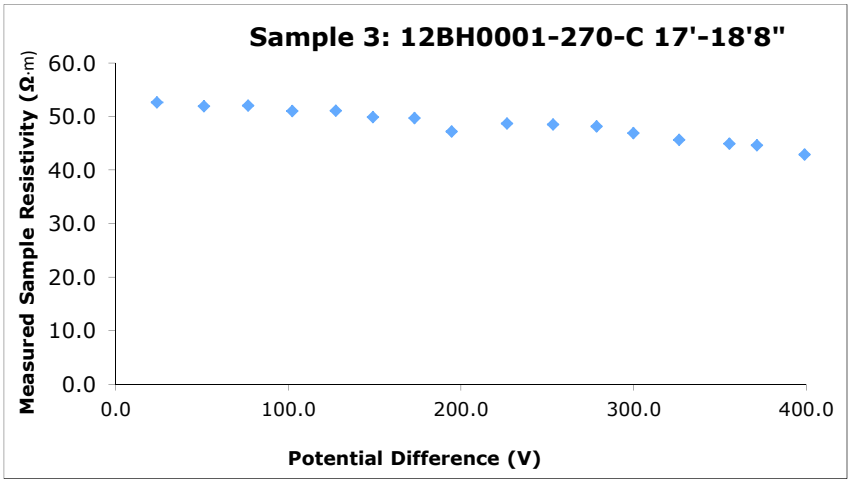
$$\frac{k\,\rho g}{\mu} = 9.671848 \cdot 10^{-6}\ \left[\frac{m}{s}\right] = 9.671848 \cdot 10^{-4}\ \left[\frac{cm}{s}\right]$$

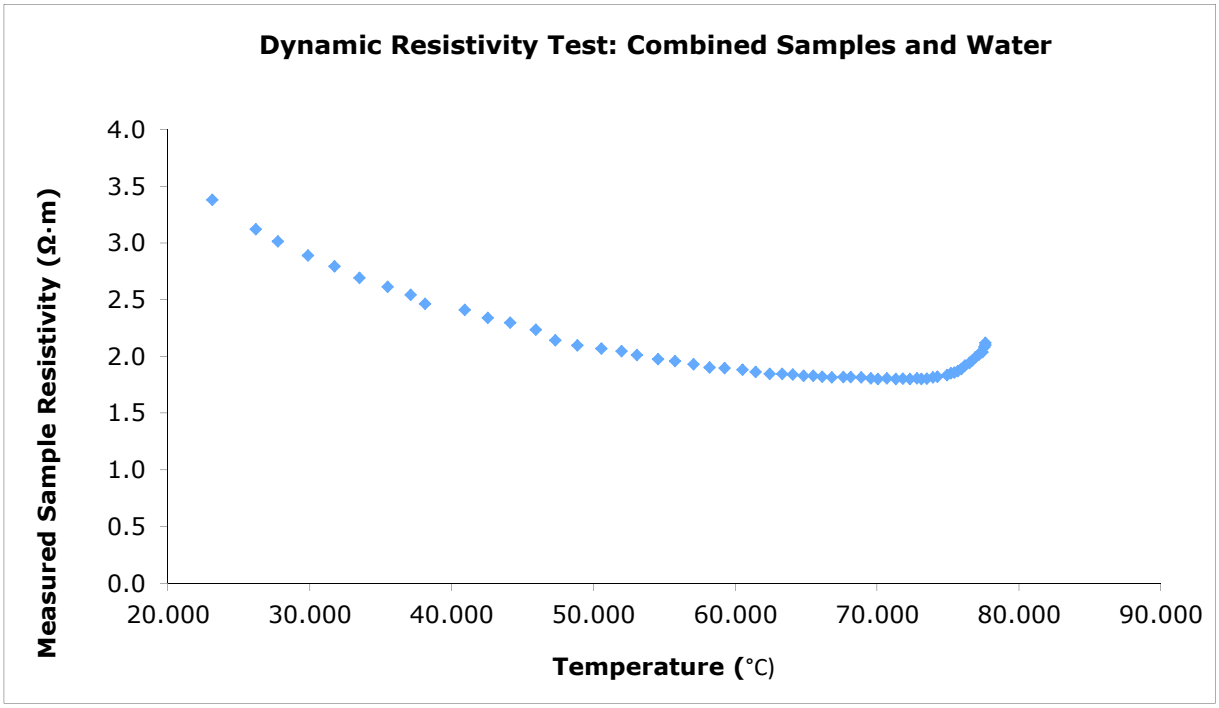
$$\therefore \quad 1\ \left[\frac{cm}{s}\right] \equiv\ 1{,}033.9285 \text{ Darcys}$$

Appendix D – Resistivity Testing Results


Sample 1: 12BH0001-270-A 8'-9'8"
Measured Sample Resistivity (Ω·m)
74.0
73.0
72.0
71.0
70.0
69.0
68.0
67.0
66.0
65.0
64.0
63.0
0.0
100.0
200.0
300.0
400.0
Potential Difference (V)


Sample 2: 12BH0001-270-B 11'-12-8"
Measured Sample Resistivity (Ω·m)
140.0
120.0
100.0
80.0
60.0
40.0
20.0
0.0
0.0
100.0
200.0
300.0
400.0
Potential Difference (V)


Sample 3: 12BH0001-270-C 17'-18'8"
Measured Sample Resistivity (Ω·m)
60.0
50.0
40.0
30.0
20.0
10.0
0.0
0.0
100.0
200.0
300.0
400.0
Potential Difference (V)


Dynamic Resistivity Test: Combined Samples and Water
Measured Sample Resistivity (Ω·m)
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
20.000
30.000
40.000
50.000
60.000
70.000
80.000
90.000
Temperature (°C)

Appendix E – Equipment Cut Sheets

1. 60 Electrode PDS
2. 60 Electrode WCS
3. DigiTAM™ Temperature Sensor

McMillan-McGee Corp.

CREATORS OF ET-DSP™

McMillan-McGee Corp.
60 Electrode Power Delivery System (PDS)







ET-DSP™ Power Delivery System. 60 Electrode Unit Specifications

Electrical Performance	Principle	Two 3-phase high voltage utility transformers
	Power Rating	1330 kVA - 2-660 kVA Transformers
	Amperage	4-15 Electrode Busses at 400A Per Phase
		100 A per electrode. 5 Electrodes/Phase/Buss
	Voltage	Multi-tap secondary, 600 V max. phase to phase
		Field adjustable tap settings
Power Control	Principle	Time distributed control - Half-wave AC switching rectifiers SCR triggering-electronics with internet capability
	Power Selection	Current duty cycle from off to 100% Adjustment increment to 5%
Power Monitoring	Principle	High performance current transducers Internet-enabled, full wave CT monitoring electronics
	Measurement	Current amplitude; ms and effective values Independent TDCM duty cycle verification

McMillan-McGee Corp.
4895 35B. St. SE. Calgary, Ab. Canada. T2B 3M9
www.mcmillan-mcgee.com

McMillan-McGee Corp.

Creators of ET-DSP™

McMillan-McGee Corp.
60 Electrode Water Circulation System







Water Circulation System 60 Electrode Unit Specifications		
Flow Performance	Principle	Utility water supply with internal pump Individual electrode injection valves
	Pressure	Rated at 100 psi
	Temperature	Water at 90 C
Injection Control	Principle	One voltage fired solenoid valve per electrode Proportional Valve 0-100%
Injection Monitoring	Operation	Designed for simultaneous injection to 6 electrodes
	Principle	Inline ultrasonic flow meters Internet-enabled pulse counting electronics
	Operation	One flow meter per solenoid valve assembly Each meter monitors injection to 10 electrodes

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McMillan-McGee Corp.

Creators of ET-DSP™

McMillan McGee Corp.
digiTAM Temperature Acquisition Module



digiTAM Sensor String Specifications		
Temperature	Principle	Integrated silicon temperature sensors
	Range Accuracy Resolution	-55 to 125°C ±0.5 °C ±0.125 °C
Environmental	Media compatibility	Air, water, steam, fuels, oils (Contact Mc^2 for specific contaminants)
	Wetted material	Teflon
Dimensions	Bottom Seal	1-1/16" (max)
	Cable	1/2 "
	Sensor interval (typ)	3.0 ft
Weight	Cable	50g/ft.
Connection	Power	External supply, 3.0 to 5.5 V DC; no batteries needed Power consumption of 7.5 mW per sensor during measurement
	Communication	Data acquisition occurs using Mc^2's 3 line digital serial bus Individual temperature measurements occur within 750 ms Data immediately accessible via the internet
	Sensor string	Placed in a drop-tube at required depth and anchored to surface
	Data server	Data lines connected with CAT5 cable Connects to site server through Mc^2 communication hub

Networking
Multiple digiTAMs are accessed from a data server using Mc^2's communication protocols. Temperatures are immediately accessible via the Internet.

Easily Powered
DigiPAMs require only 7.5 mW of power per sensor during temperature conversions. External power supply over the 3 line digital bus means no batteries are required.

Digital at the Source
The temperatures are converted directly to digital signals to limit the effects of high electromagnetic interference due to thermal remediation systems. DigiTAMs and digiPAM pressure sensors are connected on the same digital bus for simple installation, automated process monitoring and real-time data access.

Instantaneous Temperature Profiling
The digiTAM strings make use of multiple temperature sensors on a common 3 line digital bus. Up to 30 temperature sensors are embedded in the Teflon cable, typically at 3 ft intervals. Thus a complete temperature profile is obtained for a narrow borehole within seconds.

Extreme Environments
DigiTAMs are fully submersible and measure temperatures of up to 125°C. The sensor is compatible with most chemical contaminants seen at remediation sites.

Fast Installation
DigiTAMs are simply lowered into a monitoring well and anchored to the surface. The sensor is linked to the data server using standard CAT5 network cable and Mc^2's communication.

McMillan-McGee Corp.
4895 35B. St. SE. Calgary, Ab. Canada. T2B 3M9
www.mcmillan-mcgee.com

Appendix F – Equipment Cleaning/Changeout Checklists

Project	
Location	
Mc2 Representative	
Date & Time	

The following must be performed in accordance with the Site HASP and O&M plan.
All Meters being used with in QAQC procedures must be with in calibration.

Item	Inspected by: Status	Date	Mc2	Comments/Documentation
Changeout/Cleaning				
Sludge Settling Tank - *Will only be cleaned at the end of the project or as deemed necessary. (Inspect daily once sludge has been transferred to the tank)*				
Ensure safety protocols are in place, including PPE for workers.				
Utilize a vac truck to remove accumulated sludge from the tank.				
Use a pressure washer to remove any remaining residues from the tank walls and bottom.				
Preform a final rinse. Rinse the tank thoroughly with clean water to ensure all cleaning chemicals and debris are removed.				
Ensure the rinse water is allowed to clarify, and pump clarified water through the air stripper and/or activated carbon. Dispose of any sludge in accordance with applicable regulations.				
Reassemble any equipment that was disassembled during the cleaning process.				
Test the system to ensure it is operating properly and without any issues.				
Sludge Dewatering Tank - *Check sludge drying in bag daily after first transfer*				
Ensure safety protocols are in place, including PPE for workers.				
Utilize a vac truck to remove accumulated sludge from the tank.				
Use a pressure washer to remove any remaining residues from the tank walls and bottom.				
Preform a final rinse. Rinse the tank thoroughly with clean water to ensure all cleaning chemicals and debris are removed.				
Ensure the rinse water is allowed to clarify, and pump clarified water through the air stripper and activated carbon. Dispose of any sludge in accordance with applicable regulations.				
Reassemble any equipment that was disassembled during the cleaning process.				
Test the system to ensure it is operating properly and without any issues.				
Phase Separator - *Will only be cleaned at the end of the project or as deemed necessary*				
Calibrate PID, and survey workspace with PID.				
Turn off all of the electrodes on the PDS units with electrodes that are within 30 feet of where the work is to take place.				
Perform Step and Touch Potential Testing on the equipment and on any piping or structures that contact may be made with in the work area.				
Remove building panels or open equipment enclosure doors for access and ventilation.				
Install fan blowing over tank to outside.				
Place double diaphragm pump in double containment.				
Securely attach air line from regulated source at air compressor to double diaphragm pump. Inspect hose clamps.				
Secure suction and discharge lines, and lock cam levers on fittings.				
Cease or reduce liquid extraction, shut down transfer pumps, wait 15 minutes, and verify fluid transfer is complete.				
Manually transfer remaining fluids in the phase separator to downstream treatment.				
Loosen portion of lid to allow tank to vent. Monitor air space for a period of 5 mins.				
Loosen and unfasten all hardware. Continue monitoring air space with a fan blowing over tank top.				
Clean coalescing media with pressure washer or replace.				

Item	Inspected by: Status	Date	Mc2	Comments/Documentation
Clean tank interior with pressure washer. Allow cleaning fluids to clarify. Process clarified cleaning fluids through air stripper and activated carbon. Dispose of any sludge in accordance with applicable regulations.				
Air Stripper - *Inspect for precipitaion daily. Clean as needed.*				
Calibrate PID, and survey workspace with PID.				
Turn off all of the electrodes on the PDS units with electrodes that are within 30 feet of where the work is to take place.				
Remove building panels or open equipment housing doors for access and ventilation.				
Install a fan blowing near the airstripper to outdoors.				
Shut down transfer pumps and process blower, confirm fluid transfer completion, and close influent flow valves.				
Manually transfer remaining fluid to downstream treatment and monitor sight glass and pump pressure.				
Remove trays from air stripper.				
Remove the influent water hose connection on top of the air stripper. Take care to drain line away from personnel.				
Using a pressure washer, remove as much silt and scale buildup as possible. Use a screw driver of the correct diameter to clear holes in air stripper trays if necessary.				
Reassemble air stripper				
Ensure all hoses and connections are secure. Fasten all screws, check all hardware for tightness. Pin all camlock connections.				
Bag Filters - *Check back pressure twice daily (once in the morning and once before leaving). Change filters at 15psi pressure drop.*				
A bag filter change-out will occur: i. After the first week of commissioning; ii. When the pressure difference between the inlet and outlet gauges warrants a changeout; iii. If fouling of the Y-Strainers is noted.				
Ensure the process water stream can bypass the bag filter set being changed. Typically this is through an alternate, parallel-arrangement bag filter set. If this is not available, put the treatment system into yellow alarm status to temporarily stop the process water flow.				
Close the water inlet valve on the bag filter vessel requiring the filter change and allow the vessel to depressurize.				
Once depressurized, close the water outlet valve on this vessel to isolate the unit.				
Bleed off any remaining pressure through the bag filter(s) top vent valve. Close the valve once pressure drops to zero.				
Open the top lid on the bag filter vessel requiring the filter change.				
Remove the spent bag filter and place in the 5-gallon pail.				
Install the new bag filter, close the lid, and tighten the clamps.				
Open the water inlet valve on the bag filter vessel.				
Vent out any air out of the bag filter vessel through the top vent valve. Be sure this venting process occurs with the pump feeding the bag filters on, so that all the air is displaced from the bag filter vessel.				
Once water comes out the top vent valve, close the top vent valve and open the water outlet valve.				
Inspect for leaks.				
Dispose of the bag filter in accordance with approved waste management procedures.				
Liquid Granulated Carbon Vesels - *This will be provided in more detail by the vendor preforming the changeouts* *Check pressure twice daily (once in the morning and once before leaving). Backwash at 15psi pressure drop.*				
Calibrate PID and survey workspace with PID.				
Turn off all of the electrodes on the PDS units with electrodes that are within 30 feet of where the work is to take place.				
Identify and setup a containment area for the temporary storage of media if necessary.				
Process flow will need to be re-routed or stopped to remove media from the vessel. Notify all project personnel & MC2 project management before re-routing or stopping process flow.				
Isolate the vessels to be serviced & note valves closed and/or pumps & blowers that need to be turned off.				

Item	Inspected by: Status	Date	Mc2	Comments/Documentation
Lock out/tag out pumps & blowers.				
Drain liquid from vessels if liquid present.				
Monitor while vac truck extracts media.				
Refilling vessels with media typically requires the use of a forklift to suspend large bags of media. Fill vessels with new media.				
Secure lids on vessels.				
Open the valves that were closed previously to isolate vessels so that the vessels are no longer isolated. Confirm process flow paths are open.				
Remove lock out/tag out. Re-start process equipment.				
Verify flow.				
Cooling Tower - *If blowdown is set correctly, cooling tower should not need to be cleaned during operation.* *Check maintenance manual for selected cooling tower. Blower motors may need to be greased every few months.*				
Turn off power to the cooling tower. Close all water supply valves.				
Drain all water from the system completely.				
Use brushes or power washers to remove dirt, leaves, scale, and loose debris from the tower basin and sump.				
Inspect film plates for debris or scale buildup. Use high-pressure hoses or power washers to clean thoroughly.				
Scrub the basin walls and floor.				
Clean the water distribution system, including nozzles and spray heads.				
Remove scale, algae, or sediment buildup using proper cleaning agents or biocides (such as lactic acid or vinegar).				
Inspect drift eliminators for blockages or dirt buildup. Use brushes or high-pressure water to clean and ensure unobstructed airflow.				
Flush the entire system with clean water to remove loosened debris and chemicals.				
Use high-pressure hoses to rinse all components, including the film plates, basin, and distribution system.				
Process collected cleaning fluids through treatment system or dispose of properly in accordance with applicable regulations.				
Refill the cooling tower with clean and/or treated water per manufacturer specifications and design calculations.				
Restart the system and check that all valves and controls are functioning correctly.				
Ensure the overall circulation flow rate, distribution between heat exchangers (if more than one), and the blowdown flow rate are all set correctly.				
Monitor performance to ensure proper operation.				
Knockout Tanks - *Will only be cleaned at the end of the project or as deemed necessary* *Clean level sensors about once a week.*				
Calibrate PID and survey workspace with PID.				
Turn off all of the electrodes on the PDS units with electrodes that are within 30 feet of where the work is to take place.				
Ensure the system is depressurized and isolated from active processes.				
Ventilate the area to prevent the accumulation of harmful vapors.				
Drain all liquids from the tank.				
Manually remove accumulated sludge or solids.				
Circulate a suitable cleaning solution to dissolve and remove residual contaminants.				
Thoroughly rinse the tank with water to remove any remaining cleaning agents.				
Neutralize any residual chemicals as required.				
Allow cleaning fluids to clarify. Process clarified cleaning fluids through air stripper and activated carbon. Dispose of any sludge in accordance with applicable regulations.				
Inspect the tank for corrosion, damage, or wear.				
Return the tank to service, monitor preformance.				
Air Filter - *Check pressure drop daily. Change filter if pressure drop reaches 15 psi.*				
Ensure the treatment system is powered down and locked out according to facility safety procedures.				
Identify the air filter compartment in the treatment system.				

Item	Inspected by: Status	Date	Mc2	Comments/Documentation
Open the filter housing by loosening fasteners or latches.				
Carefully remove the old filter to avoid releasing dust or contaminants into the air. Set it aside for proper disposal.				
Use a vacuum cleaner or damp cloth to remove dust and debris from the filter housing.				
Ensure the gasket sealing surfaces are free from dirt to maintain an airtight seal.				
Install the new filter - ensure the filter is properly oriented, seated, and secured to prevent air bypass.				
Close the housing and fasten any latches or screws.				
Remove lockout/tagout devices and power on the treatment system.				
Observe the system for proper airflow and operation.				
Vapor Granulated Carbon Canisters - *This will be provided in more detail by the vendor preforming the changeouts Check daily to ensure no condensate is trapped in the bottom. Check pressure drop daily.*				
Calibrate PID and survey workspace with PID.				
Turn off all of the electrodes on the PDS units with electrodes that are within 30 feet of where the work is to take place.				
Perform Step and Touch Potential Testing on the equipment and on any piping or structures that contact may be made with in the work area.				
Identify and setup a containment area for the temporary storage of media if necessary.				
Process flow will need to be re-routed or ceased to remove media from the vessel. Notify all project personnel & MC2 project management before re-routing or ceasing process flow.				
Isolate the vessels to be serviced & note valves closed and/or pumps & blowers that need to be turned off.				
Lock out tag out pumps & blowers.				
Drain liquid from vessels if liquid present.				
Allow any fluids to clarify. Process clarified fluids through air stripper and activated carbon. Dispose of any sludge in accordance with applicable regulations.				
Monitor while vac truck extracts media.				
Refilling vessels with media typically requires the use of a forklift. Fill vessels with new media.				
Secure lids on vessels.				
Open the noted valves closed to isolate vessels . Confirm process flow paths are not impinged.				
Remove lock out tag out. Re-start process equipment.				
Verify flow.				
DNAPL and LNAPL Storage Tanks - *Will only be cleaned at the end of the project or as deemed necessary Check levels daily. Plan for NAPL removals as needed.*				
Calibrate PID and survey workspace with PID.				
Turn off all of the electrodes on the PDS units with electrodes that are within 30 feet of where the work is to take place.				
Perform Step and Touch Potential Testing on the equipment and on any piping or structures that contact may be made with in the work area.				
Lower main process blower speed by adjusting speed setting at VFD. Achieve process vacuum of less than 1 in Hg.				
Protect respiratory system with full face respirator.				
Ensure the NAPL tank is fully drained via vacuum truck or waste disposal tanker, to be taken off site for proper disposal.				
Manually clean the interior surfaces using tools like long-handled brushes or high-pressure washers.				
Collect all waste materials, including DNAPL residues, cleaning agents, and rinse water, for processing through the treatment system and/or proper disposal.				
After cleaning, inspect the tank for any signs of corrosion, damage, or residual contamination.				

Appendix G – Procedures

1. Hot Soil Sampling Procedure
2. Hot Ground Water Sampling Procedure

PREPARED FOR:

ARCADIS

Hot Soil Sampling Procedure

March, 2025

Project-Specific Guidelines for:

G.T.E Products Corporation,
NYSDEC Site No. 850003
Former Philips Display Components Facility
Seneca Falls, New York

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Contents

Introduction 1
Purpose 1
Scope 1
Equipment List 1
Safety Equipment 1
Job Supplies 1
Safety Considerations 2
Hot Soil Sampling Procedure 2
1. Preparation and Mobilization 2
2. De-Energize Electrodes 2
3. Calibrate Air Monitoring Equipment 3
4. Turn off Relevant ET-DSP™ Equipment and Place Under LOTO 3
5. Mobilize Direct Push Drill Rig to Sampling Location 4
6. Assess Heat and Chemical Exposure Hazards 5
7. Collect and Process Direct Push Soil Sample(s) 6
8. Decontaminate Downhole and Sampling Equipment 7
9. Abandon Direct Push Sampling Location 8
10. Demobilize Direct Push Drill Rig from Sampling Location 8
11. Start up the ET-DSP™ System 8

Table of Figures

Figure 1: ESD Button 3
Figure 2: Orange PDS Beacon 3
Figure 3: PDP Unit 5
Figure 4: PTFE Sleeve Capped and Taped Shut 6
Figure 5: Sample Temperature Prior to Ice Bath 7
Figure 6: Sample Temperature After Ice Bath 7

Introduction

This document has been developed to outline the methodology for collecting and analyzing hot soil samples for remediation projects utilizing the Electro-Thermal Dynamic Stripping Process (ET-DSP™). The implementation of this Hot Soil Sampling Procedure follows site-specific health and safety protocols, including air monitoring and appropriate personal protective equipment (PPE) usage, to mitigate risks associated with high-temperature soil and potential chemical exposure.

Purpose

The purpose of this document is to provide a hot soil sampling procedure for the safe collection of soil samples within the treatment volume. This procedure specifically addresses sampling of soil that has been heated as a result of the ET-DSP™ treatment process.

Scope

This procedure serves as a guideline for the collection of soil samples following the application of in-situ thermal remediation (ISTR). Only authorized personnel trained in the procedures outlined in the project's health and safety plan (HASP) are permitted to perform LOTO on ET-DSP™ equipment. Personnel are required to follow this procedure in alignment with site-specific health and safety requirements, as well as all applicable regulations and laws.

Equipment List

Safety Equipment

1) Hard Hat
2) Face shield for splash protection when there is a risk of exposure to hot fluids
3) Electrical hazard rated steel toed boots
4) Long sleeve shirt and pants – or coveralls
5) Rain coat for splash protection when there is a risk of exposure to hot fluids
6) Saranex suit for when there is a risk of chemical exposure
7) Safety glasses with side shields
8) Electrical insulated gloves
9) Thermal resistant gloves
10) Nitrile gloves under other gloves when there is risk of chemical exposure
11) High visibility safety vest

Job Supplies

1) Waste disposal drum correctly identified and labeled for management of waste
2) Core barrel with SS or PTFE sleeve
3) Decontamination supplies
4) Mobile phone
5) Electrically isolated tools (wrenches, pliers, screwdrivers, etc.)
6) Volt mete

7) Step and touch testing apparatus
8) Calibrated photoionization detector (PID)
9) Temperature gun
10) Thermometer
11) Ice bath
12) Eye wash supplies

Safety Considerations

Hot soil sampling presents several potential hazards. Proper precautions must be taken to ensure the safety of all personnel involved in the sampling process. The following are key risks that must be addressed before and during sampling activities:

- Lightning: This poses an electrocution risk. No one is permitted in the well field during lightning and until 30 minutes after the last recorded strike.
- Hot Fluids and Surfaces: This presents a risk of burns. Equipment is only to be handled when temperatures are equal to or less than 50°C/122°F, or with appropriate PPE up to temperatures of 120°C/248°F.
- Energized Wellfield: This poses an electrocution risk. Prior to performing the task, all electrodes near the work area must be shut off and step and touch potential testing must be performed. Use electrically isolated tools.
- Contamination: A contaminated site represents a chemical exposure risk. All employees must review site-specific health and safety plan and consult with onsite health and safety representative to determine air monitoring protocols, MSDS, PPE requirements, and engineering controls to mitigate risk of exposure.

Hot Soil Sampling Procedure

The following procedure outlines the necessary steps for safely and effectively collecting hot soil samples at the Site.

1. Preparation and Mobilization

To prepare and mobilize for the soil sample, a few precautions must be taken:

- Review the following items to ensure adherence:
    - Health and Safety Plan (HASP)
    - Emergency response procedures
    - Job Safety Analysis (JSA) procedures
    - Waste management procedures

2. De-Energize Electrodes

To avoid exposure to hot vapors, consult with a McMillan-McGee representative at least 24 hours prior to scheduled drilling and sampling activities, in order to determine the time needed for the electrodes to be shut down to cease steam production in the subsurface.

3. Calibrate Air Monitoring Equipment

Calibrate all air monitoring equipment to be used during the hot soil sample collection. Review relevant equipment manuals for safe calibration procedure and perform in a clean, well-ventilated area.

4. Turn off Relevant ET-DSP™ Equipment and Place Under LOTO

First, review Emergency Shutdown Device (ESD) locations specific to the locations in which sampling activities will take place. Consult with an Mc^2 representative to determine if it is necessary to activate the ESD prior to entering the wellfield.



Figure 1: ESD Button

Next, determine if the ET-DSP™ System is on or off. View the ET-DSP™ beacon lights located above the Power Delivery Systems (PDS):

i. ON = Beacon lights will be flashing **ORANGE**. The ET-DSP™ electrodes have the potential to be energized. Note that the beacon lights may flash whether or not the electrodes are energized.
ii. OFF = **ORANGE** beacon lights are off. The ET-DSP™ electrodes are de-energized. Note that power is still being supplied to the PDS units – PDS units are energized.



Figure 2: Orange PDS Beacon

Activate the ESD button if the McMillan-McGee representative has suggested doing so. If the ESD is activated, the orange beacon lights above the associated PDS units will turn OFF. Have the ET-DSP™ operator place the secondary of the PDS units upstream of the electrodes in the treatment area under Lock-Out-Tag-Out (LOTO). Next, put on the appropriate PPE for step and touch potential testing. Have the ET-DSP™ operator perform step and touch potential tests on wells and piping within vicinity of soil

sampling locations prior to allowing personnel into the well field perimeter. If potentials are higher than 15 V in the vicinity of soil sampling locations, notify a McMillan-McGee representative and wait for guidance.

5. Mobilize Direct Push Drill Rig to Sampling Location

When mobilizing the direct push drill rig to the sampling location, several general operational hazards must be addressed. To ensure the safety and efficiency of the operation, the following steps should be taken:

- **Review Drilling Contractor's Associated JSAs:** Prior to mobilization, review the Drilling Contractor's JSAs to identify potential risks and ensure appropriate mitigations are in place.
- **Wear Appropriate PPE for Rig Mobilization:** Ensure that all personnel wear the necessary personal protective equipment (PPE) for rig mobilization activities.
- **Awareness of Rig Operations and Movements:** Remain vigilant of the rig's operations and movements throughout all phases of sampling activities. Plan the path the rig will take to the sampling location before setting up. If the rig needs to be craned into the well field, develop a lift plan to ensure safe handling.
- **Visual Safety Inspection:** Perform a visual check for potential safety concerns in the vicinity, including the presence of high voltage lines, uneven terrain, above-ground and underground utilities, and egress limitations related to rig placement. Specific safety measures include:
    - **Use of H-20 Rated Wire Bumper or Ramps:** Use H-20 rated wire bumpers or ramps when the rig must drive over electrical cables or hoses to prevent damage and ensure safety.
    - **Spotter for Egress/Digress:** A spotter must be utilized whenever the rig is moving in or out of the well field to ensure safe operation.
- **Assessment of Vapor Cap Compressive Strength:** Assess the compressive strength of the vapor cap before mobilizing the rig. If necessary, use rig mats or plywood sheets to distribute the weight of the rig and prevent damage.
- **Pre-Sampling Communication:** Communicate all project requirements to the operator and support staff prior to the commencement of sampling activities.
- **Positioning of the Rig:** Position the rig downwind of the sampling location whenever possible, ensuring that the crew and samplers can be positioned upwind to avoid exposure to airborne hazards.
- **Utility Location:** Ensure that all utilities are identified and located before drilling activities begin. Hand auger or use an air knife to clear the first 5 feet of the boring location to identify potential buried utilities.
- **Suspected Heat or Chemical Exposure:** If there is a risk of heat or chemical exposure, ensure that appropriate PPE is donned as per the safety guidelines outlined in 6. Assess Heat and Chemical Exposure Hazards .
- **Review Project-Specific Clearance Conditions**: Review any additional subsurface clearance conditions specific to the project before proceeding with mobilization.
- **Teck Cable Safety Protocols:**
    - All Teck cables (black, armored cables) are energized. Ensure that all equipment remains at least 10 feet away from Teck cables at all times.

- If maintaining a 10-foot clearance is not feasible due to equipment maneuvering, consult with a McMillan-McGee representative to coordinate de-energizing the Teck cables at the Power Distribution Panel (PDP) and place them under Lockout/Tagout (LOTO).



Figure 3: PDP Unit

- Ensure that all equipment is kept a minimum of 10 feet away from other overhead or subsurface electrical lines, based on their voltage.

6. Assess Heat and Chemical Exposure Hazards

To mitigate the risks associated with exposure to hot surfaces, hot vapors, and potential contaminants during sampling activities, the following safety measures should be implemented:

- **Walkdown of Sampling Locations:** Perform a thorough walkdown of the vicinity around the sampling locations to ensure there is no evidence of steam or hot vapor emissions. This will help identify any potential hazards before proceeding with work.
- **Breathing Space Monitoring:** Continuously monitor and document the breathing space to ensure safe air quality for the crew and workers in the area.
- **Thermal and Splash PPE Requirements:** When working in the vicinity of the drill rig or any equipment that may be exposed to high temperatures, always don appropriate thermal PPE, including; Long sleeve shirt and pants, rubber thermally-insulating gloves, and splash PPE, such as a face shield and raincoat. Ensure that no skin is exposed after donning thermal PPE. Use a temperature gun to verify surface temperatures before removing thermal PPE. Treat all pipes, hoses, and downhole equipment as hot, even if their temperature cannot be immediately verified.
- **Surface Temperature Awareness:** Be aware that surface temperatures above 50°C/122°F will cause burns to exposed skin. Avoid direct contact with any surfaces that may exceed this temperature.
- **Contaminant Exposure PPE:** If there is a suspected risk of exposure to contaminants, consult with the health and safety officer to determine the need for additional PPE. Contaminant PPE, such as a Saranex suit and nitrile gloves, should be worn to protect against harmful substances.

7. Collect and Process Direct Push Soil Sample(s)

Soil Collection

Review the Drilling Contractor's associated JSAs before beginning the sampling process. Advance the push sampler to the required depth and collect samples using PTFE, stainless steel, or brass sleeves inside the core barrel to ensure compatibility with temperature conditions. Withdraw the core barrel slowly (e.g., 2 ft/min) to allow subsurface pressures to equilibrate. Depressurization can lower the boiling point of groundwater and produce hot vapors. Splash PPE (face shield, raincoat) may be removed once invasive activities are complete and all equipment has been removed from downhole.

Hot Soil Handling/Cooling

Use a temperature gun to ensure the core barrel does not exceed 50°C/122°F. Disassemble the core barrel carefully, ensuring that rubber thermally-insulating gloves are worn over nitrile gloves. Remove the sample sleeves as the core barrel is disassembled. Cap the sample sleeves immediately at both ends following collection. PTFE tape may be used to improve the seal if necessary.



Figure 4: PTFE Sleeve Capped and Taped Shut

Place the sealed sample into an ice bath, allowing the water from the melting ice to drain, ensuring that the sleeves are not submerged. Cool the sample sleeves until the soil nears ambient temperature (approximately 20°C/70°F). Use a standard thermometer inserted through the end cap to monitor soil temperature.



Figure 5: Sample Temperature Prior to Ice Bath



Figure 6: Sample Temperature After Ice Bath

Sample Processing/Cutting Hazard

Once the sample has reached near-ambient temperature, it can be processed using standard sampling and labeling methods. PTFE sample sleeves may be placed in a vise, cut lengthwise, and sampled in the field. Exercise caution when using blades to perform cuts, ensuring blades are decontaminated between uses. Soil can be extruded from stainless steel or brass sample sleeves in the field, or sent to the laboratory for analysis.

Exposure to Contaminants

Testing soil samples can increase risk of chemical exposure. This includes exposure to soil preservatives. To mitigate these risks, always work in a ventilated area upwind of the samples. Perform air monitoring in the breathing zone to ensure safe air quality. Wear chemical-resistant PPE or implement engineering controls as appropriate to mitigate exposure in accordance with the health and safety plan.

Review the site health and safety plan to mitigate the risk of exposure to infectious water-borne diseases.

Electrocution

When processing the soil samples, review the site health and safety plan for electrical safety measures. Use a Ground Fault Circuit Interrupter (GFCI) device to protect relevant AC circuits. Ensure all equipment is correctly grounded. Avoid standing in wet areas while operating electrical equipment, and ensure cords do not come into contact with water.

8. Decontaminate Downhole and Sampling Equipment

Decontaminate all downhole and sampling equipment according to the health and safety plan and/or Drilling Contractor's JSAs. Decontamination should occur prior to each use, between sampling locations, and after all sampling locations have been completed.

If not specified in the health and safety plan, decontamination should consist of:

- Removal of contamination from all sampling equipment using steam cleaning or other appropriate methods.

- Cleaning with brushes using a biodegradable soap and water mixture.
- Rinsing with distilled water to ensure equipment is free of contaminants.

9. Abandon Direct Push Sampling Location

Before abandoning the direct push sampling location, review the Drilling Contractor's associated JSAs. Review applicable Material Safety Data Sheets (MSDSs) for abandonment materials as per the health and safety plan to prevent inhalation hazards.

Next, grout must be poured or pumped slowly into the sampling location to avoid displacement of steam and chemicals during installation.

10. Demobilize Direct Push Drill Rig from Sampling Location

Review the Drilling Contractor's associated JSAs before demobilizing the drill rig and wear the appropriate PPE for rig demobilization. Be aware of the rig's operation and movements throughout all phases of sampling activities. Plan the path that the rig will travel prior to demobilization. If the rig needs to be lifted out of the well field via crane, develop a lift plan. A spotter must be used when moving the rig to ensure safe operation. Perform a visual check for any safety concerns, including high voltage lines, uneven terrain, aboveground and underground utilities, and egress limitations related to rig placement.

11. Start up the ET-DSP™ System

Once all equipment has been removed from and all personnel have exited the electrode well field perimeter, the ET-DSP™ system can begin startup.

The ET-DSP™ operator must remove components from Lockout/Tagout (LOTO), deactivate the Emergency Shutoff Device (ESD), energize the PDS units, and follow the startup procedures as outlined in McMillan-McGee's associated JSAs.

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Contents

Introduction 1
Purpose 1
Scope 1
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Equipment List 1
Safety Equipment 1
Job Supplies 1
Safety Considerations 2
Hot Groundwater Procedure 2
1. Pre-Work Preparation 2
2. Perform Electrode Shutdown 3
3. Prepare the Sampling Apparatus 3
4. Purge the Well 4
5. Fill the Sample Vessels 4
6. Re-Energize Electrodes 5

Introduction

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Purpose

The purpose of this document is to provide a hot groundwater sampling procedure for the safe collection of groundwater samples within the treatment volume. This procedure specifically addresses sampling of groundwater that has been heated as a result of the ET-DSP™ treatment process.

Scope

This procedure serves as a guideline for the collection of hot groundwater samples following the application of the ET-DSP™ process. Only authorized personnel trained in the procedures outlined in the project's health and safety plan (HASP) are permitted to perform LOTO on ET-DSP™ equipment and execute electrode shutdown procedures. Personnel are required to follow this procedure in alignment with site-specific health and safety requirements, including air monitoring, PPE usage, and well purging protocols, as well as all applicable regulations and laws.

Equipment List

Safety Equipment

1) Hard Hat
2) Face shield for splash protection when there is a risk of exposure to hot fluids
3) Chemically resistant splash hood that covers head and neck around face shield
4) Electrical hazard rated steel toed boots
5) Long sleeve shirt and pants – or coveralls
6) Chemically resistant splash suit that covers all skin
7) Safety goggles with side shields
8) Electrical insulated gloves
9) Outer neoprene rubber gloves with chemical and temperature resistance
10) Nitrile gloves under other gloves when there is risk of chemical exposure
11) High visibility safety vest

Job Supplies

1) Mobile phone
2) Volt meter (stray voltage eliminator should be used on digital meters)
3) Temperature gun
4) Stop watch

5) Peristaltic or bladder pump (Based on depth of water table and sampling intake; with PTFE and/or silicone tubing)
6) Calibrated photoionization detector (PID)
7) Coiled tube assembly (Stainless steel coiled tube, 10’ length x 1/4” diameter)
8) Ice bath to accommodate submerged coiled tube assembly
9) Sampling vials or containers
10) Purge water receptacle (5 gallon buckets, drums, etc…)

Safety Considerations

Hot groundwater sampling presents several potential hazards. Proper precautions must be taken to ensure the safety of all personnel involved in the sampling process. The following are key risks that must be addressed before and during sampling activities:

- Lightning: This poses an electrocution risk. No one is permitted in the well field during lightning and until 30 minutes after the last recorded strike.
- Hot Fluids and Surfaces: This presents a risk of burns. Equipment is only to be handled when temperatures are equal to or less than 50°C/122°F, or with appropriate PPE up to temperatures of 120°C/248°F.
- Energized Wellfield: This poses an electrocution risk. Prior to performing the task, all electrodes near the work area must be shut off and step and touch potential testing must be performed. Use electrically isolated tools.
- Contamination: A contaminated site represents a chemical exposure risk. All employees must review site-specific health and safety plan and consult with onsite health and safety representative to determine air monitoring protocols, MSDS, PPE requirements, and engineering controls to mitigate risk of exposure.
- Pressure: Equipment may be under pressure. Use only approved valves, fittings, regulators, etc. Ensure safety relief devices are functional prior to operation.
- Steam Geysers: If groundwater temperatures are close to boiling point, the reduction of hydrostatic pressure within the well during sampling can cause the boiling point of groundwater to decrease. If this decrease in boiling point causes additional groundwater to boil off within the well, the hydrostatic pressure will decrease further, potentially running away into the generation of a steam geyser. Prior to sampling, subsurface temperatures must be evaluated, and a shutdown period may be required. During sampling, appropriate thermal and splash protection PPE must be donned, and cold water should be kept on hand to quench the well if necessary.

Hot Groundwater Procedure

The following procedure outlines the necessary steps for safely and effectively collecting hot groundwater samples at the Site.

1. Pre-Work Preparation

Before conducting hot groundwater sampling, personnel must complete pre-work preparation to ensure compliance with safety protocols and site-specific requirements. The following steps must be completed prior to initiating work:

Review Site Documentation

Review all relevant documentation before beginning the process. This includes JSAs, waster management procedures, as well as health and safety plans.

Hazard Mitigation

Inspect and familiarize yourself with the work area to identify potential hazards. Remove or clearly mark any potential tripping or slipping hazards, such as cables, wires, pipes, or hoses. Use caution when stepping over or around obstacles to prevent slips, trips, and falls.

In cold weather, wear additional layers of warm, loose clothing, along with a hat and scarf to cover the face, ears, and neck. Cold-prevention liners should be worn under standard nitrile, work, or insulating gloves. In hot weather, ensure adequate hydration, schedule work/rest cycles, and apply sunscreen to prevent sunburn.

Equipment and PPE Inspection

Gather and inspect all necessary tools prior to beginning work to ensure they are in good condition. Inspect all personal protective equipment (PPE) to confirm it is intact and suitable for use in high-temperature environments.

2. Perform Electrode Shutdown

All electrodes within 30 feet of the sampling location must be shut down prior to taking the sample. Prior to initiating the shutdown, McMillan-McGee Corp. must be consulted to determine the required duration based on the most recent subsurface temperature data. If temperatures exceed 80°C (176°F), a minimum shutdown period of 12 hours is typically necessary before sampling can proceed. In cases where subsurface temperatures approach 100°C (212°F), there is a potential risk for steam geyser formation, requiring further consultation with McMillan-McGee Corp. to assess potential dangers and implement necessary precautions.

Electrical hazards must also be addressed as part of the electrode shutdown process. A McMillan-McGee representative must be contacted to turn off all electrodes within the designated 30-foot radius of the well where work is planned. Step and touch potential testing must then be performed on all equipment and piping within the work area to ensure safe conditions. If any measured potential exceeds 15 volts, additional electrodes in the vicinity may need to be shut down before work can proceed, and McMillan-McGee personnel must be notified. To maintain safety throughout the sampling event, the breakers controlling the de-energized electrodes must be placed under Lockout-Tagout (LOTO) until all sampling activities are complete.

3. Prepare the Sampling Apparatus

Before initiating groundwater sampling, the sampling apparatus must be properly prepared, including the coiled tube ice bath assembly if groundwater temperatures exceed 40°C (104°F). Special care should be taken when handling fittings and coiling the stainless-steel tube to avoid pinch points, as improper handling can result in injury. All components should be securely fastened to ensure a stable and efficient sampling setup.

Electrical hazards must also be considered when preparing the apparatus. All electrical cables should be thoroughly inspected for damage before use to prevent potential malfunctions or safety risks. Additionally, any electrical outlets utilized during the setup must be equipped with a Ground Fault Circuit Interrupter (GFCI) to reduce the risk of electric shock.

4. Purge the Well

Purge the well in accordance with the field sampling plan, ensuring that all discharged groundwater is collected in an appropriate receptacle for disposal following site procedures. Given the potential for high subsurface temperatures, well components may be extremely hot. Prior to handling, personnel must review the latest available sensor data and verify surface temperatures using a temperature gun. If temperatures exceed 50°C (122°F), thermal-resistant gloves must be worn to prevent burns.

To mitigate the risk of leaks or unintended releases, sorbent pads should be placed beneath the sampling location and apparatus. Any detected leaks must be immediately contained, cleaned up, and documented in accordance with site protocols. Hot groundwater sampling may be performed at various locations, including extraction wells with PTFE tubing inserted through sample ports, slurper tubes disconnected from compressed air supplies, or monitoring wells where downhole PTFE tubing is deployed. Specific sampling configurations should be confirmed by project personnel.

Exposure to contaminants, fumes, or inhalation hazards must also be managed. Air monitoring should be conducted both within the breathing zone and near the sampling port. Personnel should position themselves upwind of the well during sampling activities to minimize inhalation exposure.

Due to the potential for pressurized hot liquids and vapors, appropriate PPE must be worn, including coveralls or long-sleeve clothing, safety goggles, a face shield affixed to a hard hat, splash protection gear, steel-toed rubber boots, nitrile gloves, and thermal-resistant neoprene gloves. If subsurface temperatures approach 100°C (212°F), there is a risk of steam geysers forming, requiring consultation with McMillan-McGee Corp. before proceeding.

For extraction wells, the liquid extraction ball valve at the lateral manifold should be closed prior to sampling. Depending on the method used, a PTFE tube may be inserted through the sample port, or an air assist line may be disconnected from the compressed air supply. For monitoring wells, personnel should open the well's top plate and remove the cap while standing to the side, avoiding direct exposure. The well should be left open for 15 minutes before any sampling equipment is introduced.

During the low-flow purge process, groundwater should be extracted at a rate of less than 500 mL/min while closely monitoring for signs of steam production, such as bubbling or visible vapors. Personnel must remain clear of any potential steam discharge areas and be prepared to halt purging immediately if a steam geyser is suspected. If this occurs, the area should be evacuated, and McMillan-McGee Corp. personnel must be contacted for further guidance. A bucket of cold water should be readily available to quench the system if needed. The purging process should continue until the minimum volume criteria specified in the site’s field sampling plan is met.

5. Fill the Sample Vessels

To collect groundwater samples, fill the designated sampling vials or containers from the discharge tube on the outlet of the peristaltic or bladder pump. Sampling should continue until an adequate volume has

been obtained for laboratory analysis. Each sample container must be labeled accordingly and placed into an empty cooler on ice to ensure temperature control. The temperature of the collected samples should not exceed 40°C (104°F) due to the cooling effect of the ice bath.

Once sampling is complete, power down the pump and remove the assembly from the well. For extraction wells, reinstall the ¾" sample port plug on the well head or reconnect the ¼" PTFE air assist line before reopening the liquid extraction ball valve that was previously closed. For monitoring wells, reinstall the well cap and top plate securely. All collected samples should be stored in foam sample holders inside an empty cooler, and any observed headspace in the sample containers should be documented in the field logbook.

During sample collection, personnel must take precautions to minimize exposure to contaminants, particularly through dermal contact or liquid exposure. Nitrile gloves and other chemical-resistant PPE must be worn at all times. Extra care should be taken when filling VOA vials to ensure a proper meniscus is formed and to avoid trapping air bubbles. After sampling, the assembly should be cleaned and decontaminated using approved site procedures before collecting additional samples. When feasible, samples should be collected from the lowest concentration locations first, progressing to higher concentration locations last.

All purge water, sorbent pads, and other sampling-related waste must be properly contained and disposed of in accordance with site-specific waste management protocols.

6. Re-Energize Electrodes

Once the sampling is complete, all personnel and equipment must be cleared from the vicinity of the well field to ensure a safe re-energization process. The lockout-tagout (LOTO) devices should be removed from the breakers controlling the electrodes that were de-energized prior to sampling. After confirming that the area is clear and all safety precautions have been met, the electrodes can be restarted in accordance with site procedures.

Appendix G

Waste Management Plan for ISTR Preparation Activities

GTE Operations Support Incorporated

Waste Management Plan for ISTR Preparation Activities

Former Philips Display Components Facility
Seneca Falls, New York
USEPA ID No. NYD002246015
NYSDEC Site No. 850003 – G.T.E. Products Corporation

October 2, 2025

Waste Management Plan for ISTR Preparation Activities

Former Philips Display Components Facility
Seneca Falls, New York
USEPA ID No. NYD002246015
NYSDEC Site No. 850003 – G.T.E. Products Corporation

October 2, 2025

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Contents

1 Introduction 1
2 Health and Safety 2
3 Planned Site Activities 3
3.1 Utility Relocation and Abandonment 3
3.1.1 Site Preparation and Controls 3
3.1.2 Scope of Work 4
3.1.2.1 Water Main Relocation 4
3.1.2.2 Stormwater System Modifications 4
3.1.2.3 Other Pipe Filling/Plugging Activities 5
3.1.3 Excavation and Backfill 6
3.2 SSD Extraction Point Installation 7
3.3 Electrical Service Installation 7
4 Waste Management 8
4.1 Soil 8
4.2 Water 8
4.3 Concrete and Asphalt Debris 9
5 Schedule and Reporting 10

Attachments

Attachment 1 Utility Relocation and Abandonment Figures
Attachment 2 Soil Management Flow Chart

1 Introduction

Arcadis of New York, Inc. (Arcadis) has prepared this revised Waste Management Plan for ISTR Preparation Activities (WMP) on behalf of GTE Operations Support Incorporated (GTEOSI) for submission to the New York State Department of Environmental Conservation (NYSDEC) regarding the Former Philips Display Components Facility (NYSDEC Site No. 850003) located at 50 Johnston Street, Seneca Falls, New York ("the site"). On December 10, 2024, NYSDEC issued comments to GTEOSI regarding the previous version of the WMP for the site that GTEOSI submitted to NYSDEC and the New York State Department of Health (NYSDOH) on October 31, 2024. The WMP has been revised as described in Arcadis' response-to-comments letter, dated October 1, 2025, which is being submitted concurrently with this WMP.

As indicated in the revised *100% Remedial Design Report* (100% RDR) that was prepared by Arcadis and submitted by GTEOSI to NYSDEC on October 2, 2025, utilities that may interfere with or be damaged during in situ thermal remediation (ISTR) will be abandoned or relocated before ISTR operations begin. This WMP provides additional details regarding the utility relocation/abandonment work to be performed and the plan for managing the associated soil, water, and asphalt debris to be generated. This WMP also describes the following additional site preparation activities that will be conducted before ISTR operations begin, and the plan for managing the associated wastes:

- Sub-slab depressurization (SSD) extraction point installation; and
- Electrical service installation (trenching and pole installation).

This WMP is intended to supplement the waste management plan details included in Section 6 the 100% RDR.

A qualified environmental professional as defined in 6 NYCRR Part 375, a Professional Engineer who is licensed and registered in New York State, or his/her qualified representative, will oversee (i.e., be on-site for) all earthwork performed on-site in relation to the work described herein, including excavation, excavated material handling, and loadout of excavated materials.

2 Health and Safety

Activities performed by Arcadis staff (e.g., construction oversight) will be in accordance with the latest version of the Site-Specific Health and Safety Plan (SSHASP) provided in Appendix D of the 100% RDR. On behalf of GTEOSI, Arcadis will subcontract implementation of the utility relocation and abandonment activities to experienced and qualified contractors. Activities performed by contractor employees will be covered by the respective contractors' site-specific health and safety plans. Work involving the handling of environmental media (e.g., soil, groundwater) and excavation will be conducted by Occupational Safety and Health Administration (OSHA) Hazardous Waste Operations and Emergency Response (HAZWOPER)-trained employees and in compliance with 29 CFR 1910.120 and 29 CFR 1926 Subpart P.

Contractors performing excavation or handling environmental media will prepare a site-specific health and safety plan that includes the following:

- Job safety and health risk or hazard analysis for each task to be performed;
- Copies of OSHA 40-hour, 24-hour supervised field activities, 8-hour supervisors, and 8-hour refresher training certifications for all employees performing work at the site;
- Medical clearance certificates for all employees performing work at the site;
- Frequency and types of air monitoring to be performed;
- Site control measures to be implemented for the protection of workers during excavation activities;
- Site control measures to prevent trespassing or the entry of unqualified or unprotected workers to restricted areas; and
- Plan for safe and effective responses to emergencies, including necessary personal protective equipment and other equipment.

3 Planned Site Activities

This section describes the construction activities planned for utility relocation and abandonment, SSD extraction point installation, and electrical service installation.

3.1 Utility Relocation and Abandonment

Details regarding the relocation and abandonment of underground utilities within the ISTR areas are presented below.

3.1.1 Site Preparation and Controls

The following site preparation and controls will be implemented for utility relocation and abandonment:

- Utility location services will be performed by a private contractor and UDig NY will be contacted prior to subsurface intrusive activities.
- Erosion and sedimentation controls will be installed in accordance with the Stormwater Pollution Prevention Plan provided in Appendix B of the 100% RDR.
- Active work areas will be delineated using orange construction fencing (or similar). When work is being conducted in the site perimeter road, temporary chain-link fencing and signage will be used to reroute traffic as necessary. Temporary chain-link fencing and signage will also be installed around open excavations to prevent persons from entering excavation areas during non-working hours.
- Community air monitoring will be conducted in accordance with the Community Air Monitoring Plan (CAMP) provided in Appendix E the 100% RDR. Special CAMP requirements for work within 20 feet of potentially exposed individuals or occupied structures, as specified in the CAMP, will be adhered to during utility relocation and abandonment activities.
- Excavated soils that may be reused as backfill will be temporarily staged near the excavation area(s) as described in Section 3.1.3. For soils that will not be reused as backfill, a temporary containment area (i.e., soil stockpile area) will be constructed to allow for management for off-Site disposal as described in Section 4.1. The temporary containment area will be constructed consistent with the design detail provided on Drawing 15 in Appendix H of the 100% RDR. The planned location of the temporary containment area to be constructed is shown on Figure 11 (Attachment 1). Vehicles transferring soils from the excavation area(s) to the temporary containment area will be inspected and cleaned as necessary to prevent tracking of impacted materials within the Site.
- Decontamination pads will be constructed in Area of Concern (AOC) 1, AOC 3, and next to the temporary containment area to prevent off-Site tracking of impacted materials by construction vehicles, equipment, or personnel. The decontamination pads will be constructed consistent with the design detail provided on Drawing 15 in Appendix H of the 100% RDR. The planned locations of the decontamination pads to be constructed are shown on Figure 11 (Attachment 1).
- One frac tank will be staged on asphalt in the vicinity of each work area in AOC 1 and AOC 3 (Figure 11) while conducting excavation dewatering and decontamination activities.

3.1.2 Scope of Work

Figures illustrating the utility relocation and abandonment scope are provided as Attachment 1. Planned work activities are described below.

3.1.2.1 Water Main Relocation

A private below-grade water main for the site runs through the ISTR thermal influence zones in both AOC 1 and AOC 3 (Attachment 1, Figures 2 and 3). The water main is present at a depth of approximately 7 to 8 feet below ground surface (bgs), consists of an 8-inch diameter cast iron pipe, and will be modified as follows:

- The segments of the below-grade water main that span the thermal influence zones will be temporarily relocated above grade. Excavations will be advanced at prospective tie-in locations outside both sides of the thermal influence zones (Attachment 1, Figures 4 and 5). The tie-in locations will be at least 25 feet outside the thermal influence zones to protect the remaining below-grade water line from damage during ISTR operations. At each tie-in location, new piping will be installed to bring the water main above grade and inside the facility building. New piping will be installed inside the facility building to complete the water main relocation for AOCs 1 and 3.
- On both sides of the thermal influence zone in AOC 1, pipe segments approximately 3 feet long will be removed to isolate the section of below-grade water main that will be deactivated during ISTR operations (i.e., the section between the tie-in locations). The pipe segments will be removed at least 10 feet outside the thermal influence zone (Attachment 1, Figure 8) to reduce the potential for uneven subsurface heating around the existing cast iron water main.
- In AOC 3, a segment of below-grade water main approximately 135 feet long will be removed from the area between approximately 15 feet west of the thermal influence zone and the western side of the Pole Barn (Attachment 1, Figure 9). As with the water main segment removals planned in AOC 1, the purpose of removing this segment of line is to promote more uniform subsurface heating during ISTR operations. However, because the water main in AOC 3 would be in close proximity to several electrode wells (less than 5 feet), the entire water main will be removed from the thermal influence zone in AOC 3, as opposed to the short segments being removed in AOC 1.
- Portions of the relocated water main that are above the frost line (4 feet bgs), including interior piping in AOC 1 (the buildings adjacent to AOC 1 are partially heated), will be equipped with heat trace and insulation to prevent freezing.

The water main relocation described above is anticipated to be temporary (i.e., only during ISTR operations). Permanent below grade reinstallation of the water main will be performed after ISTR operations are completed.

3.1.2.2 Stormwater System Modifications

Below-grade stormwater system components are present within the thermal influence zones in AOCs 1 and 3. Modifications associated with the stormwater system are described below. “Cement-based material” to be used for filling and sealing underground structures in connection with this work is defined as a composite material consisting of some combination of cement, aggregate, sand, water, and/or admixtures to provide a quick-setting material with properties of adhesiveness, binding, compressive strength, and workability suitable for the intended application such as grout, expanding cement, concrete, and flowable fill.

- One catch basin (identified as CB-1A) present in the AOC 1 thermal influence zone (and within the ISTR vapor cap extent) will be abandoned in-place by filling with sand and capping with concrete at the surface (Attachment 1, Figure 8). The below-grade inlet pipes to catch basin CB-1A will be filled with a cement-based material and rerouted as described in the third and fourth bullets below. A Request to Import/Reuse Fill or Soil form will be submitted to NYSDEC for approval of the imported fill sand.
- Two new catch basins will be installed in AOC 1 (identified as CB-1B and CB-2B) (Attachment 1, Figure 6). The new catch basins, which will be located west and east, respectively, the planned ISTR vapor cap, will serve as stormwater runoff collection points both during ISTR (i.e., while the vapor cap is present) and after ISTR is completed. Below-grade stormwater piping will be installed to connect each catch basin to one of two existing nearby stormwater system manholes (identified as MH-1 and MH-2 on Attachment 1, Figure 6).
- Roof drain piping that currently runs below grade from the eastern end of Building 2 southward through the AOC 1 thermal influence zone and into catch basin CB-1A will be filled with a cement-based material between Building 2 and catch basin CB-1A (Attachment 1, Figure 8). New piping will be installed inside Buildings 2 and 3 to reroute the roof drain piping currently discharging to catch basin CB-1A to a portion of the existing Building 3 overhead roof drain piping network that discharges to stormwater system manhole MH-3, which lies outside of the thermal influence zone (Attachment 1, Figure 6).
- The segment of roof drain pipe that runs below grade between new catch basin CB-1B and existing catch basin CB-1A will be filled with a cement-based material because catch basin CB-1A will be abandoned (Attachment 1, Figure 8).
- Two roof drain pipes that currently run below grade from the southern end of Buildings 11/11A through the AOC 3 thermal influence zone and into existing stormwater system manhole MH-7 will be filled with a cement-based material between the southern end of Buildings 11/11A and about 10 feet outside the thermal influence zone (Attachment 1, Figure 9). New piping will be installed inside Building 11 and below grade outside Building 11 to reroute roof drainage to manhole MH-7 following an alignment that is west of the AOC 3 thermal influence zone (Attachment 1, Figure 7).

To verify that roof drain pipe segments have been filled, both ends of the targeted pipe segment will be visually inspected.

3.1.2.3 Other Pipe Filling/Plugging Activities

Other below-grade piping may be present within the thermal influence zones in AOCs 1 and 3. Modifications associated with that piping are described below.

- In AOC 1, up to four exploratory excavations (Attachment 1, Figure 8) will be advanced to locate inactive below-grade process waste pipes that could serve as hindrances to ISTR performance. These locations have been selected based on their relative proximity to the ISTR thermal influence zone and the potential that, if the pipes are intact and open, they could hinder ISTR performance and create a vapor migration pathway. If located, the pipes will be filled to the extent practicable with a cement-based material.
- In AOC 3, an approximately 55-foot-long segment of inactive below-grade process waste pipe (24-inch diameter) that spans the eastern side of the thermal influence zone (Attachment 1, Figure 9) will be filled with a cement-based material.
- In AOC 3, multiple inactive electrical conduits that run below-grade between Buildings 11/11A and the Pole Barn (Attachment 1, Figure 9) will be filled with a cement-based material from ground surface to at least 1 foot below grade.

3.1.3 Excavation and Backfill

The excavation contractor will prepare an excavation plan that includes the following information:

- Procedures and equipment for excavation, dewatering, backfilling, and compaction;
- Excavation protection methods to be used (e.g., sloping, benching, shoring/shielding);
- The contractor's competent person responsible for excavation and fill work; and
- Plans for locating utilities, coordinating utility shutoffs, providing temporary services as needed, and filling/plugging utility structures that are being abandoned.

As described Section 6.1.1.1 of the 100% RDR, soils removed during ISTR-related subsurface utility relocating and abandoning activities will be temporarily stockpiled for subsequent reuse as backfill to the extent practicable following the United States Environmental Protection Agency (USEPA) Area of Contamination Policy as described in USEPA's guidance document titled *Management of Remediation Waste Under RCRA*[1]. As a point of clarification, it is noted that both unsaturated soils and saturated soils (after being dried as necessary) will be reusable as backfill at any depth, provided that such soils are not grossly contaminated, as defined in Part 375 and DER-10.

Backfilling of excavations will be conducted as follows:

- Between the bottom of the excavation and the groundwater table (around 4 feet bgs), excavations will be backfilled in 6-inch lifts with either previously excavated soils (from the same Area of Contamination) or with imported crushed stone (American Association of State Highway and Transportation Officials #57 or Arcadis-approved equivalent). Crushed stone will be used as pipe bedding in excavations where a new pipe is being installed (Attachment 1, Figure 10).
- Between the groundwater table and about 18 inches bgs, excavations will be backfilled in 6-inch lifts with unsaturated excavated soils that were excavated from the same Area of Contamination.
- Between about 18 inches bgs and ground surface, excavations will be backfilled in 6-inch lifts with crusher run (New York State Department of Transportation 304.12 Type 2 subbase course gradation or Arcadis-approved equivalent). Where the existing ground surface is grass, the top 18 inches of backfill will consist of 15 inches of unsaturated excavated soils and 3 inches of topsoil.

Backfill restoration details are shown on Figure 10 (Attachment 1).

A Request to Import/Reuse Fill or Soil form and required supporting documentation (e.g., sieve analysis, laboratory analytical) will be submitted to the NYSDEC project manager for all bulk soil and stone materials to be imported to the site. Required laboratory analyses are listed in Section 5.7 of the 100% RDR. Approval will be received from the NYSDEC project manager prior to bulk stone and soil being delivered to the site. For commercially-available material to be imported to the site in bags (e.g., topsoil), a Request to Import/Reuse Fill or Soil form will not be submitted but receipts documenting the purchase of such material will be provided in the Final Engineering Report.

[1] USEPA. 1998. *Management of Remediation Waste Under RCRA*. October 1998.

3.2 SSD Extraction Point Installation

As described in Section 4.1.13.1 of the 100% RDR, SSD will be implemented inside the facility building adjacent to the AOC 1 thermal influence zone (Figure 6 of the 100% RDR) and, if needed based on an assessment of the current sub-slab vacuum influence area, inside the facility building adjacent to the AOC 3 thermal influence zone (Figure 7 of the 100% RDR). Implementation of SSD will involve installation of SSD extraction points through the existing building slab. Each SSD extraction point will be installed by core-drilling a hole through the existing building slab and removing sub-slab material to create a 2-foot-diameter by 1-foot-deep extraction sump, as depicted on Figure 8 of the 100% RDR. The plan for managing concrete and sub-slab material generated during SSD extraction point installations is described later in this WMP.

3.3 Electrical Service Installation

A new power drop from New York State Electric and Gas (NYSEG) will be obtained to provide electrical service for ISTR operations. The new power drop will be provided east of NYSEG's electrical substation located south of AOC 1. The new power drop will also provide electrical service to the site's existing centralized SSD systems located in Buildings 7 and 9B. To bring the new electrical service into the site, the installation of electrical poles and below-grade conduit will be necessary. Below-grade conduit will be installed in a narrow trench approximately 150 feet long and 2 feet deep and electrical poles will be installed to a depth of approximately 8 feet below ground surface (locations shown on Figure 10 of the 100% RDR). Consistent with utility relocation/abandonment soils, the soils removed during trenching for the below-grade electrical conduit and power pole installations will be reused as backfill consistent with USEPA's Area of Contamination Policy.

4 Waste Management

4.1 Soil

Soils handled during the site preparation activities for ISTR described herein will be either:

- reused as backfill following USEPA's Area of Contamination Policy;
- reused on-site above the water table if soil concentrations are less than NYSDEC's Protection of Groundwater Soil Cleanup Objectives and NYSDEC approval has been received;
- managed as non-hazardous waste, contingent upon receiving a contained-in determination approval from NYSDEC, in accordance with NYSDEC's Contained-In Policy outlined in *Technical Administrative Guidance Memorandum 3028*[2] and transported for off-site disposal at a permitted non-hazardous waste disposal facility; or
- managed as hazardous waste (F-listed with characteristic waste codes applied as applicable) and transported for off-site disposal at a permitted hazardous waste disposal facility.

A flow chart depicting the decision-making process to be used to manage soils generated during site preparation and ISTR installation activities is provided as Attachment 2. As indicated in the flow chart, soil from a designated Area of Contamination will be reused as backfill only within the same Area of Contamination from which the soil was excavated, and only if the soil is not grossly contaminated media as defined in 6 NYCRR Part 375 and DER-10 and does not exceed a photoionization detector screening value of 25 parts per million.

Figure 10 of the 100% RDR depicts six distinct areas to be managed following the Area of Contamination Policy (Areas of Contamination 1, 2, 3, 4A, 4B, and 4C). Soils to be reused as backfill within each respective Area of Contamination will be temporarily staged on high-density polyethylene sheeting (minimum thickness of 30-mil) within the Area of Contamination until backfilling commences and will not be moved outside of the Area of Contamination nor placed into containers. Temporarily staged soils, when not being actively managed, will be covered by polyethylene sheeting (minimum thickness of 10-mil) to prevent erosion by wind and precipitation.

Some of the soils included in Areas of Contamination may not be reused as backfill because of insufficient excavation capacity, unsuitable moisture content, or readily evident contamination. Additionally, soils generated during the installation of SSD extraction points will not be reused as backfill. As indicated in the flow chart (Attachment 2), the management of these soils (e.g., off-site disposal as hazardous waste, off-site disposal as non-hazardous waste, or reuse as backfill elsewhere on-site) will be based on analytical data resulting from ex situ soil samples and, as applicable, contained-in approval from NYSDEC. To evaluate the reuse of soil from a designated Area of Contamination as backfill outside the Area of Contamination from which the soil was excavated, soil samples will be collected at a rate of one sample per every 50 cubic yards of soil for laboratory analyses consistent with those described for imported fill/soil in Section 5.7 of the 100% RDR.

4.2 Water

Excavations will be dewatered as needed to complete the utility relocation and abandonment work. Dewatering water will be containerized in storage tank(s) (e.g., frac tank(s)) for subsequent characterization and disposal.

[2] NYSDEC. 1992. *Technical Administrative Guidance Memorandum 3028 "Contained-In Criteria for Environmental Media."* November 30, 1992.

Water will be managed for disposal as described in Section 6.1.1.3 of the 100% RDR. Decontamination liquids generated during the utility relocation and abandonment work will be managed for off-site disposal as hazardous waste (F-listed with characteristic waste code(s) applied as applicable).

4.3 Concrete and Asphalt Debris

Concrete and asphalt debris generated during site preparation activities will be managed as described in Section 6.1.1.2 of the 100% RDR.

5 Schedule and Reporting

Pending NYSDEC approval, the below-grade portion of the water main relocation and stormwater system modification work is anticipated to begin in the second quarter of 2026. The above-grade portion of the water main relocation and stormwater system modification work was completed in January 2025. The new electrical service installation is anticipated to occur in the second quarter of 2026. SSD extraction point installations are anticipated to occur in the first quarter of 2027. Additionally, ISTR installation activities are anticipated to begin in the second or third quarter of 2026. A more detailed remedial activities schedule is included in the 100% RDR.

A brief letter report will be submitted to NYSDEC documenting the types and quantities of wastes disposed of as part of ISTR preparation and installation activities. Details and information associated with the utility relocation and abandonment activities will also be presented in the Final Engineering Report with supporting documentation, including but not limited to photographs, manifests, bills of lading, field screening logs, CAMP logs, trucking information, and volume and locations of material reused as backfill material.

Attachment 1

Utility Relocation and Abandonment Figures

INLINE FAN (TYP. OF 4 FOR BUILDING 1)

INLINE FAN (TYP. OF 1 FOR BUILDING 1A)

INLINE FAN (TYP. OF 1 FOR BUILDING 2)

INLINE FAN

LIMITS OF AOC 1 AREA FIGURES

COURTYARD

BASEMENT

CONCRETE DECKING

CONCRETE DECKING

OLD BUILDING 10 SYSTEM

MH-1

MH-2

MH-3

MH-4

MH-5

MH-6

MH-7

MH-8

MH-9

MH-7A

MH-8A

CRAWL SPACE

(INLINE FAN SAME LOCATION)

BUILDING 7 SYSTEM

BUILDING 9/10/11 SYSTEM

OLD BUILDING 11 SYSTEM

POLE BARN

LIMITS OF AOC 3 AREA FIGURES

NOTE:

1. UNDERGROUND UTILITY LOCATIONS ARE NOT GUARANTEED. LOCATIONS SHOWN ARE GENERALLY BASED ON HISTORICAL FACILITY DRAWINGS, PRIVATE UTILITY LOCATING, AND FIELD RECONNAISSANCE, INCLUDING THE FOLLOWING:
   - INACTIVE PROCESS WASTE LINES ARE BASED ON SYLVANIA ELECTRICAL PRODUCTS, INC. DRAWING FROM 1967.
   - POTENTIAL INACTIVE PROCESS WASTE LINES ARE BASED ON INCONCLUSIVE PRIVATE UTILITY LOCATING FINDINGS AND MAY BE REDUNDANT.

0 60' 120'
GRAPHIC SCALE

LEGEND:

SSDS EXTRACTION POINT	WATER LINE (UG)
VENTILATION SYSTEM	ELECTRIC LINE (UG)
SSDS CONVEYANCE PIPING (AG)	ELECTRIC LINE (OH)
INLINE FAN	GAS LINE (UG)
1A BUILDING ID	STORMWATER/ROOF DRAIN PIPE (UG)
UG UNDERGROUND	POTENTIAL INACTIVE PROCESS WASTE LINES (UG)
OH OVERHEAD	INACTIVE PROCESS WASTE LINES (UG)
AG ABOVE-GRADE	SANITARY LINE (UG)
SSDS SUB-SLAB DEPRESSURIZATION SYSTEM	FORMER WATER LINE (UG)
	APPROXIMATE LIMITS OF AOC 1 AND AOC 3 AREA FIGURES

G.T.E. PRODUCTS CORPORATION, NYSDEC SITE NO. 850003
FORMER PHILIPS DISPLAY COMPONENTS FACILITY
SENECA FALLS, NEW YORK

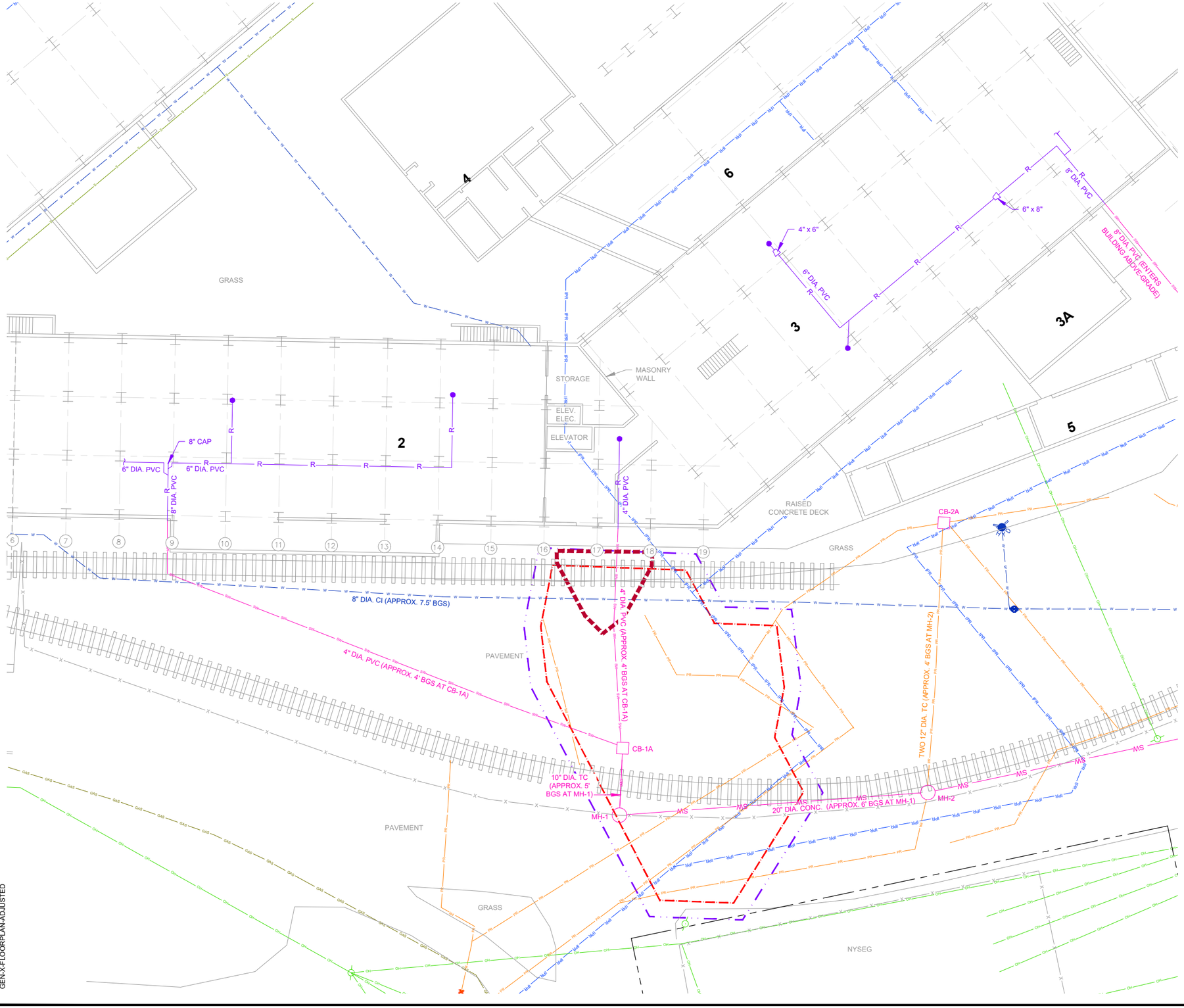
WASTE MANAGEMENT PLAN FOR ISTR PREPARATION ACTIVITIES

EXISTING SITE CONDITIONS

ARCADIS

FIGURE 1

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LEGEND:

- WATER LINE (UG)
- ROOF DRAIN (AG)
- INACTIVE PROCESS WASTE LINES (UG) (SEE NOTE 1)
- INACTIVE PROCESS WASTE LINES (UG) (SEE NOTE 1)
- ELECTRIC LINE (OH)
- STORMWATER/ROOF DRAIN PIPE (UG)
- SANITARY LINE (UG)
- MANHOLE
- CATCH BASIN
- GATE VALVE
- FENCE
- RAILROAD TRACK
- PROPERTY LINE
- ISTR THERMAL INFLUENCE ZONE
- APPROXIMATE LIMITS OF PROPOSED UNSATURATED SOIL EXCAVATION TO WATER TABLE (4 TO 6 FEET BGS)
- VAPOR CAP
- 2 BUILDING ID

AG	ABOVE–GRADE
BGS	BELOW GROUND SURFACE
CI	CAST IRON
CONC.	CONCRETE
ISTR	IN SITU THERMAL REMEDIATION
OH	OVERHEAD
PVC	POLYVINYL CHLORIDE
TC	TERRA COTTA
UG	UNDERGROUND

NOTE:

1. UNDERGROUND UTILITY LOCATIONS ARE NOT GUARANTEED. LOCATIONS SHOWN ARE GENERALLY BASED ON HISTORICAL FACILITY DRAWINGS, PRIVATE UTILITY LOCATING, AND FIELD RECONNAISSANCE, INCLUDING THE FOLLOWING:
   - IPR LINES ARE BASED ON SYLVANIA ELECTRICAL PRODUCTS, INC. DRAWING FROM 1967.
   - PR LINES ARE BASED ON INCONCLUSIVE PRIVATE UTILITY LOCATING FINDINGS AND MAY BE REDUNDANT.

0 15' 30'
GRAPHIC SCALE

G.T.E. PRODUCTS CORPORATION, NYSDEC SITE NO. 850003
FORMER PHILIPS DISPLAY COMPONENTS FACILITY
SENECA FALLS, NEW YORK

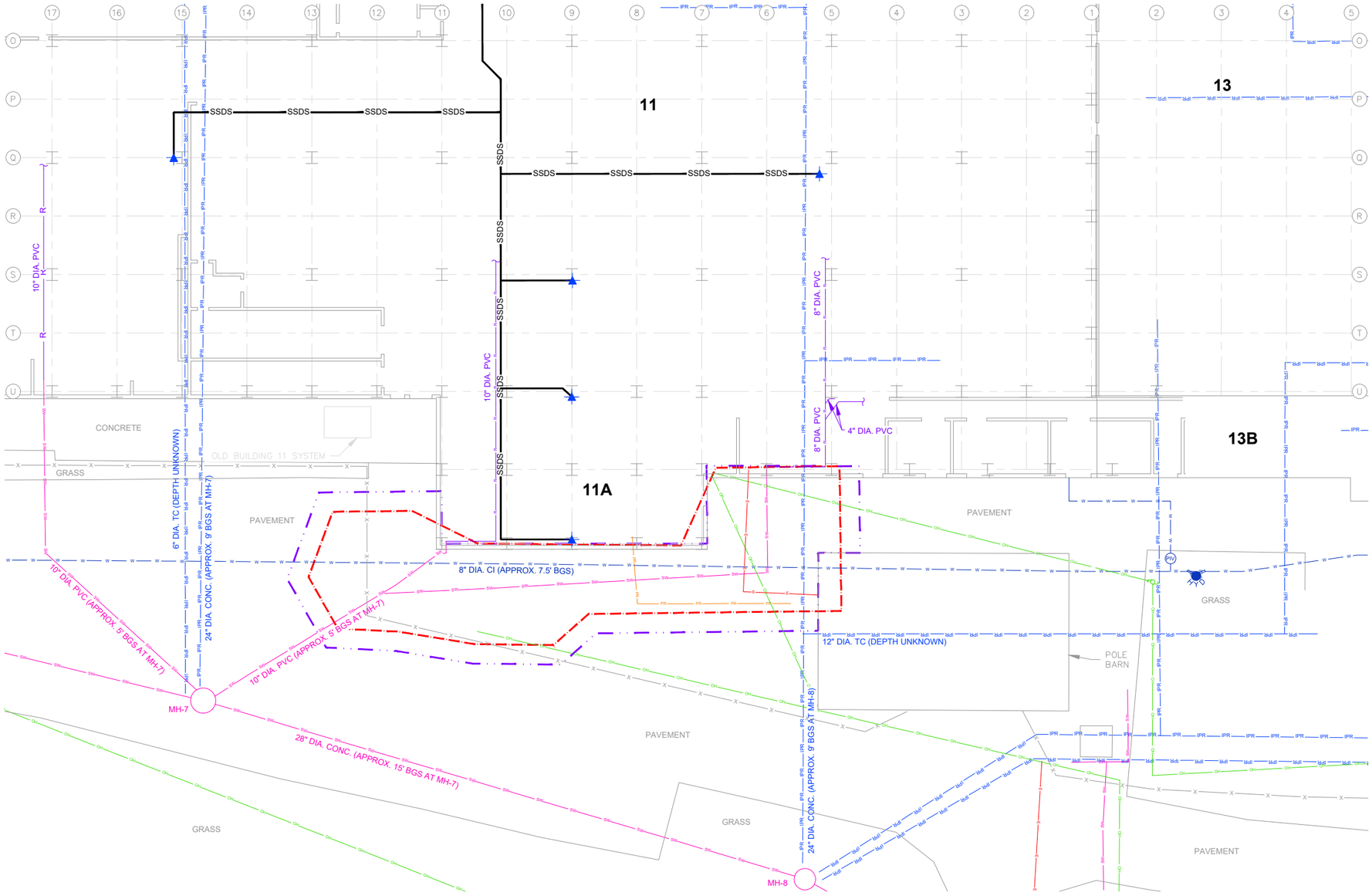
WASTE MANAGEMENT PLAN FOR ISTR PREPARATION ACTIVITIES

AOC 1 AREA EXISTING CONDITIONS

ARCADIS

FIGURE 2

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LEGEND:

- SSDS EXTRACTION POINT
- SSDS — SSDS CONVEYANCE PIPING (AG)
- W — WATER LINE (UG)
- OH — ELECTRIC LINE (OH)
- E — ELECTRIC LINE (UG)
- R — ROOF DRAIN (AG)
- IPR — INACTIVE PROCESS WASTE LINES (UG)
- PR — POTENTIAL INACTIVE PROCESS WASTE LINES (UG)
- SW — STORMWATER/ROOF DRAIN PIPE (UG)
- MANHOLE
- PIV — POST INDICATOR VALVE
- ELECTRICAL POLE
- FENCE
- ISTR THERMAL INFLUENCE ZONE
- VAPOR CAP
- 13B — BUILDING ID

AG	ABOVE-GRADE
BGS	BELOW GROUND SURFACE
CI	CAST IRON
CONC.	CONCRETE
ISTR	IN SITU THERMAL REMEDIATION
OH	OVERHEAD
PVC	POLYVINYL CHLORIDE
SSDS	SUB-SLAB DEPRESSURIZATION SYSTEM
TC	TERRA COTTA
UG	UNDERGROUND

NOTE:

1. UNDERGROUND UTILITY LOCATIONS ARE NOT GUARANTEED. LOCATIONS SHOWN ARE GENERALLY BASED ON HISTORICAL FACILITY DRAWINGS, PRIVATE UTILITY LOCATING, AND FIELD RECONNAISSANCE, INCLUDING THE FOLLOWING:
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0 15' 30'
GRAPHIC SCALE

G.T.E. PRODUCTS CORPORATION, NYSDEC SITE NO. 850003
FORMER PHILIPS DISPLAY COMPONENTS FACILITY
SENECA FALLS, NEW YORK

WASTE MANAGEMENT PLAN FOR ISTR PREPARATION ACTIVITIES

AOC 3 AREA EXISTING CONDITIONS

ARCADIS

FIGURE 3

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WMP-X-Border Arcadis Logo.PNG
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GEN-X-FLOORPLAN-ADJUSTED

NOTES:

1. UNDERGROUND UTILITY LOCATIONS ARE NOT GUARANTEED. LOCATIONS SHOWN ARE GENERALLY BASED ON HISTORICAL FACILITY DRAWINGS, PRIVATE UTILITY LOCATING, AND FIELD RECONNAISSANCE, INCLUDING THE FOLLOWING:
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   - POTENTIAL INACTIVE PROCESS WASTE LINES ARE BASED ON INCONCLUSIVE PRIVATE UTILITY LOCATING FINDINGS AND MAY BE REDUNDANT.

2. DELINEATION OF WORK:
   - CONTRACTOR IS RESPONSIBLE FOR ALL BELOW-GRADE WORK. STUB UP PIPING AS NECESSARY FOR PLUMBER TO MAKE FINAL CONNECTIONS.
   - PLUMBER IS RESPONSIBLE FOR ALL ABOVE-GRADE WORK INCLUDING FINAL ABOVE-GRADE CONNECTIONS.
   - FUTURE INSTALLATION OF PERMANENT UNDERGROUND WATER LINE NOT INCLUDED IN THIS SCOPE.

3. MATERIALS:
   a) PIPE – USE 8-INCH DIAMETER HDPE (DR11).
   b) GATE VALVE – MUELLER MODEL 2361 RWGV 250W WITH HYMAX GRIP RESTRAINT OR APPROVED EQUAL.
   c) CURB BOX – MCDONALD MODEL 5614A OR APPROVED EQUAL.

4. USE 10-INCH DIAMETER METAL PIPE SLEEVES FOR MASONRY WALL PENETRATIONS.

5. HEATING AND INSULATION:
   a) USE OUTDOOR-RATED SELF-REGULATING HEATING CABLE FOR ALL EXPOSED PIPING AND BELOW-GRADE PIPING ABOVE FROST LINE (4' BGS). INSTALL WIRE/CONDUIT TO PROVIDE HARDWIRED 120VAC POWER FOR HEATING CABLE. USE LICENSED ELECTRICAL CONTRACTOR FOR ELECTRICAL WORK.
   b) USE 2-INCH THICK FIBERGLASS INSULATION FOR ALL PIPING FIT WITH HEATING CABLE. FOR PIPING OUTSIDE THE BUILDING (INCLUDING BELOW-GRADE), ALSO AFFIX ALUMINUM JACKETING. PLACE HAY BALES AROUND PIPING RAN ON GROUND OR ON CONCRETE DECK.
   c) PLUMBER SHALL COORDINATE AS NECESSARY WITH CONTRACTOR FOR INSTALLATION OF BELOW-GRADE HEATING CABLE AND INSULATION.

6. PIPING REQUIREMENTS:
   a) SUPPORT ABOVE-GRADE PIPE EVERY 4 FEET AND AT EVERY CHANGE IN DIRECTION.
   b) ALL NEWLY INSTALLED PIPING SHALL PASS PRESSURE TEST IN ACCORDANCE WITH SPECIFICATIONS. PLUMBER/CONTRACTOR RESPONSIBLE FOR ISOLATING PIPING AS NECESSARY TO TEST RESPECTIVE WORKS.
   c) LABEL ABOVE-GRADE PIPE "WATER MAIN" EVERY 10 FEET.

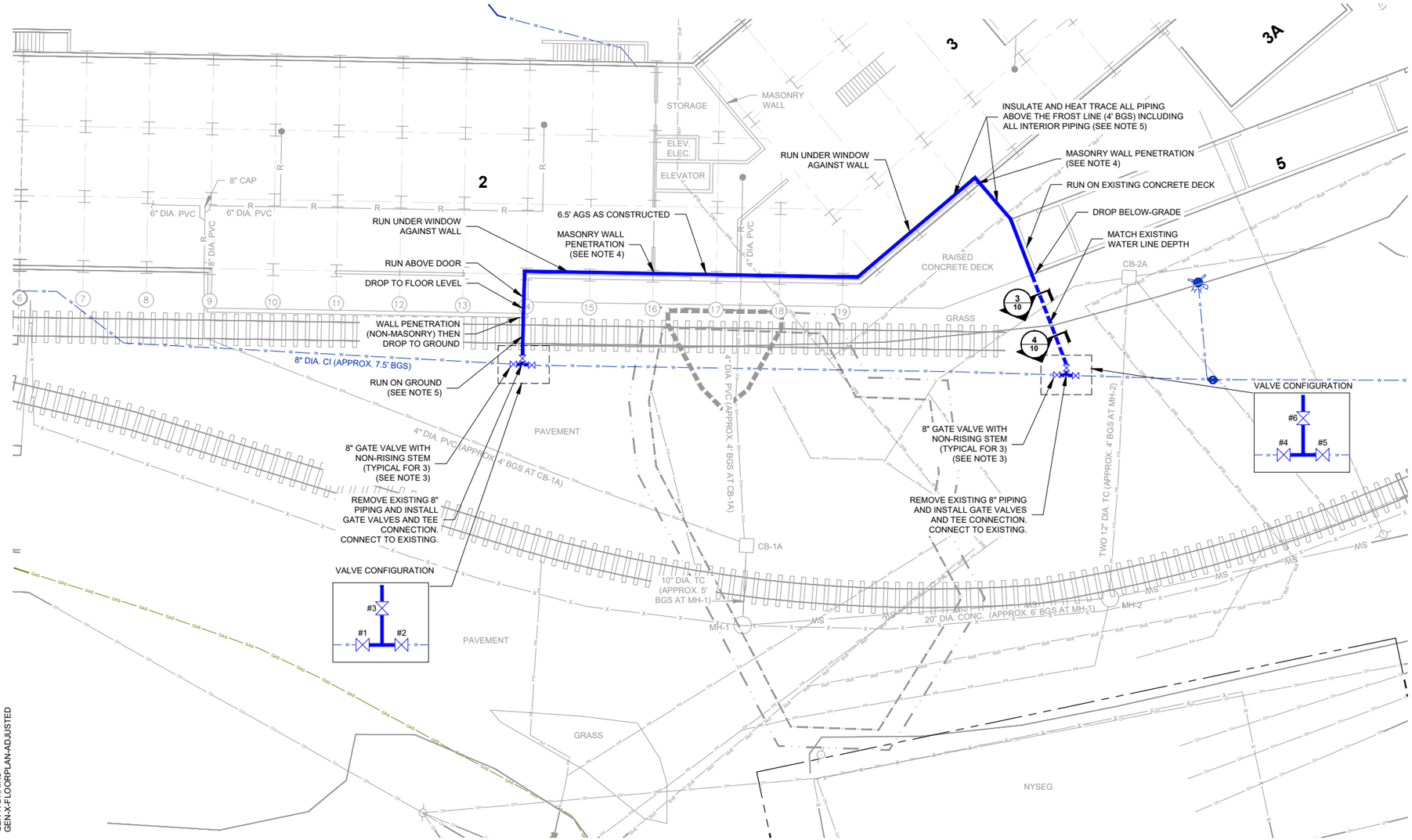
7. EXCAVATION, DEWATERING, AND MATERIAL HANDLING REQUIREMENTS:
   a) PERFORM EXCAVATIONS IN ACCORDANCE WITH ALL APPLICABLE OSHA REQUIREMENTS.
   b) EXCAVATED ASPHALT OR CONCRETE – FOR MATERIAL THAT HAS NOT CONTACTED SITE SOILS AND THAT NEITHER MEETS THE DEFINITION OF GROSSLY CONTAMINATED MEDIA (AS DEFINED IN 6 NYCRR PART 375-1.2(v)) NOR EXCEEDS A PID SCREENING VALUE OF 25 PPM, MANAGE FOR OFF-SITE RECYCLING. FOR MATERIAL THAT HAS CONTACTED SITE SOILS OR THAT EITHER MEETS THE DEFINITION OF GROSSLY CONTAMINATED MEDIA (AS DEFINED IN 6 NYCRR PART 375-1.2(v)) OR EXCEEDS A PID SCREENING VALUE OF 25 PPM, MANAGE AS LISTED HAZARDOUS WASTE (F001/F002) UNLESS OWNER OBTAINS CONTAINED-IN DETERMINATION.
   c) DEWATERING:
      - MANAGE WATER AS LISTED WASTE (F001/F002) UNLESS OWNER OBTAINS CONTAINED-IN DETERMINATION.
      - CONTAINERIZE WATER IN FRAC TANK(S) FOR FUTURE OFF-SITE DISPOSAL. REFER TO FIGURE 11 FOR PROPOSED FRAC TANK STAGING LOCATION(S).
   d) EXCAVATED SOILS:
      - MANAGE AS LISTED HAZARDOUS WASTE (F001/F002) UNLESS OWNER OBTAINS CONTAINED-IN DETERMINATION.
      - UNSATURATED SOILS – PLACE ON 30-MIL HDPE LINER(S) NEXT TO RESPECTIVE EXCAVATION(S) FOR REUSE AS BACKFILL.
      - SATURATED SOILS – ENGINEER TO DETERMINE IN FIELD IF SATURATED SOILS ARE REUSABLE AS BACKFILL.
      - EXCESS SOILS – SOILS THAT ARE NOT REUSED AS BACKFILL SHALL BE TRANSFERRED TO TEMPORARY CONTAINMENT AREA (SEE FIGURE 11) FOR ENGINEER TO CHARACTERIZE FOR OFF-SITE DISPOSAL.
      - SOILS THAT ARE GROSSLY CONTAMINATED, AS DEFINED IN 6 NYCRR PART 375-1.2(v), OR SOILS WITH PID SCREENING VALUES GREATER THAN 25 PPM, MAY NOT BE REUSED AS BACKFILL.
      - FLUIDS FROM SATURATED SOILS WILL BE COLLECTED, CONTAINERIZED, AND CHARACTERIZED FOR DISPOSAL.
      - CONSTRUCT DECONTAMINATION AREA (SEE FIGURE 11) TO PREVENT TRACKING OF IMPACTED MATERIALS BY CONSTRUCTION VEHICLES, EQUIPMENT, OR PERSONNEL. CONTAINERIZE DECONTAMINATION FLUIDS FOR OFF-SITE DISPOSAL AS LISTED HAZARDOUS WASTE.

8. ENGINEER TO CONDUCT COMMUNITY AIR MONITORING IN ACCORDANCE WITH THE COMMUNITY AIR MONITORING PLAN, INCLUDING SPECIAL COMMUNITY AIR MONITORING PLAN REQUIREMENTS FOR WORK WITHIN 20 FEET OF POTENTIALLY EXPOSED INDIVIDUALS OR OCCUPIED STRUCTURES.

9. CONTRACTOR SHALL INSTALL AND MAINTAIN EROSION AND SEDIMENT CONTROLS IN ACCORDANCE WITH THE SWPPP. ENGINEER TO ENSURE COMPLIANCE WITH SWPPP REQUIREMENTS.

10. CONTRACTOR SHALL SEQUENCE ITS WORK SUCH THAT WATER SERVICE IS NOT SHUT OFF FOR MORE THAN 4 HOURS PER DAY.

11. REFER TO FIGURE 10 FOR BACKFILL AND RESTORATION DETAILS.



LEGEND:

- PROPOSED TEMPORARY WATER LINE (AG) (SEE NOTE 3)
- PROPOSED TEMPORARY WATER LINE (UG) (SEE NOTE 3)
- WATER LINE (UG)
- ROOF DRAIN (AG)
- INACTIVE PROCESS WASTE LINES (UG)
- POTENTIAL INACTIVE PROCESS WASTE LINES (UG)
- ELECTRIC LINE (OH)
- STORMWATER/ROOF DRAIN PIPE (UG)
- SANITARY LINE (UG)
- MANHOLE
- CATCH BASIN
- GATE VALVE
- FENCE
- RAILROAD TRACK
- PROPERTY LINE
- ISTR THERMAL INFLUENCE ZONE
- APPROXIMATE LIMITS OF PROPOSED UNSATURATED SOIL EXCAVATION TO WATER TABLE (4 TO 6 FEET BGS)
- VAPOR CAP
- 2 BUILDING ID

AG	ABOVE-GRADE
BGS	BELOW GROUND SURFACE
CI	CAST IRON
CONC.	CONCRETE
ENGINEER	ARCADIS OF NEW YORK, INC.
HDPE	HIGH-DENSITY POLYETHYLENE
ISTR	IN SITU THERMAL REMEDIATION
OH	OVERHEAD
PID	PHOTOIONIZATION DETECTOR
PPM	PARTS PER MILLION
PVC	POLYVINYL CHLORIDE
TC	TERRA COTTA
UG	UNDERGROUND

G.T.E. PRODUCTS CORPORATION, NYSDEC SITE NO. 850003
FORMER PHILIPS DISPLAY COMPONENTS FACILITY
SENECA FALLS, NEW YORK

WASTE MANAGEMENT PLAN FOR ISTR PREPARATION ACTIVITIES

AOC 1 WATER LINE REROUTING

ARCADIS

FIGURE 4

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PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 9/17/2025 10:14 AM BY: HARRIS, JESS
XREFS:
IMAGES: PROJECTNAME: ----
WMP-X-Border Arcadis Logo.PNG
GEN-X-DRAINS
GEN-X-FLOORPLAN-ADJUSTED

NOTES:

1. UNDERGROUND UTILITY LOCATIONS ARE NOT GUARANTEED. LOCATIONS SHOWN ARE GENERALLY BASED ON HISTORICAL FACILITY DRAWINGS, PRIVATE UTILITY LOCATING, AND FIELD RECONNAISSANCE, INCLUDING THE FOLLOWING:
   - INACTIVE PROCESS WASTE LINES ARE BASED ON SYLVANIA ELECTRICAL PRODUCTS, INC. DRAWING FROM 1967.
   - POTENTIAL INACTIVE PROCESS WASTE LINES ARE BASED ON INCONCLUSIVE PRIVATE UTILITY LOCATING FINDINGS AND MAY BE REDUNDANT.

2. DELINEATION OF WORK:
   - CONTRACTOR IS RESPONSIBLE FOR ALL BELOW-GRADE WORK. STUB UP PIPING AS NECESSARY FOR PLUMBER TO MAKE FINAL CONNECTIONS.
   - PLUMBER IS RESPONSIBLE FOR ALL ABOVE-GRADE WORK INCLUDING FINAL ABOVE-GRADE CONNECTIONS.
   - FUTURE INSTALLATION OF PERMANENT UNDERGROUND WATER LINE NOT INCLUDED IN THIS SCOPE.

3. MATERIALS:
   a) PIPE – USE 8-INCH DIAMETER HDPE (DR11).
   b) GATE VALVE – MUELLER MODEL 2361 RWGV 250W WITH HYMAX GRIP RESTRAINT OR APPROVED EQUAL.
   c) CURB BOX – MCDONALD MODEL 5614A OR APPROVED EQUAL.

4. USE 10-INCH DIAMETER METAL PIPE SLEEVES FOR MASONRY WALL PENETRATIONS.

5. HEATING AND INSULATION:
   a) USE OUTDOOR-RATED SELF-REGULATING HEATING CABLE FOR ALL EXPOSED PIPING AND BELOW-GRADE PIPING ABOVE FROST LINE (4' BGS). INSTALL WIRE/CONDUIT TO PROVIDE HARDWIRED 120VAC POWER FOR HEATING CABLE. USE LICENSED ELECTRICAL CONTRACTOR FOR ELECTRICAL WORK.
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   c) PLUMBER SHALL COORDINATE AS NECESSARY WITH CONTRACTOR FOR INSTALLATION OF BELOW-GRADE HEATING CABLE AND INSULATION.

6. PIPING REQUIREMENTS:
   a) SUPPORT ABOVE-GRADE PIPE EVERY 4 FEET AND AT EVERY CHANGE IN DIRECTION.
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   c) LABEL ABOVE-GRADE PIPE "WATER MAIN" EVERY 10 FEET.

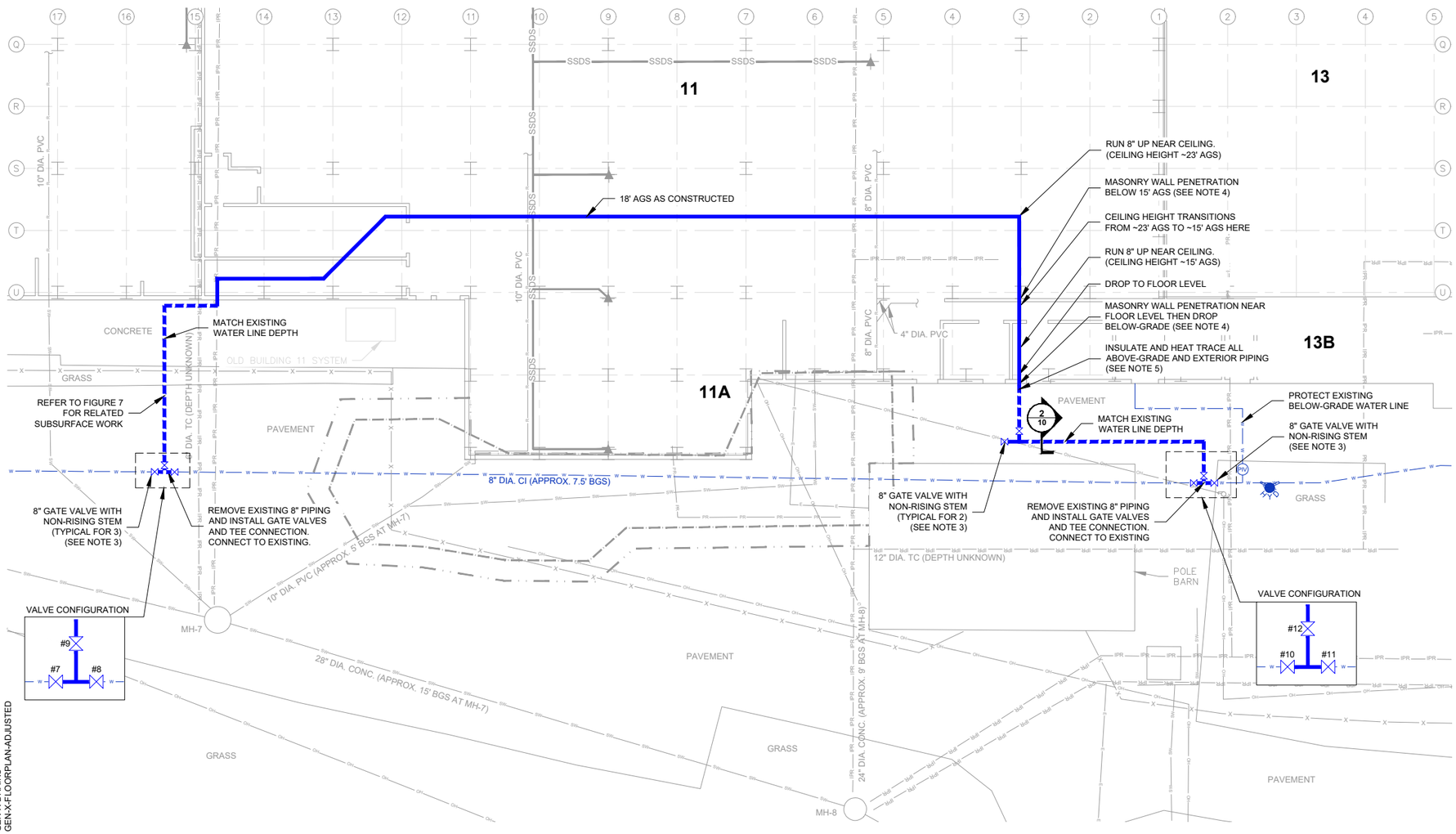
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11. REFER TO FIGURE 10 FOR BACKFILL AND RESTORATION DETAILS.





LEGEND:

- PROPOSED TEMPORARY WATER LINE (AG) (SEE NOTE 3)
- PROPOSED TEMPORARY WATER LINE (UG) (SEE NOTE 3)
- SSDS EXTRACTION POINT
- SSDS CONVEYANCE PIPING (AG)
- WATER LINE (UG)
- ELECTRIC LINE (OH)
- ELECTRIC LINE (UG)
- ROOF DRAIN (AG)
- INACTIVE PROCESS WASTE LINES (UG)
- POTENTIAL INACTIVE PROCESS WASTE LINES (UG)
- STORMWATER/ROOF DRAIN PIPE (UG)
- MANHOLE
- POST INDICATOR VALVE
- ELECTRICAL POLE
- FENCE
- ISTR THERMAL INFLUENCE ZONE
- VAPOR CAP
- 13B BUILDING ID

AG	ABOVE-GRADE
AGS	ABOVE GROUND SURFACE
BGS	BELOW GROUND SURFACE
CI	CAST IRON
CONC.	CONCRETE
ENGINEER	ARCADIS OF NEW YORK, INC.
HDPE	HIGH DENSITY POLYETHYLENE
ISTR	IN SITU THERMAL REMEDIATION
OH	OVERHEAD
PID	PHOTOIONIZATION DETECTOR
PPM	PARTS PER MILLION
PVC	POLYVINYL CHLORIDE
SSDS	SUB-SLAB DEPRESSURIZATION SYSTEM
TC	TERRA COTTA
UG	UNDERGROUND

0 15' 30'
GRAPHIC SCALE

G.T.E. PRODUCTS CORPORATION, NYSDEC SITE NO. 850003
FORMER PHILIPS DISPLAY COMPONENTS FACILITY
SENECA FALLS, NEW YORK

WASTE MANAGEMENT PLAN FOR ISTR PREPARATION ACTIVITIES

AOC 3 WATER LINE REROUTING

ARCADIS

FIGURE 5

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PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 9/17/2025 10:15 AM BY: HARRIS, JESS
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GEN-X-DRAINS
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   - PLUMBER IS RESPONSIBLE FOR ALL ABOVE-GRADE WORK INCLUDING FINAL ABOVE-GRADE CONNECTIONS.

3. USE 10-INCH DIAMETER METAL PIPE SLEEVES FOR MASONRY WALL PENETRATIONS.

4. PIPING REQUIREMENTS:
   a) SUPPORT ABOVE-GRADE PIPE EVERY 4 FEET AND AT EVERY CHANGE IN DIRECTION.
   b) LABEL ABOVE-GRADE PIPE "ROOF DRAIN" EVERY 10 FEET.

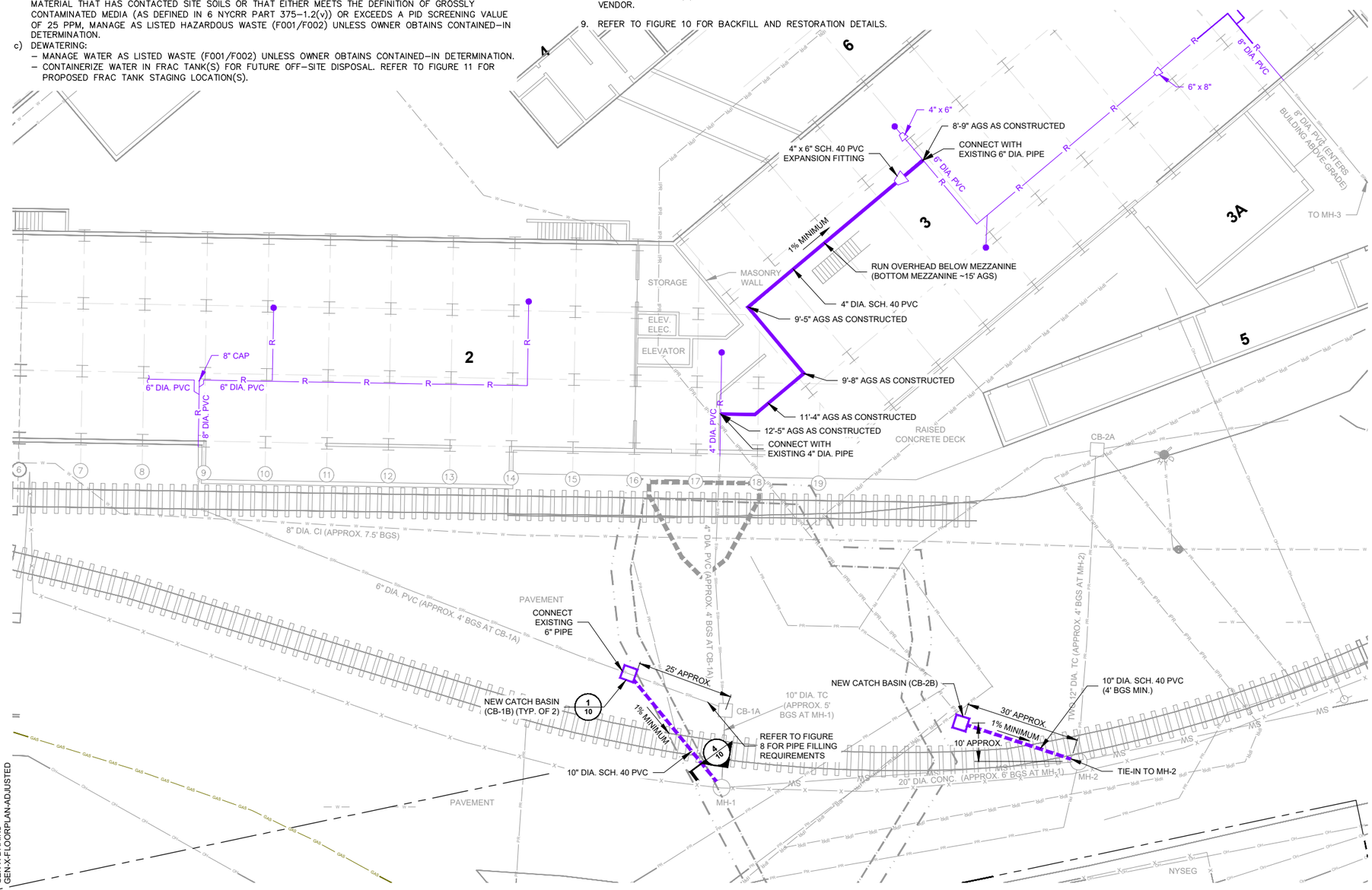
5. EXCAVATION, DEWATERING, AND MATERIAL HANDLING REQUIREMENTS:
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   c) DEWATERING:
      - MANAGE WATER AS LISTED WASTE (F001/F002) UNLESS OWNER OBTAINS CONTAINED-IN DETERMINATION.
      - CONTAINERIZE WATER IN FRAC TANK(S) FOR FUTURE OFF-SITE DISPOSAL. REFER TO FIGURE 11 FOR PROPOSED FRAC TANK STAGING LOCATION(S).
   d) EXCAVATED SOILS:
      - MANAGE AS LISTED HAZARDOUS WASTE (F001/F002) UNLESS OWNER OBTAINS CONTAINED-IN DETERMINATION.
      - UNSATURATED SOILS – PLACE ON 30-MIL HDPE LINER(S) NEXT TO RESPECTIVE EXCAVATION(S) FOR REUSE AS BACKFILL.
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      - FLUIDS FROM SATURATED SOILS WILL BE COLLECTED, CONTAINERIZED, AND CHARACTERIZED FOR DISPOSAL.
      - CONSTRUCT DECONTAMINATION AREA (SEE FIGURE 11) TO PREVENT TRACKING OF IMPACTED MATERIALS BY CONSTRUCTION VEHICLES, EQUIPMENT, OR PERSONNEL. CONTAINERIZE DECONTAMINATION FLUIDS FOR OFF-SITE DISPOSAL AS LISTED HAZARDOUS WASTE.

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7. CONTRACTOR SHALL INSTALL AND MAINTAIN EROSION AND SEDIMENT CONTROLS IN ACCORDANCE WITH THE SWPPP. ENGINEER TO ENSURE COMPLIANCE WITH SWPPP REQUIREMENTS.

8. NEW CATCH BASIN(S) LOCATIONS ARE APPROXIMATE. COORDINATE FINAL LOCATION WITH ENGINEER AND ISTR VENDOR.

9. REFER TO FIGURE 10 FOR BACKFILL AND RESTORATION DETAILS.



LEGEND:

- PROPOSED ROOF DRAIN PIPE (AG)
- PROPOSED ROOF DRAIN/STORMWATER PIPE (UG)
- PROPOSED CATCH BASIN (SEE NOTE 6)
- WATER LINE (UG)
- ROOF DRAIN (AG)
- INACTIVE PROCESS WASTE LINES (UG)
- POTENTIAL INACTIVE PROCESS WASTE LINES (UG)
- ELECTRIC LINE (OH)
- STORMWATER/ROOF DRAIN PIPE (UG)
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- VAPOR CAP
- 2 BUILDING ID

AG	ABOVE-GRADE
AGS	ABOVE GROUND SURFACE
BGS	BELOW GROUND SURFACE
CI	CAST IRON
CONC.	CONCRETE
ENGINEER	ARCADIS OF NEW YORK, INC.
I.E.	INVERT ELEVATION
ISTR	IN SITU THERMAL REMEDIATION
OH	OVERHEAD
PID	PHOTOIONIZATION DETECTOR
PPM	PARTS PER MILLION
PVC	POLYVINYL CHLORIDE
SCH.	SCHEDULE
TC	TERRA COTTA
UG	UNDERGROUND

0 15' 30'
GRAPHIC SCALE

G.T.E. PRODUCTS CORPORATION, NYSDEC SITE NO. 850003
FORMER PHILIPS DISPLAY COMPONENTS FACILITY
SENECA FALLS, NEW YORK
WASTE MANAGEMENT PLAN FOR ISTR PREPARATION ACTIVITIES

AOC 1 ROOF DRAIN REROUTING

ARCADIS

FIGURE 6

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PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 9/17/2025 10:21 AM BY: HARRIS, JESS
XREFS:
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IMAGES:
Arcadis Logo.PNG
PROJECTNAME: ----

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   - PLUMBER IS RESPONSIBLE FOR ALL ABOVE-GRADE WORK INCLUDING FINAL ABOVE-GRADE CONNECTIONS.

3. USE 10-INCH DIAMETER METAL PIPE SLEEVES FOR MASONRY WALL PENETRATIONS.

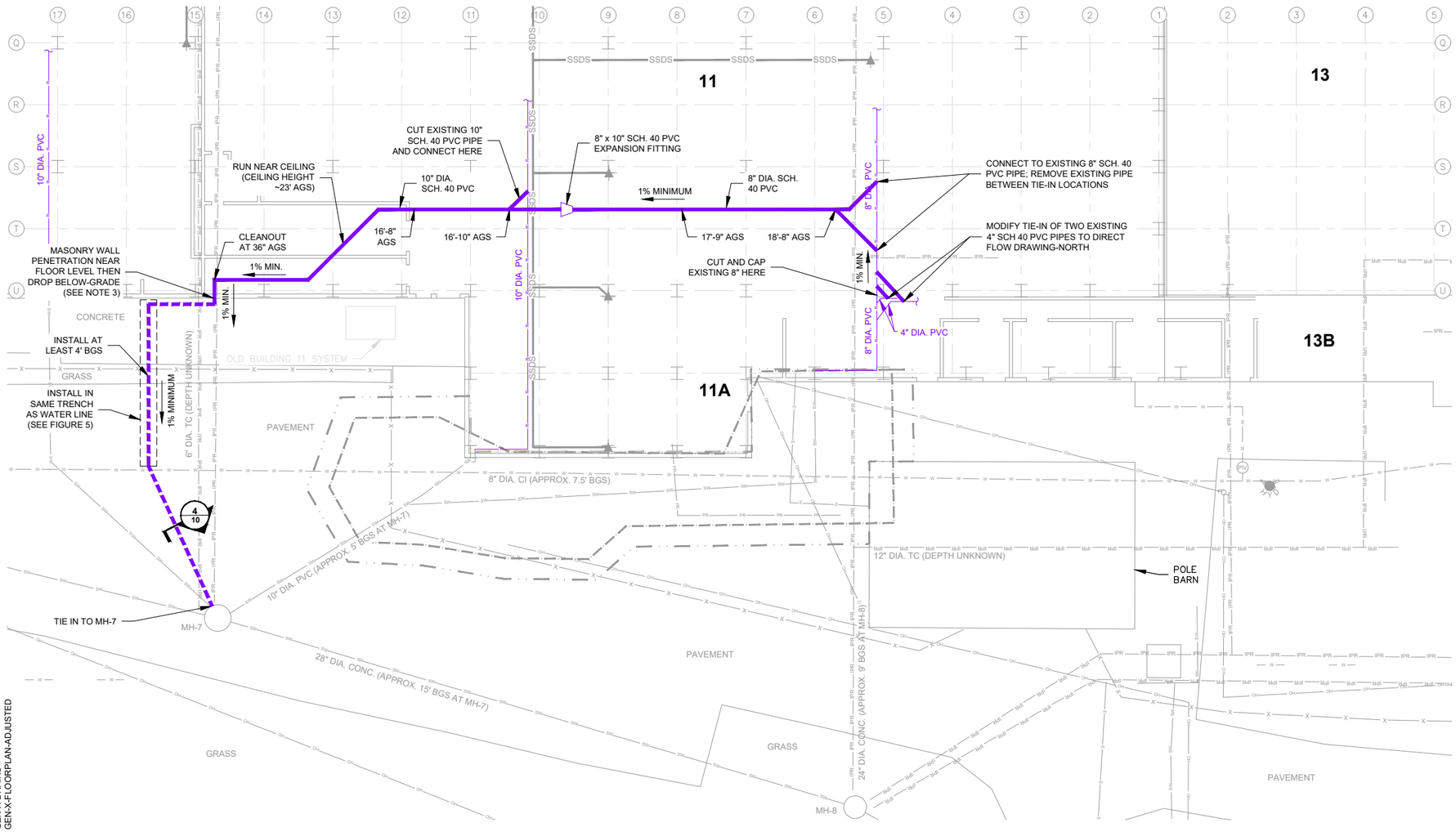
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      - FLUIDS FROM SATURATED SOILS WILL BE COLLECTED, CONTAINERIZED, AND CHARACTERIZED FOR DISPOSAL.
      - CONSTRUCT DECONTAMINATION AREA (SEE FIGURE 11) TO PREVENT TRACKING OF IMPACTED MATERIALS BY CONSTRUCTION VEHICLES, EQUIPMENT, OR PERSONNEL. CONTAINERIZE DECONTAMINATION FLUIDS FOR OFF-SITE DISPOSAL AS LISTED HAZARDOUS WASTE.

6. ENGINEER TO CONDUCT COMMUNITY AIR MONITORING IN ACCORDANCE WITH THE COMMUNITY AIR MONITORING PLAN, INCLUDING SPECIAL COMMUNITY AIR MONITORING PLAN REQUIREMENTS FOR WORK WITHIN 20 FEET OF POTENTIALLY EXPOSED INDIVIDUALS OR OCCUPIED STRUCTURES.

7. CONTRACTOR SHALL INSTALL AND MAINTAIN EROSION AND SEDIMENT CONTROLS IN ACCORDANCE WITH THE SWPPP. ENGINEER TO ENSURE COMPLIANCE WITH SWPPP REQUIREMENTS.

8. REFER TO FIGURE 10 FOR BACKFILL AND RESTORATION DETAILS.



LEGEND:

- PROPOSED ROOF DRAIN PIPE (AG)
- PROPOSED ROOF DRAIN/STORMWATER PIPE (UG)
- SSDS EXTRACTION POINT
- SSDS CONVEYANCE PIPING (AG)
- WATER LINE (UG)
- ELECTRIC LINE (OH)
- ELECTRIC LINE (UG)
- ROOF DRAIN (AG)
- INACTIVE PROCESS WASTE LINES (UG)
- POTENTIAL INACTIVE PROCESS WASTE LINES (UG)
- STORMWATER/ROOF DRAIN PIPE (UG)
- MANHOLE
- POST INDICATOR VALVE
- ELECTRICAL POLE
- FENCE
- ISTR THERMAL INFLUENCE ZONE
- VAPOR CAP
- 13B BUILDING ID

AG	ABOVE-GRADE
AGS	ABOVE GROUND SURFACE
BGS	BELOW GROUND SURFACE
CI	CAST IRON
CONC.	CONCRETE
ENGINEER	ARCADIS OF NEW YORK, INC.
I.E.	INVERT ELEVATION
ISTR	IN SITU THERMAL REMEDIATION
OH	OVERHEAD
PID	PHOTOIONIZATION DETECTOR
PPM	PARTS PER MILLION
PVC	POLYVINYL CHLORIDE
SCH.	SCHEDULE
SSDS	SUB-SLAB DEPRESSURIZATION SYSTEM
TC	TERRA COTTA
UG	UNDERGROUND

0 15' 30'
GRAPHIC SCALE

G.T.E. PRODUCTS CORPORATION, NYSDEC SITE NO. 850003
FORMER PHILIPS DISPLAY COMPONENTS FACILITY
SENECA FALLS, NEW YORK
WASTE MANAGEMENT PLAN FOR ISTR PREPARATION ACTIVITIES

AOC 3 ROOF DRAIN REROUTING

ARCADIS

FIGURE 7

C:\Users\jlharris\DCACCDocs\Arcadis ACC US\AUS-99999999-GTEOS_FMR PHILIPS SITE_SENECA FALLS_NY\Project Files\10_WIP\10T_ARC_ENV\2025\01-DWG\WMP-FIG07-AOC3-ROOF DRAIN RELO.dwg LAYOUT: 7 SAVED: 9/17/2025 10:23 AM ACADVER: 25.1S (LMS TECH) PAGESETUP: ----
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XREFS: IMAGES: PROJECTNAME: ----
WMP-X-Border Arcadis Logo.PNG
GEN-X-DRAINS
GEN-X-FLOORPLAN-ADJUSTED

NOTES:

1. UNDERGROUND UTILITY LOCATIONS ARE NOT GUARANTEED. LOCATIONS SHOWN ARE GENERALLY BASED ON HISTORICAL FACILITY DRAWINGS, PRIVATE UTILITY LOCATING, AND FIELD RECONNAISSANCE, INCLUDING THE FOLLOWING:
   - INACTIVE PROCESS WASTE LINES ARE BASED ON SYLVANIA ELECTRICAL PRODUCTS, INC. DRAWING FROM 1967.
   - POTENTIAL INACTIVE PROCESS WASTE LINES ARE BASED ON INCONCLUSIVE PRIVATE UTILITY LOCATING FINDINGS AND MAY BE REDUNDANT.

2. EXCAVATION, DEWATERING, AND MATERIAL HANDLING REQUIREMENTS:
   a) PERFORM EXCAVATIONS IN ACCORDANCE WITH ALL APPLICABLE OSHA REQUIREMENTS.
   b) EXCAVATED ASPHALT OR CONCRETE – FOR MATERIAL THAT HAS NOT CONTACTED SITE SOILS AND THAT NEITHER MEETS THE DEFINITION OF GROSSLY CONTAMINATED MEDIA (AS DEFINED IN 6 NYCRR PART 375–1.2(v)) NOR EXCEEDS A PID SCREENING VALUE OF 25 PPM, MANAGE FOR OFF–SITE RECYCLING. FOR MATERIAL THAT HAS CONTACTED SITE SOILS OR THAT EITHER MEETS THE DEFINITION OF GROSSLY CONTAMINATED MEDIA (AS DEFINED IN 6 NYCRR PART 375–1.2(v)) OR EXCEEDS A PID SCREENING VALUE OF 25 PPM, MANAGE AS LISTED HAZARDOUS WASTE (F001/F002) UNLESS OWNER OBTAINS CONTAINED–IN DETERMINATION.
   c) DEWATERING:
      - MANAGE WATER AS LISTED WASTE (F001/F002) UNLESS OWNER OBTAINS CONTAINED–IN DETERMINATION.
      - CONTAINERIZE WATER IN FRAC TANK(S) FOR FUTURE OFF–SITE DISPOSAL. REFER TO FIGURE 11 FOR PROPOSED FRAC TANK STAGING LOCATION(S).
   d) EXCAVATED SOILS:
      - MANAGE AS LISTED HAZARDOUS WASTE (F001/F002) UNLESS OWNER OBTAINS CONTAINED–IN DETERMINATION.
      - UNSATURATED SOILS – PLACE ON 30–MIL HDPE LINER(S) NEXT TO RESPECTIVE EXCAVATION(S) FOR REUSE AS BACKFILL.
      - SATURATED SOILS – ENGINEER TO DETERMINE IN FIELD IF SATURATED SOILS ARE REUSABLE AS BACKFILL.
      - EXCESS SOILS – SOILS THAT ARE NOT REUSED AS BACKFILL SHALL BE TRANSFERRED TO TEMPORARY CONTAINMENT AREA (SEE FIGURE 11) FOR ENGINEER TO CHARACTERIZE FOR OFF–SITE DISPOSAL.
      - SOILS THAT ARE GROSSLY CONTAMINATED, AS DEFINED IN 6 NYCRR PART 375–1.2(v), OR SOILS WITH PID SCREENING VALUES GREATER THAN 25 PPM, MAY NOT BE REUSED AS BACKFILL.
      - FLUIDS FROM SATURATED SOILS WILL BE COLLECTED, CONTAINERIZED, AND CHARACTERIZED FOR DISPOSAL.
      - CONSTRUCT DECONTAMINATION AREA (SEE FIGURE 11) TO PREVENT TRACKING OF IMPACTED MATERIALS BY CONSTRUCTION VEHICLES, EQUIPMENT, OR PERSONNEL. CONTAINERIZE DECONTAMINATION FLUIDS FOR OFF–SITE DISPOSAL AS LISTED HAZARDOUS WASTE

3. ENGINEER TO CONDUCT COMMUNITY AIR MONITORING IN ACCORDANCE WITH THE COMMUNITY AIR MONITORING PLAN, INCLUDING SPECIAL COMMUNITY AIR MONITORING PLAN REQUIREMENTS FOR WORK WITHIN 20 FEET OF POTENTIALLY EXPOSED INDIVIDUALS OR OCCUPIED STRUCTURES.

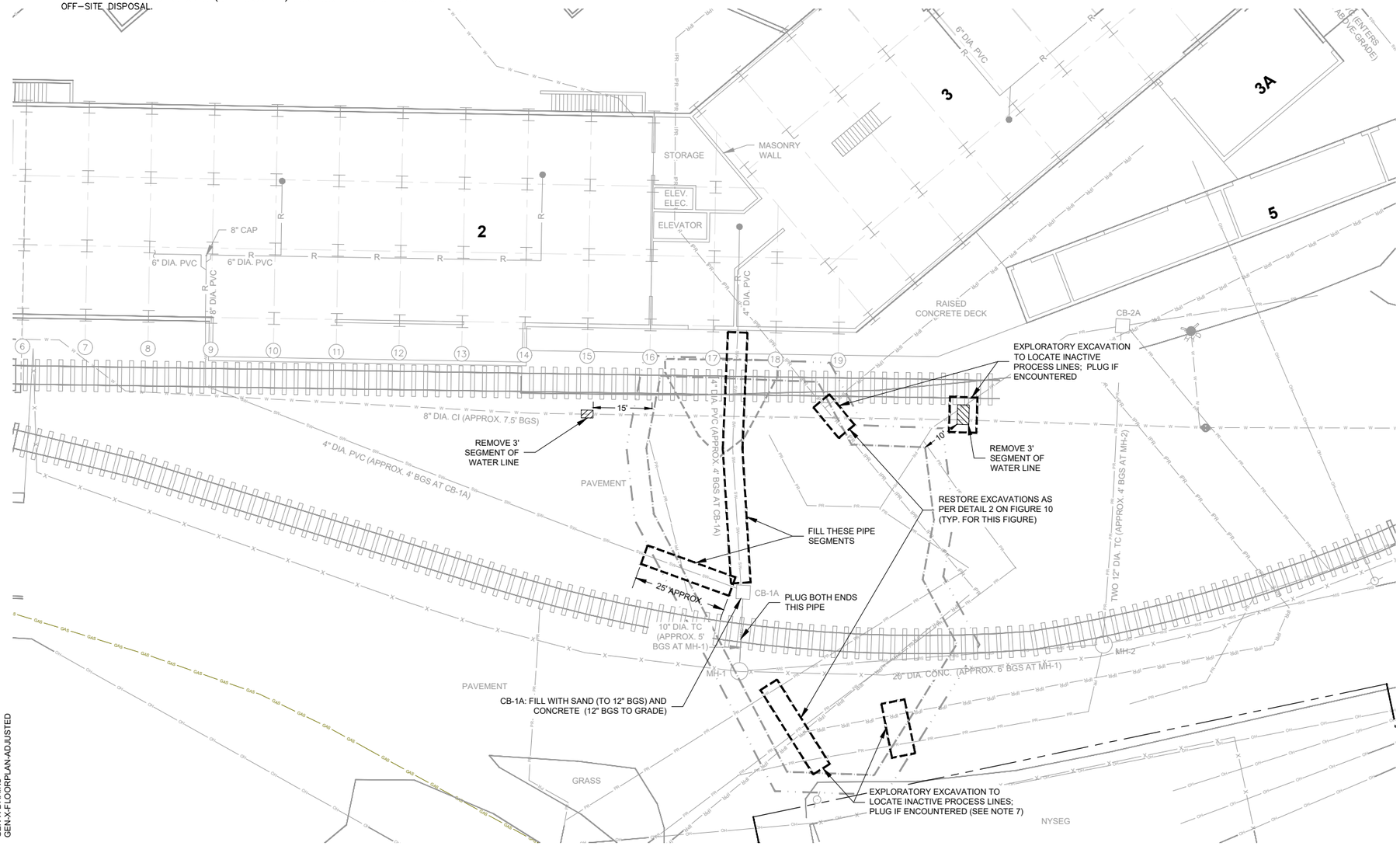
4. CONTRACTOR SHALL INSTALL AND MAINTAIN EROSION AND SEDIMENT CONTROLS IN ACCORDANCE WITH THE SWPPP. ENGINEER TO ENSURE COMPLIANCE WITH SWPPP REQUIREMENTS.

5. CONTRACTOR SHALL DETERMINE ITS WORK SCHEDULE AND SEQUENCE WITH CONSIDERATION TO RELATED ROOF DRAIN REROUTING TASK. DOWNTIME FOR ACTIVE UTILITIES SHALL BE KEPT TO A MINIMUM.

6. USE OF THE WORD "PLUG" ON THIS DRAWING SHALL IMPLY A PERMANENT PLUG BLOCKING THE ENTIRE INNER CROSS–SECTIONAL SURFACE AREA OF A PIPE (OR PIPE ANNULUS IF INDICATED) AT AN INDICATED LOCATION. USE OF THE WORD "FILL" ON THIS DRAWING SHALL AN INDICATED SEGMENT OF PIPE IS TO BE ENTIRELY AND PERMANENTLY FILLED. CONTRACTOR MAY PROPOSE MEANS AND METHODS FOR PERMANENT PLUGGING AND FILLING PIPES, INCLUDING MATERIALS (E.G., CONCRETE, FLOWABLE FILL, ETC.) (SUBJECT TO ENGINEER APPROVAL).

7. PERFORM WESTERN OF TWO EXPLORATORY EXCAVATIONS IN JOHNSTON STREET FIRST. IF NO UTILITIES ENCOUNTERED IN WESTERN EXPLORATORY EXCAVATION, EASTERN EXPLORATORY EXCAVATION WILL NOT BE PERFORMED. SEQUENCE EXCAVATION IN ROADWAY TO OCCUR AT SAME TIME AS INSTALLATION OF SUBSURFACE ISTR COMPONENTS IN ROADWAY.

8. REFER TO FIGURE 10 FOR BACKFILL AND RESTORATION DETAILS.



LEGEND:

- WATER LINE (UG)
- ROOF DRAIN (AG)
- INACTIVE PROCESS WASTE LINES (UG)
- POTENTIAL INACTIVE PROCESS WASTE LINES (UG)
- ELECTRIC LINE (OH)
- STORMWATER/ROOF DRAIN PIPE (UG)
- SANITARY LINE (UG)
- MANHOLE
- CATCH BASIN
- GATE VALVE
- FENCE
- RAILROAD TRACK
- PROPERTY LINE
- ISTR THERMAL INFLUENCE ZONE
- APPROXIMATE LIMITS OF PROPOSED UNSATURATED SOIL EXCAVATION TO WATER TABLE (4 TO 6 FEET BGS)
- VAPOR CAP
- 2 BUILDING ID

AG	ABOVE–GRADE
BGS	BELOW GROUND SURFACE
CI	CAST IRON
CONC.	CONCRETE
ENGINEER	ARCADIS OF NEW YORK, INC.
ISTR	IN SITU THERMAL REMEDIATION
OH	OVERHEAD
PID	PHOTOIONIZATION DETECTOR
PPM	PARTS PER MILLION
PVC	POLYVINYL CHLORIDE
TC	TERRA COTTA
UG	UNDERGROUND

0 15' 30'
GRAPHIC SCALE

G.T.E. PRODUCTS CORPORATION, NYSDEC SITE NO. 850003
FORMER PHILIPS DISPLAY COMPONENTS FACILITY
SENECA FALLS, NEW YORK

WASTE MANAGEMENT PLAN FOR ISTR PREPARATION ACTIVITIES

AOC 1 UTILITY ABANDONMENT

ARCADIS

FIGURE 8

C:\Users\jlharris\DOCACDocs\Arcadis ACC USA\US-99999999-GTEOS_FMR PHILIPS SITE_SENECA FALLS_NY\Project Files\10_WIP\10T_ARC_ENV\2025\01-DWG\WMP-FIG08-AOC1-PIPE PLUG.dwg LAYOUT: 8 SAVED: 9/17/2025 10:25 AM ACADVER: 25.1S (LMS TECH) PAGESETUP: PDF-D2B
PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 9/17/2025 10:29 AM BY: HARRIS, JESS
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WMP-X-Border Arcadis Logo.PNG
GEN-X-DRAINS
GEN-X-FLOORPLAN-ADJUSTED

NOTES:

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   b) EXCAVATED ASPHALT OR CONCRETE – FOR MATERIAL THAT HAS NOT CONTACTED SITE SOILS AND THAT NEITHER MEETS THE DEFINITION OF GROSSLY CONTAMINATED MEDIA (AS DEFINED IN 6 NYCRR PART 375–1.2(v)) NOR EXCEEDS A PID SCREENING VALUE OF 25 PPM, MANAGE FOR OFF–SITE RECYCLING. FOR MATERIAL THAT HAS CONTACTED SITE SOILS OR THAT EITHER MEETS THE DEFINITION OF GROSSLY CONTAMINATED MEDIA (AS DEFINED IN 6 NYCRR PART 375–1.2(v)) OR EXCEEDS A PID SCREENING VALUE OF 25 PPM, MANAGE AS LISTED HAZARDOUS WASTE (F001/F002) UNLESS OWNER OBTAINS CONTAINED–IN DETERMINATION.
   c) DEWATERING:
      - MANAGE WATER AS LISTED WASTE (F001/F002) UNLESS OWNER OBTAINS CONTAINED–IN DETERMINATION.
      - CONTAINERIZE WATER IN FRAC TANK(S) FOR FUTURE OFF–SITE DISPOSAL. REFER TO FIGURE 11 FOR PROPOSED FRAC TANK STAGING LOCATION(S).
   d) EXCAVATED SOILS:
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      - FLUIDS FROM SATURATED SOILS WILL BE COLLECTED, CONTAINERIZED, AND CHARACTERIZED FOR DISPOSAL.
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3. ENGINEER TO CONDUCT COMMUNITY AIR MONITORING IN ACCORDANCE WITH THE COMMUNITY AIR MONITORING PLAN, INCLUDING SPECIAL COMMUNITY AIR MONITORING PLAN REQUIREMENTS FOR WORK WITHIN 20 FEET OF POTENTIALLY EXPOSED INDIVIDUALS OR OCCUPIED STRUCTURES.

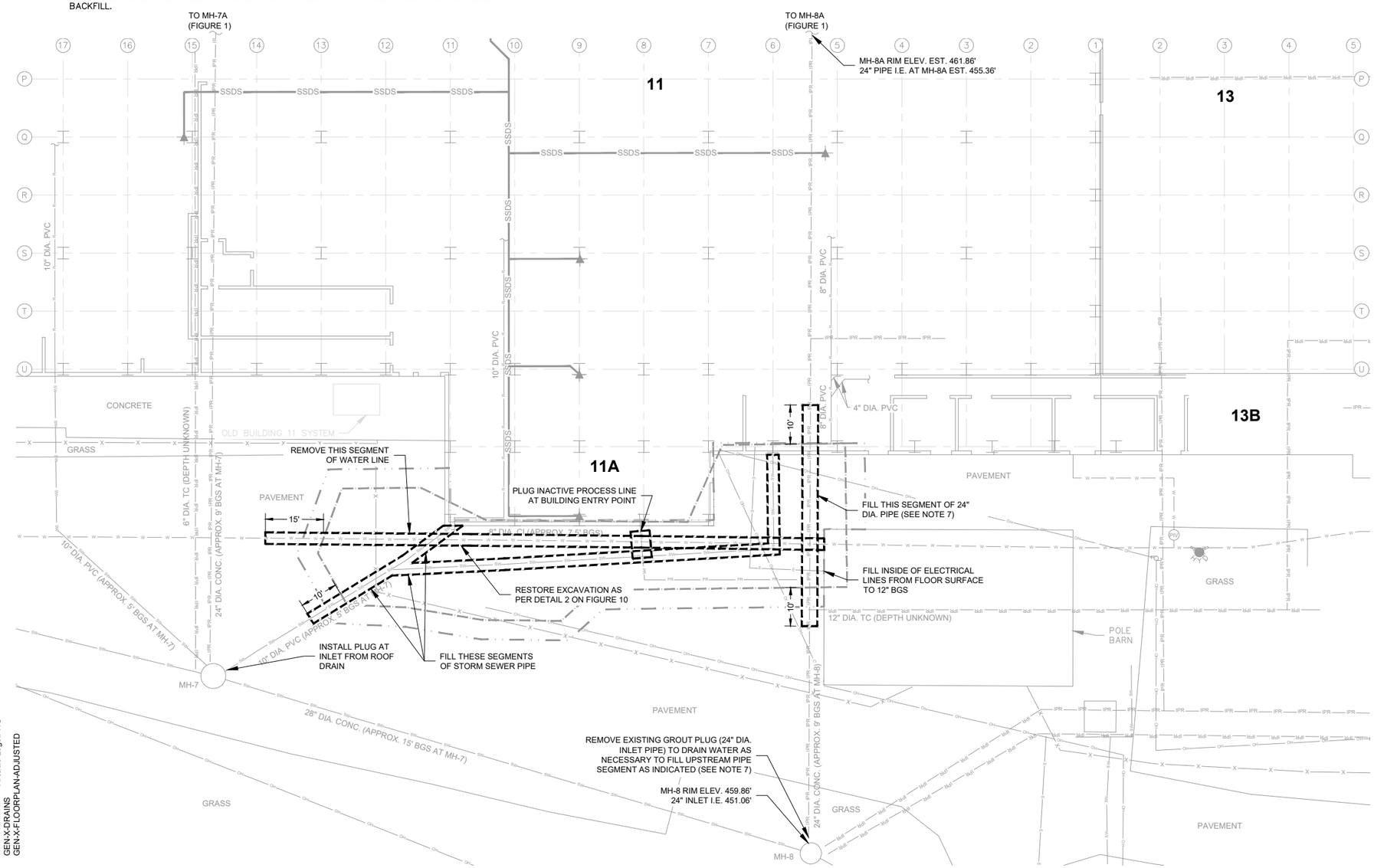
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5. CONTRACTOR SHALL DETERMINE ITS WORK SCHEDULE AND SEQUENCE WITH CONSIDERATION TO RELATED ROOF DRAIN REROUTING TASK. DOWNTIME FOR ACTIVE UTILITIES SHALL BE KEPT TO A MINIMUM.

6. USE OF THE WORD "PLUG" ON THIS DRAWING SHALL IMPLY A PERMANENT PLUG BLOCKING THE ENTIRE INNER CROSS–SECTIONAL SURFACE AREA OF A PIPE AT AN INDICATED LOCATION. USE OF THE WORD "FILL" ON THIS DRAWING SHALL AN INDICATED SEGMENT OF PIPE (OR PIPE ANNULUS IF INDICATED) IS TO BE ENTIRELY AND PERMANENTLY FILLED. CONTRACTOR MAY PROPOSE MEANS AND METHODS FOR PERMANENT PLUGGING AND FILLING PIPES, INCLUDING MATERIALS (E.G., CONCRETE, FLOWABLE FILL, ETC.) (SUBJECT TO ENGINEER APPROVAL).

7. MEANS AND METHODS OF PLUGGING SEGMENT OF 24–INCH DIAMETER PIPE TO BE DETERMINED BY CONTRACTOR AND ARE SUBJECT TO ENGINEER APPROVAL. SUPPORTING INFORMATION FOR THIS TASK INCLUDES THE FOLLOWING:
   - PIPE IS PLUGGED AT MH–8 AND OPEN/SUBMERGED AT MH–8A.
   - EXCAVATION INSIDE BUILDING IS NOT PREFERRED.
   - PIPE PLUGGING SHALL BE VERIFIED BY EITHER VISUAL MEANS OR CAMERA INSPECTION.
   - PLUGGING ENTIRETY OF LINE FROM MH–8A TO MH–8 IS ACCEPTABLE.

8. REFER TO FIGURE 10 FOR BACKFILL AND RESTORATION DETAILS.



LEGEND:

- SSDS EXTRACTION POINT
- SSDS CONVEYANCE PIPING (AG)
- WATER LINE (UG)
- ELECTRIC LINE (OH)
- ELECTRIC LINE (UG)
- ROOF DRAIN (AG)
- INACTIVE PROCESS WASTE LINES (UG)
- POTENTIAL INACTIVE PROCESS WASTE LINES (UG)
- STORMWATER/ROOF DRAIN PIPE (UG)
- MANHOLE
- POST INDICATOR VALVE
- ELECTRICAL POLE
- FENCE
- ISTR THERMAL INFLUENCE ZONE
- VAPOR CAP
- 13B BUILDING ID

AG	ABOVE–GRADE
BGS	BELOW GROUND SURFACE
CI	CAST IRON
CONC.	CONCRETE
ENGINEER	ARCADIS OF NEW YORK, INC.
I.E.	INVERT ELEVATION
ISTR	IN SITU THERMAL REMEDIATION
OH	OVERHEAD
PID	PHOTOIONIZATION DETECTOR
PPM	PARTS PER MILLION
PVC	POLYVINYL CHLORIDE
SSDS	SUB–SLAB DEPRESSURIZATION SYSTEM
TC	TERRA COTTA
UG	UNDERGROUND

0 15' 30'
GRAPHIC SCALE

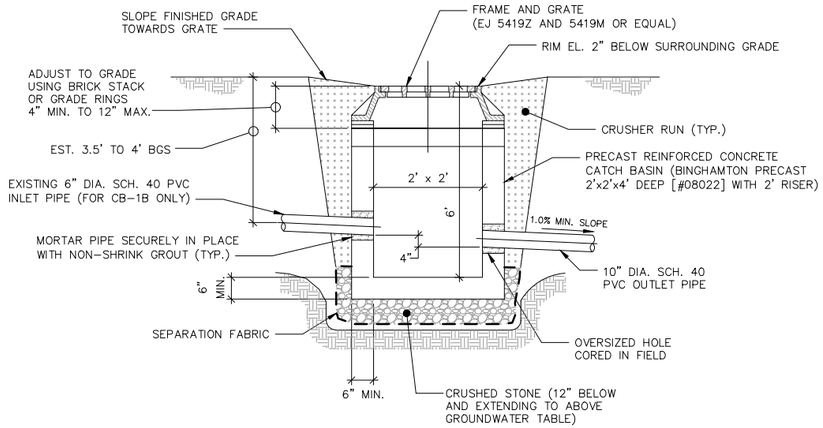
G.T.E. PRODUCTS CORPORATION, NYSDEC SITE NO. 850003
FORMER PHILIPS DISPLAY COMPONENTS FACILITY
SENECA FALLS, NEW YORK
WASTE MANAGEMENT PLAN FOR ISTR PREPARATION ACTIVITIES

AOC 3 UTILITY ABANDONMENT

ARCADIS

FIGURE 9

C:\Users\jharris\DOCACDDocs\Arcadis ACC USAUS-99999999-GTEOSI_FMR PHILIPS SITE_SENECA FALLS_NY\Project Files\10_WIP\10T_ARC_ENV\2025\01-DWG\WMP-FIG09-AOC3-PIPE PLUG.dwg LAYOUT: 9 SAVED: 9/17/2025 10:33 AM ACADVER: 25.1S (LMS TECH) PAGESETUP: PDF-D2B
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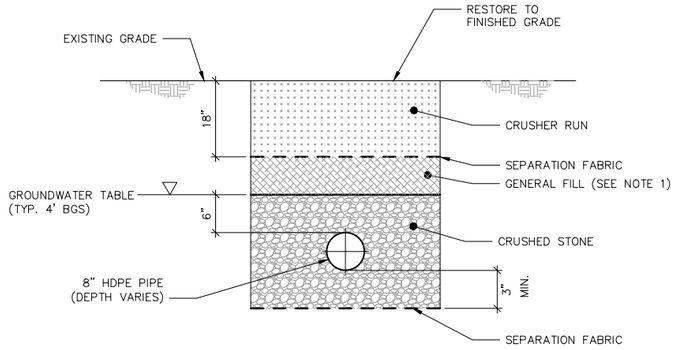


NOTES:

1. ALL CATCH BASINS, STRUCTURES, FRAMES, AND GRATES SHALL BE DESIGNED FOR H20 LOADING.
2. REFER TO SPECIFICATIONS FOR MATERIALS REQUIREMENTS.
3. SEPARATION FABRIC SHALL CONSIST OF NON-WOVEN GEOTEXTILE MEETING A CLASS 1 DESIGNATION PER AASHTO-M-288, 8 OZ/YD2 MINIMUM WEIGHT.

1 CATCH BASIN DETAIL

NOT TO SCALE

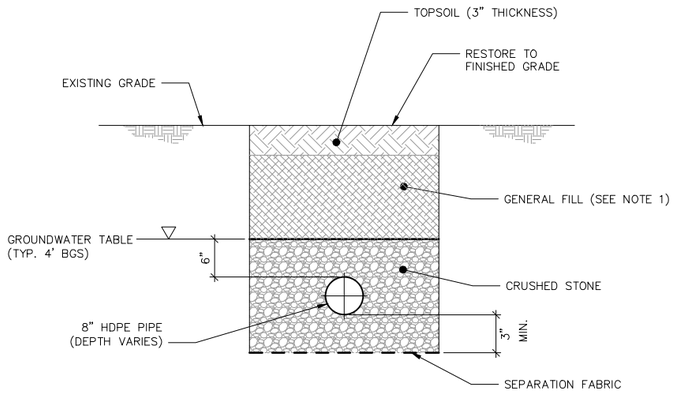


NOTES:

1. USE STOCKPILED UNSATURATED SOIL FOR GENERAL FILL. SOIL MUST HAVE ORIGINATED FROM THE SAME EXCAVATION AREA TO BE USED AS BACKFILL.
2. SEE SPECIFICATIONS FOR MATERIALS REQUIREMENTS.
3. SEE SPECIFICATIONS FOR BACKFILL AND COMPACTION REQUIREMENTS.
4. SEPARATION FABRIC SHALL CONSIST OF NON-WOVEN GEOTEXTILE MEETING A CLASS 1 DESIGNATION PER AASHTO-M-288, 8 OZ/YD2 MINIMUM WEIGHT.

2 WATER LINE TRENCH IN ASPHALT/CONCRETE

NOT TO SCALE

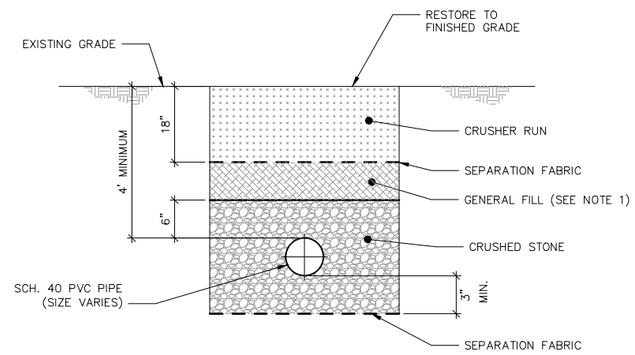


NOTES:

1. USE STOCKPILED UNSATURATED SOIL FOR GENERAL FILL. SOIL MUST HAVE ORIGINATED FROM THE SAME EXCAVATION AREA TO BE USED AS BACKFILL.
2. SEE SPECIFICATIONS FOR MATERIALS REQUIREMENTS.
3. SEE SPECIFICATIONS FOR BACKFILL AND COMPACTION REQUIREMENTS.
4. SEED TOPSOIL WITH PERENNIAL RYE GRASS AND COVER WITH 1/4-INCH OF STRAW. WATER DAILY UNTIL ESTABLISHMENT.
5. SEPARATION FABRIC SHALL CONSIST OF NON-WOVEN GEOTEXTILE MEETING A CLASS 1 DESIGNATION PER AASHTO-M-288, 8 OZ/YD2 MINIMUM WEIGHT.

3 WATER LINE TRENCH IN GRASS

NOT TO SCALE



NOTES:

1. USE STOCKPILED UNSATURATED SOIL FOR GENERAL FILL. SOIL MUST HAVE ORIGINATED FROM THE SAME EXCAVATION AREA TO BE USED AS BACKFILL.
2. SEE SPECIFICATIONS FOR MATERIALS REQUIREMENTS.
3. SEE SPECIFICATIONS FOR BACKFILL AND COMPACTION REQUIREMENTS.
4. SEPARATION FABRIC SHALL CONSIST OF NON-WOVEN GEOTEXTILE MEETING A CLASS 1 DESIGNATION PER AASHTO-M-288, 8 OZ/YD2 MINIMUM WEIGHT.

4 STORMWATER PIPE TRENCH

NOT TO SCALE

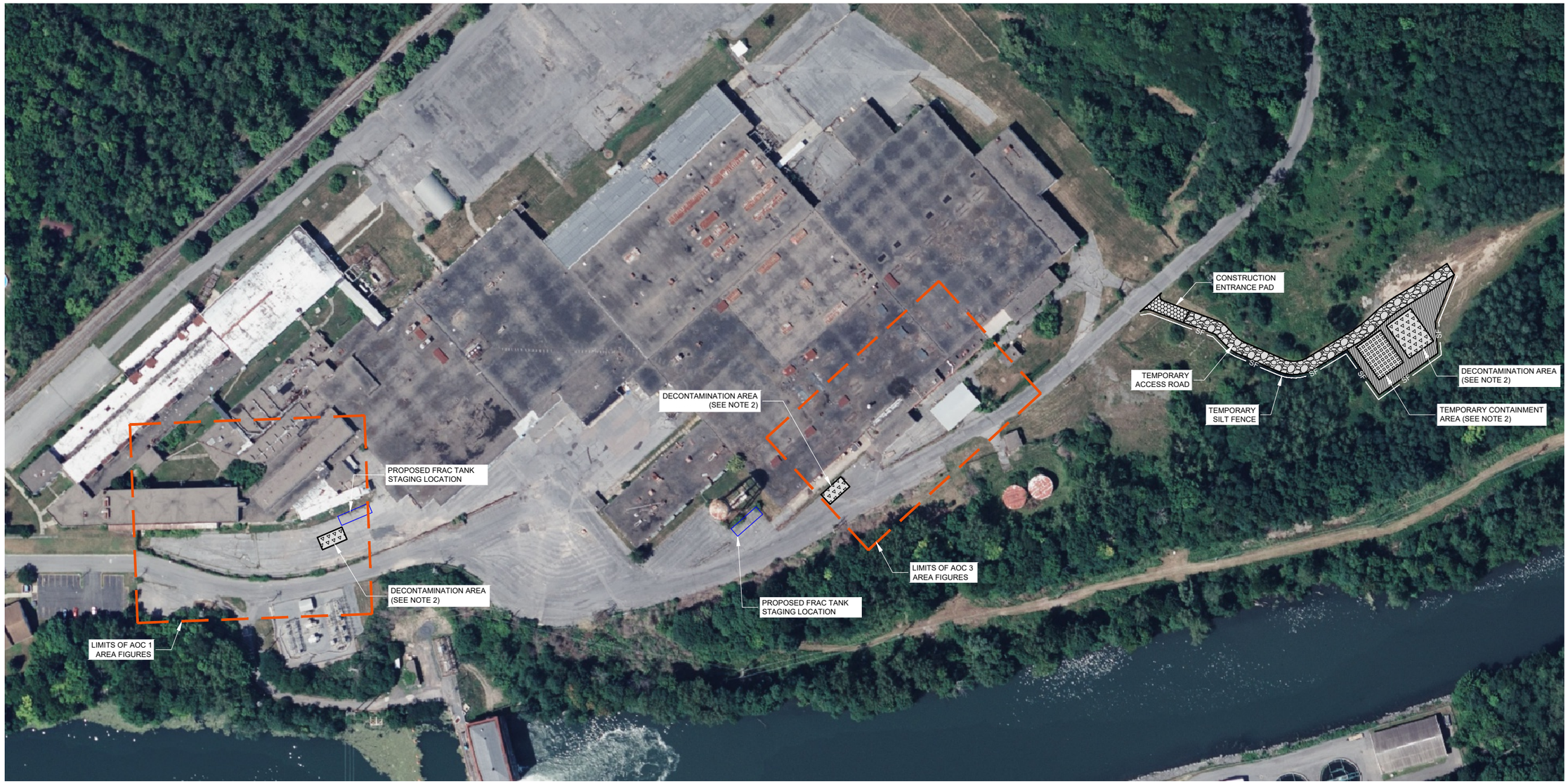
G.T.E. PRODUCTS CORPORATION, NYSDEC SITE NO. 850003
FORMER PHILIPS DISPLAY COMPONENTS FACILITY
SENECA FALLS, NEW YORK
WASTE MANAGEMENT PLAN FOR ISTR PREPARATION ACTIVITIES

BACKFILL/RESTORATION DETAILS

ARCADIS

FIGURE 10

C:\Users\jlharris\DOCACCDocs\Arcadis ACC US\AUS-99999999-GTEOSI_FMR PHILIPS SITE_SENECA FALLS_NY\Project Files\10_WIP\10T_ARC_ENV\2025\01-DWG\WMP-FIG10-DETAILS.dwg LAYOUT: 10 SAVED: 9/17/2025 10:34 AM ACADVER: 25.1S (LMS TECH) PAGESETUP: PDF-D2B
PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 9/17/2025 10:34 AM BY: HARRIS, JESS
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LEGEND:

- SF — SILT FENCE
- TEMPORARY CONTAINMENT AREA
- DECONTAMINATION AREA
- TEMPORARY ACCESS ROAD
- TEMPORARY CONSTRUCTION ENTRANCE
- AREA AVAILABLE FOR STAGING AND LAYDOWN

NOTES:

1. CONSTRUCT TEMPORARY CONTAINMENT AREA, DECONTAMINATION AREA, TEMPORARY ACCESS ROAD, CONSTRUCTION ENTRANCE PAD, AND TEMPORARY SILT FENCE IN ACCORDANCE WITH THE DESIGN DETAILS PROVIDED IN APPENDIX H OF THE 100% REMEDIAL DESIGN REPORT.
2. TEMPORARY CONTAINMENT AREA AND DECONTAMINATION AREAS SHOWN ARE APPROXIMATE. THE ACTUAL SIZES AND LOCATIONS SHALL BE DETERMINED BY THE CONTRACTOR AND APPROVED BY THE OWNER AND/OR ENGINEER PRIOR TO CONSTRUCTION.

0 80' 160'
GRAPHIC SCALE

G.T.E. PRODUCTS CORPORATION, NYSDEC SITE NO. 850003
FORMER PHILIPS DISPLAY COMPONENTS FACILITY
SENECA FALLS, NEW YORK

WASTE MANAGEMENT PLAN FOR ISTR PREPARATION ACTIVITIES

SUPPORT AREAS

ARCADIS

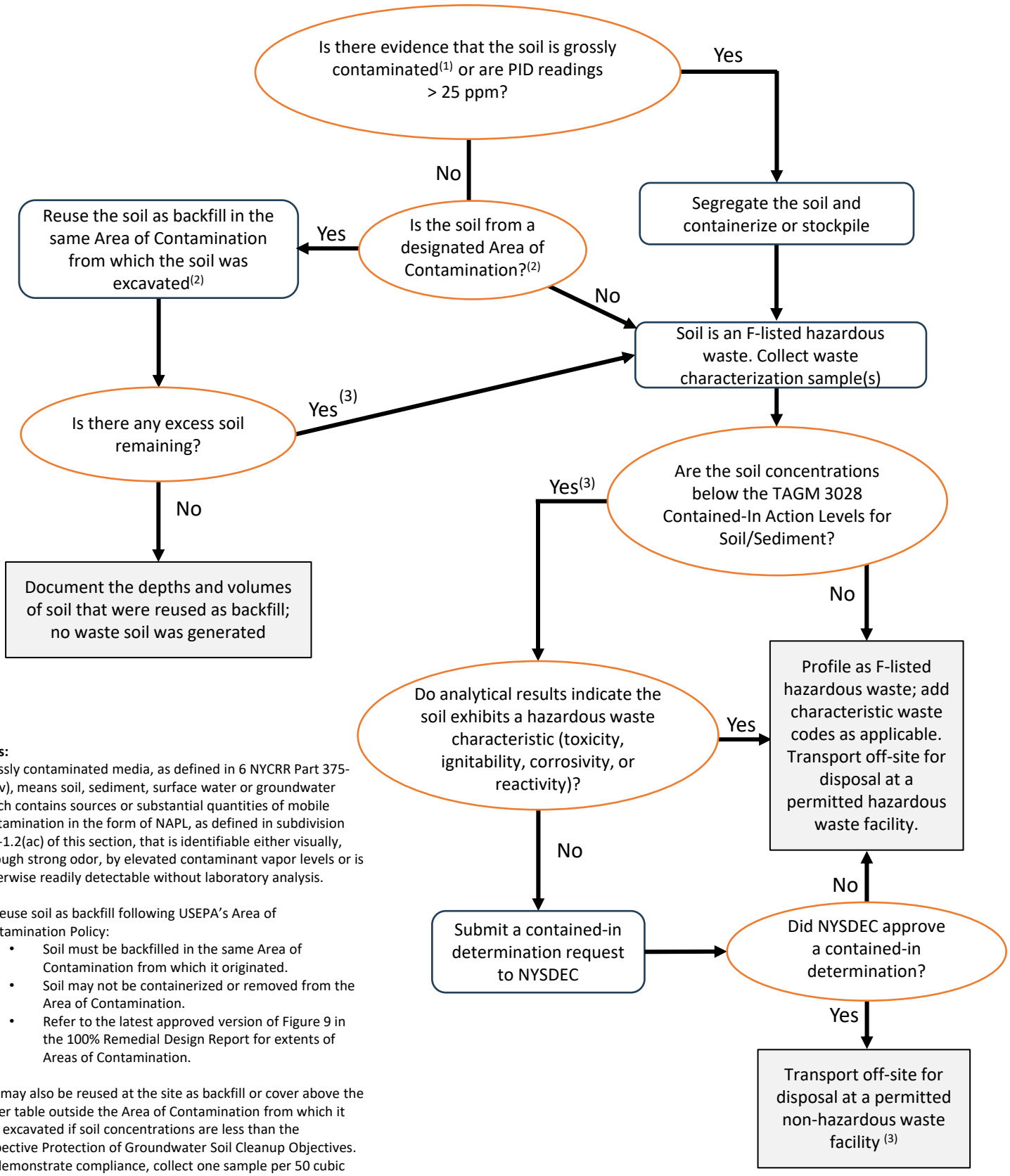
FIGURE 11

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PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 9/17/2025 10:40 AM BY: HARRIS, JESS
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WMP-X-Border Arcadis Logo.PNG

Attachment 2

Soil Management Flow Chart

Former Philips Display Components Facility
Seneca Falls, New York
ISTR Preparation and Installation Activities –
Soil Management Flow Chart



Footnotes:

(1) Grossly contaminated media, as defined in 6 NYCRR Part 375-1.2(v), means soil, sediment, surface water or groundwater which contains sources or substantial quantities of mobile contamination in the form of NAPL, as defined in subdivision 375-1.2(ac) of this section, that is identifiable either visually, through strong odor, by elevated contaminant vapor levels or is otherwise readily detectable without laboratory analysis.

(2) To reuse soil as backfill following USEPA's Area of Contamination Policy:

- Soil must be backfilled in the same Area of Contamination from which it originated.
- Soil may not be containerized or removed from the Area of Contamination.
- Refer to the latest approved version of Figure 9 in the 100% Remedial Design Report for extents of Areas of Contamination.

(3) Soil may also be reused at the site as backfill or cover above the water table outside the Area of Contamination from which it was excavated if soil concentrations are less than the respective Protection of Groundwater Soil Cleanup Objectives. To demonstrate compliance, collect one sample per 50 cubic yards of soil for analysis of the parameters listed for imported fill/soil in Section 5.7 of the 100% Remedial Design Report.

Appendix H

Operable Unit 2 Design Drawings and Specifications

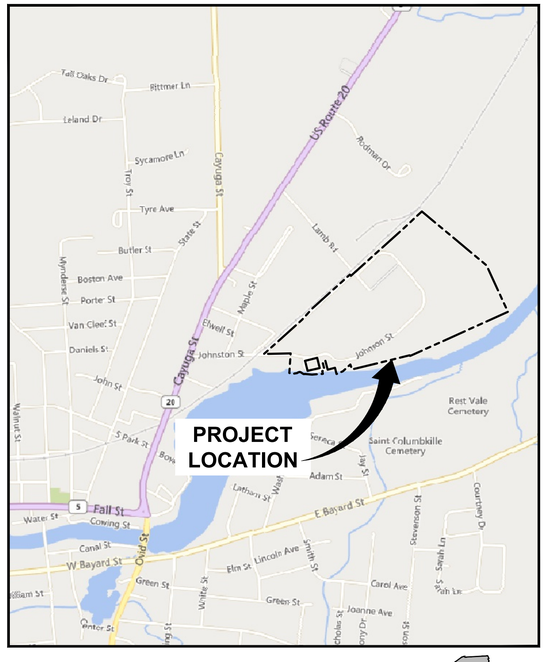
DESIGN DRAWINGS

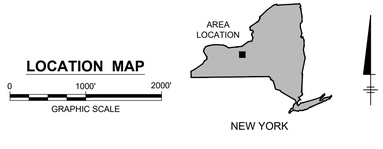
DESIGN DRAWINGS

REMEDIAL DESIGN - OPERABLE UNIT 2

FORMER PHILIPS DISPLAY COMPONENTS FACILITY
SENECA FALLS, NEW YORK
NYSDEC SITE NO. 850003

DRAFT 100% DESIGN - APRIL 2024
REVISED 100% DESIGN - SEPTEMBER 2025





LOCATION MAP

0 1000' 2000'

GRAPHIC SCALE

OWNER

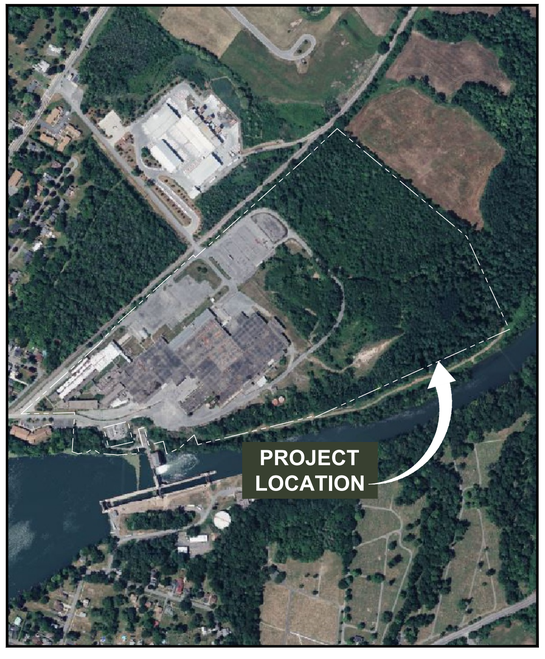
GTE OPERATIONS SUPPORT INCORPORATED
ONE VERIZON WAY, VC 33E039
BASKING RIDGE, NJ 07920

ENGINEER

ARCADIS OF NEW YORK, INC.
646 PLANK ROAD, SUITE 100
CLIFTON PARK, NY 12065

INDEX TO DRAWINGS

	COVER SHEET
1	GENERAL NOTES, ABBREVIATIONS, AND LEGEND
2	EXISTING CONDITIONS PLAN
3	SITE PREPARATION PLAN
4	EXCAVATION PLAN HO-2
5	EXCAVATION PLAN HO-4 AND HO-5
6	EXCAVATION PLAN HO-6, HO-7 AND HO-6/7
7	RESTORATION PLAN HO-2
8	CAPPING PLAN HO-3
9	RESTORATION PLAN HO-4 AND HO-5
10	RESTORATION PLAN HO-6, HO-7 AND HO-6/7
11	PROFILE HO-2
12	PROFILES HO-4 AND HO-5
13	PROFILES HO-6, HO-7 AND HO-6/7
14	EROSION AND SEDIMENT CONTROL DETAILS
15	TEMPORARY CONSTRUCTION DETAILS
16	MISCELLANEOUS DETAILS
17	MISCELLANEOUS DETAILS
18	RESTORATION NOTES AND DETAILS



AERIAL PHOTO

0 500' 1000'

GRAPHIC SCALE

STATE OF NEW YORK
DANIEL B. HIGGINS
098643-1
LICENSED PROFESSIONAL ENGINEER
Oct 1, 2025

ARCADIS

ARCADIS OF NEW YORK, INC.

NO ALTERATIONS PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK STATE EDUCATION LAW

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LEGEND - EXISTING SITE FEATURES

- PROPERTY BOUNDARY
- 440 — MAJOR TOPOGRAPHIC CONTOUR (20' INTERVAL)
- 438 — MINOR TOPOGRAPHIC CONTOUR (2' INTERVAL)
- PAVED ROAD
- UNPAVED ROAD
- EXISTING OBSERVED EDGE OF WATER
- CENTERLINE OF HISTORICAL OUTFALL (HO) DITCH
- 100-YEAR FLOODPLAIN (385.44 FEET AT SENECA RIVER, 430.54 IN VAN CLEEF LAKE, ABOVE SEA LEVEL)
- MONUMENT
- HISTORICAL OUTFALL DITCH SAMPLE LOCATION
- MONITORING WELL
- W — W — WATER LINE
- E — ELECTRIC LINE
- OE — OE — ELECTRIC LINE (OVERHEAD)
- GAS — GAS — GAS LINE
- D — STORM SEWER PIPE
- R — STORM WATER (ROOF DRAINS)
- PR — PROCESS WASTE LINES
- S — SANITARY SEWER
- FW — FORMER WATER LINE
- MANHOLE / CATCH BASIN
- UTILITY POLE
- ELECTRIC TOWER
- FIRE HYDRANT
- CHAIN-LINK FENCE
- APPROXIMATE EXISTING TREE LINE
- EXISTING WETLANDS/STREAMS

LEGEND - PROPOSED SITE FEATURES

- 450 — MAJOR TOPOGRAPHIC CONTOUR (10' INTERVAL)
- MINOR TOPOGRAPHIC CONTOUR (2' INTERVAL)
- GRADE BREAK
- LOD — LIMIT OF DISTURBANCE
- TEMPORARY SILT FENCE
- X — TEMPORARY SECURITY FENCE
- TEMPORARY CHECK DAM
- STABILIZED CONSTRUCTION ENTRANCE
- CONTRACTOR SUPPORT AREA
- CONSTRUCTION VEHICLE ROUTE
- WATER BAR
- EXCAVATION AREA
- 2.0' — EXCAVATION DEPTH
- EXISTING ACCESS ROAD TO BE IMPROVED AS NEEDED
- LIMITS OF TYPE A EROSION CONTROL MAT
- LIMITS OF TYPE B EROSION CONTROL MAT
- APPROXIMATE LIMITS OF GRADING
- LIMITS OF CONCRETE CAP
- LIMITS OF STONE INFILL
- LIMITS OF RIPRAP
- LIMITS OF VEGETATED RESTORATION AREA
- LIMITS OF WETLAND RESTORATION
- X / X — DETAIL/SECTION REFERENCE NUMBER / DRAWING REFERENCE NUMBER

1 - GENERAL NOTES

1. ACTUAL SITE FEATURES AT THE TIME OF CONSTRUCTION MAY DIFFER FROM THOSE SHOWN ON THE DESIGN DRAWINGS. CONTRACTOR SHALL PROMPTLY NOTIFY THE ENGINEER (IN WRITING) OF ANY SUCH DIFFERENCES THAT MAY AFFECT THE PERFORMANCE OF THE WORK.
2. CONTRACTOR SHALL OBTAIN ANY OTHER FEDERAL, STATE, COUNTY, AND CITY-SPECIFIC PERMITS THAT MAY BE REQUIRED TO PERFORM THE WORK.
3. INFORMATION RELATED TO SUBSURFACE CONDITIONS IS APPROXIMATE AND SHOULD NOT BE RELIED ON AS A COMPLETE DEPICTION OF SITE CONDITIONS. CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS, INCLUDING ABOVE GRADE AND SUBSURFACE FEATURES WHETHER OR NOT SHOWN ON DRAWING OR OTHERWISE DESCRIBED IN THE CONTRACT DOCUMENTS.
4. CONTRACTOR SHALL MAINTAIN ACCESS FOR THE PROPERTY OWNER AT ALL TIMES. PROPERTY OWNER'S PERSONNEL SHALL HAVE ACCESS TO SITE FEATURES AND AREAS OF THE WORK THAT ARE TO REMAIN OPERATIONAL DURING CONSTRUCTION ACTIVITIES. CONTRACTOR SHALL SECURE ALL OTHER AREAS IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
5. HISTORICAL OUTFALL DITCH SAMPLES ARE BASED ON MARCH 2022 PRE-DESIGN INVESTIGATION REPORT BY ARCADIS, AND WERE COLLECTED IN JULY AND AUGUST OF 2020.
6. DEFINITIONS:
   CONTRACTOR = ENTITY THAT HAS ENTERED INTO AGREEMENT WITH ENGINEER TO PERFORM THE WORK
   ENGINEER = ARCADIS OF NEW YORK, INC. ENGINEER IS ACTING AS THE PROFESSIONAL ENGINEER OF RECORD AND WILL BE CERTIFYING THE FINAL ENGINEERING REPORT AND STAMPING RECORD DRAWINGS IN FINAL ENGINEERING REPORT.
   OWNER = GTE OPERATIONS SUPPORT INCORPORATED.
   PROPERTY OWNER = SENECA FALLS SPECIALTIES AND LOGISTICS COMPANY.

2 - UTILITY NOTES

1. THE LOCATIONS, ALIGNMENTS, AND CONSTRUCTION OF UTILITIES SHOWN ON THE DRAWINGS ARE APPROXIMATE AND BASED ON INFORMATION READILY AVAILABLE TO THE OWNER/ENGINEER. CONTRACTOR SHALL VERIFY THE PRESENCE AND LOCATION OF ALL OVERHEAD/UNDERGROUND SITE FEATURES AND UTILITIES RELEVANT TO, AND POTENTIALLY TO BE ENCOUNTERED DURING THE WORK. ADDITIONAL SITE FEATURES AND UTILITIES MAY BE PRESENT THAT ARE NOT SHOWN ON THE DRAWINGS.
2. CONTRACTOR SHALL CONTACT/COORDINATE WITH UDIG NY TO LOCATE AND IDENTIFY UNDERGROUND UTILITIES. THE DIG SAFELY NEW YORK PHONE NUMBER IS 811 AND THE WEBSITE IS HTTP://UDIGNY.ORG.
3. CONTRACTOR SHALL SUBCONTRACT/COORDINATE WITH AN APPROPRIATE PRIVATE UTILITY LOCATOR TO LOCATE AND IDENTIFY UNDERGROUND UTILITIES WITHIN WORK LIMITS.
4. EXCEPT WHERE NOTED OR AS OTHERWISE INDICATED IN THE DESIGN, CONTRACTOR SHALL MAINTAIN AND PROTECT ALL OVERHEAD/UNDERGROUND SITE FEATURES AND UTILITIES THAT MAY BE AFFECTED BY THE WORK. ALL UTILITIES, UNLESS STATED OTHERWISE, SHALL REMAIN IN OPERATION FOR THE DURATION OF THE WORK.
5. CONTRACTOR SHALL CONTACT/COORDINATE WITH THE APPROPRIATE UTILITIES COMPANIES FOR THE TEMPORARY BRACING, REMOVAL, RELOCATION, AND/OR REPLACEMENT OF ANY UTILITIES, UTILITY POLES, OR GUY WIRES.
6. CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING TEMPORARY ELECTRIC SERVICE (E.G., GENERATORS OR OBTAINING METERED POWER FROM EXISTING SERVICE AT FACILITY) AS NECESSARY TO SUPPORT CONSTRUCTION ACTIVITIES. ALL COSTS ASSOCIATED WITH TEMPORARY ELECTRICAL SERVICE, INCLUDING, BUT NOT LIMITED TO, PERMITTING, INSPECTIONS, FEES, CONNECTION, MODIFICATIONS, ENERGIZING, FUEL FOR GENERATORS, AND USAGE CHARGES, SHALL BE BORNE BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER/ENGINEER. ELECTRICAL SERVICE PROVIDED BY THE CONTRACTOR SHALL BE OF SUFFICIENT CAPACITY AND CHARACTERISTIC TO SUPPLY THE PROPER CURRENT FOR THE VARIOUS TYPES OF EQUIPMENT, PUMPS, AND TOOLS WITH MOTORS, LIGHTS, AND OTHER REQUIRED FACILITIES TO IMPLEMENT THE WORK. ALL NECESSARY SUPPORTS, CONNECTIONS FOR UTILITY WIRING, PANELBOARDS, OUTLETS, SWITCHES, LAMPS, LAMP HOLDERS, CIRCUIT-PROTECTION DEVICES, CONTROLS, AND ACCESSORIES SHALL BE PROVIDED BY THE CONTRACTOR AND SHALL CONFORM TO ALL APPLICABLE FEDERAL, STATE, AND LOCAL CODES AND REGULATIONS.
7. IF THE CONTRACTOR DAMAGES EXISTING UTILITY EQUIPMENT OR STRUCTURES, CONTRACTOR SHALL NOTIFY THE UTILITY COMPANY OR MUNICIPALITY AND FULLY REPAIR DAMAGES IN ACCORDANCE WITH THE REQUIREMENTS OF THE UTILITY COMPANY/ MUNICIPALITY AT NO ADDITIONAL COST TO THE OWNER.

3 - REFERENCE AND SURVEY NOTES

1. ALL LOCATIONS ARE APPROXIMATE.
2. BASE MAP PREPARED FROM TOPOGRAPHIC SURVEY FOR OUTFALL AREAS AND REMEDIATION AREAS BASED ON SEPTEMBER 8, 2020 FIELD SURVEY BY ADVANCED INFORMATION SYSTEMS, JOHN S. DAMIANO, LLS AND NEW YORK STATE GIS PROGRAM OFFICE (NYSGPO). ALL OTHER AREAS BASED ON USGS LIDAR DATA FOR THE "CENTRAL NY FINGERLAKES" DATED 2020. LIDAR ACCURACY IS 1 METER.
3. LOCATIONS SURVEYED RELATIVE TO NORTH AMERICAN DATUM 1983, NEW YORK STATE PLAN COORDINATE SYSTEM CENTRAL ZONE. ELEVATIONS PRESENTED IN U.S. SURVEY FEET BASED ON VERTICAL DATUM NAVD-1988.
4. ESTABLISH AND MAINTAIN CONSTRUCTION SURVEY CONTROL AND VERIFY GRADES DURING THE PERFORMANCE OF WORK AND FOR AS-BUILT DOCUMENTATION PURPOSES USING A NEW YORK STATE LICENSED LAND SURVEYOR.

4 - WASTE MANAGEMENT NOTES

1. EXISTING SITE FEATURES NOT SPECIFICALLY IDENTIFIED ON THE DRAWINGS MAY REQUIRE REMOVAL AND DISPOSAL BY CONTRACTOR TO FACILITATE CONSTRUCTION. DO NOT REMOVE SUCH FEATURES WITHOUT PRIOR APPROVAL FROM THE OWNER OR ENGINEER.
2. COLLECT, CONVEY, CONTAINERIZE, AND DISPOSE OFFSITE ALL WATER GENERATED DURING THE PROJECT (E.G., FROM EXCAVATION/MATERIAL DEWATERING, GROUNDWATER ENCOUNTERED DURING EXCAVATION ACTIVITIES, CONTACT RUNOFF, DECONTAMINATION OF EQUIPMENT) IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS. CONTRACTOR IS RESPONSIBLE FOR ALL COSTS AND FEES ASSOCIATED WITH THE OPERATION, TESTING, MAINTENANCE, AND DISPOSAL OF WATER MANAGEMENT SYSTEM.
3. HANDLE, STAGE (IF REQUIRED) AND DISPOSE OF ALL GENERATED WASTES. DECONTAMINATE EQUIPMENT THAT COMES INTO CONTACT WITH IMPACTED MATERIAL PRIOR TO HANDLING NON-IMPACTED MATERIAL AND PRIOR TO LEAVING THE SITE.
4. ADDITIONAL EXCAVATION BEYOND LIMITS SHOWN MAY BE REQUIRED BASED ON FIELD OBSERVATION TO BE CONDUCTED BY THE ENGINEER.
5. EXCAVATED IMPACTED SOILS TO BE DEWATERED OR TEMPORARILY STORED ONSITE SHALL BE STAGED IN LINED CONTAINMENT AREAS IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS AND DETAIL 3 ON DRAWING 15.
6. SOILS FROM HO DITCHES 2, 4, AND 5 SHALL BE MANAGED AS HAZARDOUS WASTE. SOILS FROM HO DITCHES 6, 7, AND 6/7 SHALL BE MANAGED AS NON-HAZARDOUS WASTE. NON-HAZARDOUS SOILS SHALL BE STOCKPILED (IF STOCKPILING PERFORMED) SEPARATE FROM HAZARDOUS SOILS. DECONTAMINATE ALL EQUIPMENT AND TOOLS USED TO MANAGE HAZARDOUS SOILS STOCKPILE PRIOR TO LEAVING STOCKPILE AREA.
7. ALL WATER GENERATED DURING CONSTRUCTION ACTIVITIES THAT IS REQUIRED TO BE CONTAINERIZED FOR OFF-SITE DISPOSAL (IN ACCORDANCE WITH SPECIFICATIONS) MAY BE COMMINGLED REGARDLESS OF ORIGIN. REFER TO SWPPP FOR ADDITIONAL INFORMATION REGARDING WATER MANAGEMENT.

5 - SITE MANAGEMENT/PROJECT PERFORMANCE NOTES

1. UTILIZE COMPETENT, EXPERIENCED PERSONNEL TO PERFORM ALL WORK IN A NEAT AND ORDERLY MANNER, IN CONFORMANCE WITH BEST MODERN TRADE PRACTICE. MATERIALS AND INSTALLATION SHALL BE IN ACCORDANCE WITH ALL CODES, REGULATIONS, AND REQUIREMENTS OF ALL APPLICABLE CITY, STATE, FEDERAL, AND OTHER PUBLIC OR PRIVATE AUTHORITIES. KEEP THE CONSTRUCTION AREAS FREE FROM ACCUMULATIONS OF WASTE MATERIALS OR RUBBISH AT ALL TIMES; REMOVE ANY RUBBISH, TOOLS, EQUIPMENT, AND MATERIALS FROM THE PREMISES PRIOR TO COMPLETION OF THE WORK.
2. PROVIDE TEMPORARY FIRST AID AND SANITARY FACILITIES AT EACH WORK AREA AND THE TRAILER AREA. SANITARY FACILITIES SHALL INCLUDE SUITABLY-ENCLOSED CHEMICAL OR SELF-CONTAINED TOILETS AND TEMPORARY WASHING FACILITIES. TEMPORARY FACILITIES SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS.
3. ALL EQUIPMENT WITHIN THE PROJECT WORK LIMITS SHALL BE DECONTAMINATED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS PRIOR TO ARRIVAL ONSITE AND PRIOR TO LEAVING THE SITE. DECONTAMINATE PROJECT EQUIPMENT THAT COMES IN CONTACT WITH IMPACTED MATERIAL PRIOR TO HANDLING IMPORTED OR NON-IMPACTED MATERIALS, PRIOR TO MOVING ABOUT THE SITE, AND PRIOR TO LEAVING THE SITE.
4. PREVENT TRACKING OF SOIL MATERIALS ONTO OFF-SITE AREAS AND THROUGHOUT ON-SITE AREAS. IMMEDIATELY CLEAN UP ANY SOIL MATERIALS TRACKED, SPILLED, OR DROPPED AT NO ADDITIONAL COST TO THE OWNER/ENGINEER. TRACKING OF IMPACTED MATERIALS IS NOT PERMITTED IN ANY AREA.
5. ESTABLISH, MAINTAIN, AND PROTECT THE PROJECT WORK LIMITS (INCLUDE EXCLUSION, CONTAMINATION REDUCTION, AND SUPPORT ZONES) IN ACCORDANCE WITH THE CONTRACTOR'S HASP. PERFORM ALL WORK WITHIN THE PROJECT WORK LIMITS UNLESS PRIOR APPROVAL IS OBTAINED FROM THE OWNER AND ENGINEER.
6. PROVIDE TEMPORARY TRAFFIC CONTROL MEASURES (E.G., FLAGGERS, SIGNS, CONES). OBTAIN ANY NECESSARY PERMITS THAT MAY BE REQUIRED IN CONJUNCTION WITH VEHICLE USE ON PUBLIC ROADS.
7. DO NOT STORE EXCAVATED MATERIALS OR SUPPLIES OF ANY KIND ON PRIVATE OR PUBLIC PREMISES WITHOUT PRIOR APPROVAL FROM THE OWNER, ENGINEER AND NYSDEC PROJECT MANAGER.
8. COMMUNITY AIR MONITORING WILL BE PERFORMED BY OTHERS FOR PARTICULATES ON A CONTINUOUS BASIS DURING ALL INTRUSIVE AND/OR POTENTIAL DUST GENERATING ACTIVITIES (E.G., INSTALLATION OF EROSION AND SEDIMENT CONTROL MEASURES, EXCAVATION/MATERIAL HANDLING ACTIVITIES). ENSURE THAT COMMUNITY AIR MONITORING IS BEING PERFORMED PRIOR TO INITIATING INTRUSIVE AND/OR POTENTIAL DUST GENERATING ACTIVITIES EACH DAY. PERFORM WORK ZONE AIR MONITORING IN ACCORDANCE WITH THE CONTRACTOR'S HASP.
9. CONTROL DUST AND VAPORS GENERATED DURING THE PROJECT, AS NECESSARY, TO MEET THE COMMUNITY AIR MONITORING ACTION LEVELS SPECIFIED IN THE CONTRACTOR HEALTH AND SAFETY PLAN (CHASP.) IMPLEMENT DUST AND VAPOR CONTROLS, AS SPECIFIED IN THE CHASP AND TECHNICAL SPECIFICATIONS. CONTRACTOR SHALL BE RESPONSIBLE FOR COSTS ASSOCIATED WITH PROJECT DELAYS ASSOCIATED WITH UNCONTROLLED DUST EMISSIONS.
10. RESTORE ALL AREAS IMPACTED BY OR OTHERWISE DISTURBED DURING THE PROJECT TO PRE-CONSTRUCTION CONDITION, OR AS INDICATED IN THE DESIGN, IN A TIMELY MANNER AND PRIOR TO DEMOBILIZATION.
11. CONTRACTOR SHALL BE RESPONSIBLE FOR THE COORDINATION, LOADING, TRANSPORTATION, AND DISPOSAL OF ALL WASTE MATERIALS GENERATED DURING THE PROJECT.
12. COMPLY WITH NOISE CONTROLS IN THE CHASP AND ALL NOISE ORDINANCES. MAKE EVERY EFFORT TO MINIMIZE NOISE CAUSED BY CONSTRUCTION OPERATIONS. EQUIPMENT SHALL BE EQUIPPED WITH SILENCERS OR MUFFLERS DESIGNED TO OPERATE WITH THE LEAST POSSIBLE NOISE IN COMPLIANCE WITH LAWS AND REGULATIONS.

6 - SAFETY NOTES

1. ATTEND IN-PERSON SITE ORIENTATION PRIOR TO START OF WORK. PROVIDE EVIDENCE THAT ALL ON-SITE PERSONNEL HAVE COMPLETED OSHA 40-HOUR TRAINING AND 8-HOUR REFRESHER TRAINING PRIOR TO PERFORMING WORK WITH OR NEAR IMPACTED MATERIAL. PROVIDE A LIST OF ALL CHEMICAL PRODUCTS AND AN SDS FOR ALL CHEMICAL PRODUCTS TO BE USED ON-SITE. THE LIST MUST BE APPROVED BY THE OWNER OR ENGINEER PRIOR TO CHEMICAL PRODUCTS BEING BROUGHT ON-SITE.
2. ATTEND DAILY SAFETY MEETINGS IN ACCORDANCE WITH THE SITE-SPECIFIC HASP PRESENTED IN APPENDIX D OF THE 100% REMEDIAL DESIGN DOCUMENTS.
3. IMPLEMENT, MAINTAIN, AND SUPERVISE ALL SAFETY MEASURES AND PROGRAMS IN CONNECTION WITH THE PROJECT. TAKE ALL NECESSARY PRECAUTIONS FOR THE SAFETY OF, AND PROVIDE THE NECESSARY PRECAUTIONS TO PROTECT, SITE WORKERS, ENGINEERING PERSONNEL, AND SITE VISITORS. CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL SAFETY PROGRAMS FOR THEIR EMPLOYEES, SUBCONTRACTORS, AND ANY OTHER PERSONS WHO MAY BE AFFECTED BY THE WORK.
4. COMPLY WITH ALL APPLICABLE LAWS, ORDINANCES, RULES, REGULATIONS, AND ORDERS OF PUBLIC BODIES HAVING JURISDICTION FOR THE SAFETY OF PERSONS OR PROPERTIES OR TO PROTECT THEM FROM DAMAGE, INJURY, OR LOSS, INCLUDING, WITHOUT LIMITATION, THE DEPARTMENT OF LABOR SAFETY AND HEALTH REGULATIONS FOR CONSTRUCTION PROMULGATED UNDER THE OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970 (PL 91-596) AND UNDER SECTION 107 OF THE CONTRACT WORK HOURS AND SAFETY STANDARDS ACT (PL 91-54) AND AMENDMENTS THERETO.
5. FURNISH AND PLACE PROPER GUARDS FOR PREVENTION OF ACCIDENTS, AND PROVIDE ALL EXCAVATION SHORING/BACKING, SCAFFOLDING, SHIELDING, DUST/VAPOR/ODOR PROTECTION, MECHANICAL/ELECTRICAL PROTECTIONS, SPECIAL GROUNDING, SAFETY RAILINGS, BARRIERS, PROPER WORKING EQUIPMENT WITH FUNCTIONING SAFETY MECHANISMS (E.G., LIFT GATE WARNING SIGNALS), AND ALL APPLICABLE RECOMMENDATIONS OF THE MANUAL OF ACCIDENT PREVENTION IN CONSTRUCTION FROM THE ASSOCIATED GENERAL CONTRACTORS OF AMERICA, INC.
6. THE MATERIALS SUBJECT TO HANDLING AS PART OF THE PROJECT MAY CONTAIN HAZARDOUS CONSTITUENTS OR CHEMICALS AND SHOULD BE HANDLED IN ACCORDANCE WITH APPLICABLE REGULATIONS. CONTRACTOR SHALL DEVELOP AND IMPLEMENT APPROPRIATE HEALTH AND SAFETY MEASURES FOR ITS EMPLOYEES, SUBCONTRACTORS, AND SITE VISITORS, AND FOR THE PROTECTION OF THE ENVIRONMENT AND SURROUNDING COMMUNITY. DEVELOP THE CONTRACTOR'S HASP IN ACCORDANCE WITH APPLICABLE OSHA, FEDERAL, STATE, AND LOCAL REGULATIONS, INCLUDING 29 CFR 1910.120 AND 29 CFR 1926.65.
7. SEVERAL CONTRACTOR ACTIVITIES WILL BE PERFORMED WITHIN, ADJACENT TO, OR IN THE VICINITY OF THE EXCAVATION/BACKFILL AREAS. CONTRACTOR'S HASP SHALL RECOGNIZE THE TYPES OF ACTIVITIES TO BE PERFORMED, THE UNIQUE HAZARDS SPECIFIC TO THESE ACTIVITIES, AND SPECIAL PRECAUTIONS AND CONTROLS THAT ARE TO BE IMPLEMENTED. OF ADDITIONAL NOTE AND EMPHASIS ARE THOSE ACTIVITIES THAT POTENTIALLY INVOLVE WORK WITHIN THE EXCAVATION AREAS ONCE EXCAVATION/BACKFILL ACTIVITIES ARE INITIATED, AND THAT POTENTIALLY REQUIRE WORKER ACCESS INTO THE EXCAVATED AREAS. CLEARLY IDENTIFY AND EVALUATE THE SPECIFIC TYPES OF ACTIVITIES THAT COULD INVOLVE WORKER ENTRY INTO THE EXCAVATION AREAS. SPECIFIC INGRESS/EGRESS ROUTES, AND PROVISIONS, PERSONNEL AND WORK AREA MONITORING, PERSONAL PROTECTIVE EQUIPMENT, COMMUNICATIONS, ETC. FURTHER, TO THE EXTENT PRACTICABLE (AS DETERMINED BY THE CONTRACTOR), CONTRACTOR IS ENCOURAGED TO MINIMIZE WORKER ENTRY INTO EXCAVATED AREAS.

7 - SITE PREPARATION AND EROSION AND SEDIMENT CONTROL NOTES

1. INSTALL SITE SECURITY MEASURES AND EROSION AND SEDIMENTATION CONTROL MEASURES PRIOR TO DISTURBING SITE SOILS.
2. TAKE ALL NECESSARY PRECAUTIONS TO PREVENT MIGRATION OF CONSTRUCTION RELATED SOIL, DEBRIS, FUEL, SOLVENTS, LUBRICANTS, CONCRETE, LEACHATE, OR OTHER MATERIAL BEYOND THE PROJECT WORK LIMITS.
3. ACTUAL LOCATION OF EROSION AND SEDIMENTATION CONTROL MEASURES MAY VARY BASED ON ACTUAL SITE CONDITIONS AT THE TIME OF CONSTRUCTION.
4. INSPECT, MAINTAIN, AND INSTALL ADDITIONAL EROSION AND SEDIMENT CONTROLS (AS NEEDED AND IN COORDINATION WITH THE ENGINEER) DURING CONSTRUCTION. INSTALL ALL EROSION AND SEDIMENTATION CONTROL MEASURES IN ACCORDANCE WITH SWPPP AND NEW YORK STATE STANDARDS AND SPECIFICATIONS FOR EROSION AND SEDIMENT CONTROL.
5. INSPECT ALL EROSION AND SEDIMENTATION CONTROL MEASURES, AT A MINIMUM, ONCE EVERY SEVEN CALENDAR DAYS AND AFTER PRECIPITATION EVENTS GREATER THAN 0.5 INCHES IN ACCORDANCE WITH SWPPP REQUIREMENTS. CONTRACTOR SHALL DOCUMENT ALL INSPECTIONS AND MAINTAIN RECORDS OF ALL INSPECTIONS AND REPAIRS.
6. PROTECT ALL ABOVE AND BELOW GRADE UTILITIES.
7. CLEAR TREES AS NEEDED TO FACILITATE EXCAVATION OF SOILS. PRIOR TO CLEARING, CONTRACTOR SHALL PREPARE AND SUBMIT A TREE REMOVAL PLAN IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS. UPON SUBMITTAL, THE TREE REMOVAL PLAN WILL BE REVIEWED BY ENGINEER TO VERIFY THAT THE TREES PROPOSED FOR TRIMMING/REMOVAL ARE NOT POTENTIAL ROOSTING TREES FOR THE INDIANA BAT (MYOTIS SODALIS) OR NORTHERN LONG-EARED BAT (MYOTIS SEPTENTRIONALIS). CONSERVATION MEASURES SHALL BE IMPLEMENTED AS NEEDED IN COORDINATION WITH NYSDEC FOR ANY POTENTIAL BAT ROOSTING TREES PROPOSED FOR TRIMMING/REMOVAL (E.G., ADDITIONAL FIELD SURVEYS, DELAYING TREE REMOVAL UNTIL AFTER THE MATING AND PUP SEASON, ETC.). TREE REMOVAL PLAN MUST BE APPROVED BY NYSDEC PROJECT MANAGER PRIOR TO ITS IMPLEMENTATION.
8. CONTRACTOR SHALL PRESERVE NATURAL VEGETATION TO THE EXTENT PRACTICAL.
9. TEMPORARY SEEDING AND MULCHING OR COVERING SHALL BE APPLIED TO ANY DISTURBED AREA OR STOCKPILE WHERE SOIL WILL BE EXPOSED FOR MORE THAN 14 DAYS OR DURING PERIODS OF HEAVY PRECIPITATION.
10. CONTRACTOR SHALL COMPLETE ALL PERMANENT SOIL EROSION CONTROL MEASURES AS SOON AS POSSIBLE AFTER FINAL GRADING OR FINAL EARTH DISTURBANCE FOR EACH INDIVIDUAL WORK AREA. IF IT IS NOT POSSIBLE TO PERMANENTLY STABILIZE COMPLETED WORK AREAS, THEN THE CONTRACTOR SHALL MAINTAIN TEMPORARY EROSION AND SEDIMENT CONTROLS UNTIL PERMANENT EROSION CONTROL MEASURES ARE IN PLACE AND THE WORK AREA HAS BEEN STABILIZED TO THE SATISFACTION OF THE ENGINEER AND IN ACCORDANCE WITH NEW YORK STATE STANDARDS AND SPECIFICATIONS FOR EROSION AND SEDIMENT CONTROL.

ABBREVIATIONS:

CFR	CODE OF FEDERAL REGULATIONS
CHASP	COMMUNITY HEALTH AND SAFETY PLAN
HASP	HEALTH AND SAFETY PLAN
HO	HISTORICAL OUTFALL
NYSDEC	NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
NYSEG	NEW YORK STATE ELECTRIC AND GAS
OSHA	OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
ROW	RIGHT OF WAY
SDS	SAFETY DATA SHEET
SLF	SECURE LANDFILL
SPDES	STATE POLLUTION DISCHARGE ELIMINATION SYSTEM
SWPPP	STORM WATER POLLUTION PREVENTION PLAN
USEPA	UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

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Professional Engineer's Name: MICHAEL B. HIGGINS
Professional Engineer's No.: 089643

State	Date Signed	Project Mgr.
NY	10.01.2025	MAF
Designed by	Drawn by	Checked by
PTO	JLH	CMD

STATE OF NEW YORK — MICHAEL B. HIGGINS — 089643-1 — LICENSED PROFESSIONAL ENGINEER — Oct. 1, 2025

ARCADIS
ARCADIS OF NEW YORK, INC.

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G.T.E. PRODUCTS CORPORATION, NYSDEC SITE NO. 850003 • FORMER PHILIPS DISPLAY COMPONENTS FACILITY • SENECA FALLS, NEW YORK
REMEDIAL DESIGN - OPERABLE UNIT 2

GENERAL NOTES, ABBREVIATIONS, AND LEGEND

ARCADIS Project No.: 30245593.00067
Date: APRIL 2024
ARCADIS of New York, Inc.
646 Plank Road, Suite 100
Clifton Park, NY 12065
Tel: 518-250-7300

1



NOTES:

1. REFER TO DRAWING 1 FOR ADDITIONAL NOTES, LEGEND, AND BASEMAP INFORMATION.
2. HISTORICAL OUTFALLS (HO) SHOWN ARE APPROXIMATE BASED ON FIELD OBSERVATION. EXISTING OUTFALL DRAINAGE PIPES HAVE BEEN CAPPED AT CULVERT OUTLETS AT THE UPSTREAM END OF THE OUTFALL DITCHES. CONTRACTOR SHALL IDENTIFY ACTUAL LOCATIONS IN THE FIELD AND SHALL PROTECT THE EXISTING OUTLET PIPES.
3. LOCATIONS OF EXISTING SITE FEATURES AND UTILITIES ARE APPROXIMATE ONLY AND SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION. CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER OF ANY DIFFERENCES BETWEEN PLAN CONDITIONS AND FIELD OBSERVATIONS.
4. EXISTING WETLANDS DELINEATED BY ARCADIS DURING AUGUST 2022 FIELD INVESTIGATION.

C:\Users\jharris\DCACCDocs\Arcadis ACC US\AUS-999999999-GTEOSI_FMR PHILIPS SITE_SENECA FALLS_NY\Project Files\10_WIP\10T_ARC_ENV2025\01-DWG\EXCAV-100PD-DR02-EXISTCOND.dwg LAYOUT: 2 SAVED: 9/30/2025 4:36 PM ACADVER: 25.1S (LMS TECH) PAGESETUP: ----
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100' 0 100' 200'
1"=100'
SCALE(S) AS INDICATED

THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING:

USE TO VERIFY FIGURE REPRODUCTION SCALE

No.	Date	Revisions	By	Ckd

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Professional Engineer's Name
MICHAEL B. HIGGINS
Professional Engineer's No.
089643

State	Date Signed	Project Mgr.
NY	10.01.2025	MAF
Designed by	Drawn by	Checked by
PTO	JLH	CMD

STATE OF NEW YORK · MICHAEL B. HIGGINS · 089643-1 · LICENSED PROFESSIONAL ENGINEER
Oct 1, 2025

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REMEDIAL DESIGN - OPERABLE UNIT 2

EXISTING CONDITIONS PLAN

ARCADIS Project No.
30245593.00067

Date
APRIL 2024

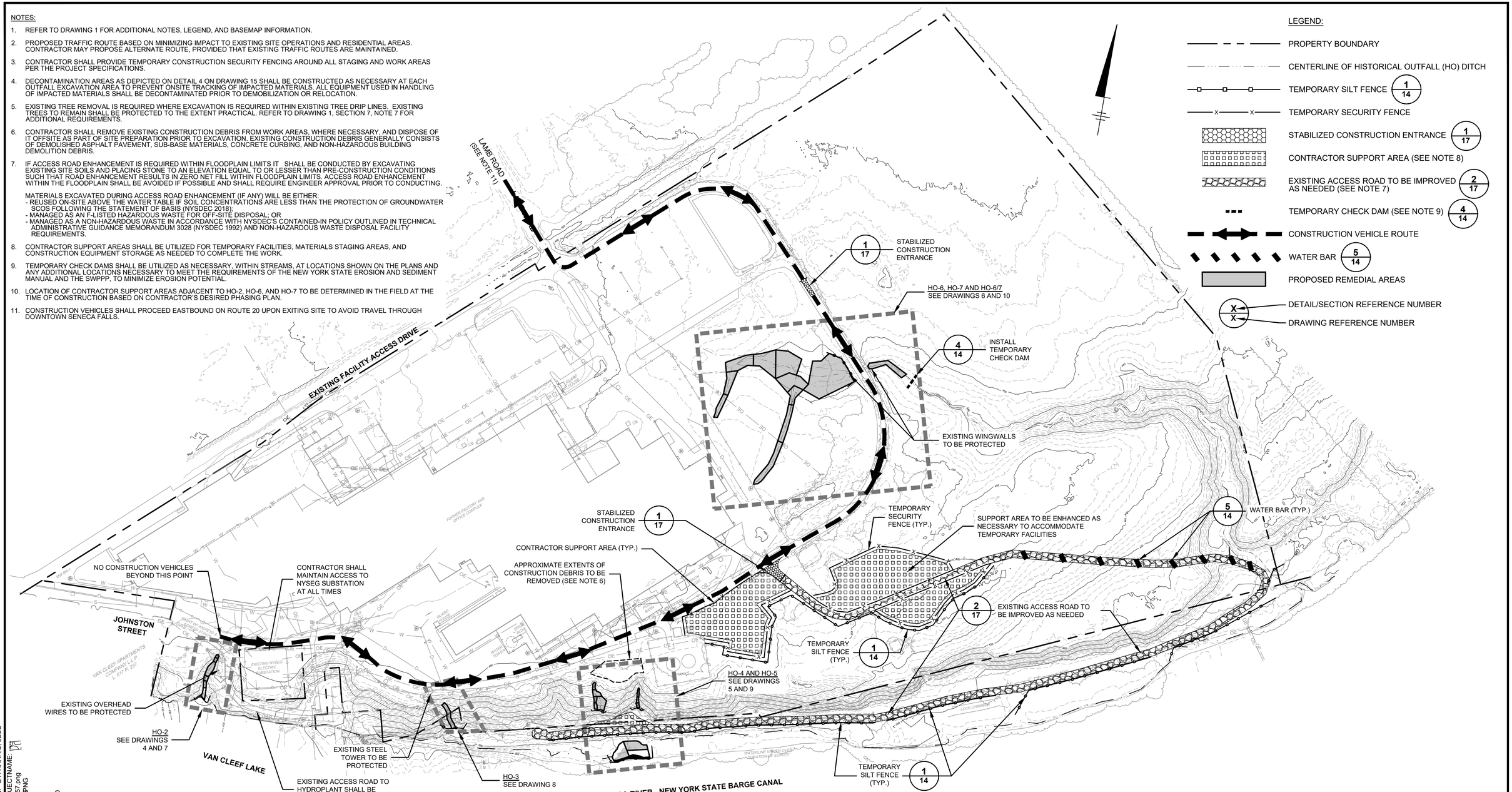
ARCADIS of New York, Inc.
646 Plank Road, Suite 100
Clifton Park, NY 12065
Tel: 518-250-7300

2

NOTES:

1. REFER TO DRAWING 1 FOR ADDITIONAL NOTES, LEGEND, AND BASEMAP INFORMATION.
2. PROPOSED TRAFFIC ROUTE BASED ON MINIMIZING IMPACT TO EXISTING SITE OPERATIONS AND RESIDENTIAL AREAS. CONTRACTOR MAY PROPOSE ALTERNATE ROUTE, PROVIDED THAT EXISTING TRAFFIC ROUTES ARE MAINTAINED.
3. CONTRACTOR SHALL PROVIDE TEMPORARY CONSTRUCTION SECURITY FENCING AROUND ALL STAGING AND WORK AREAS PER THE PROJECT SPECIFICATIONS.
4. DECONTAMINATION AREAS AS DEPICTED ON DETAIL 4 ON DRAWING 15 SHALL BE CONSTRUCTED AS NECESSARY AT EACH OUTFALL EXCAVATION AREA TO PREVENT ONSITE TRACKING OF IMPACTED MATERIALS. ALL EQUIPMENT USED IN HANDLING OF IMPACTED MATERIALS SHALL BE DECONTAMINATED PRIOR TO DEMOBILIZATION OR RELOCATION.
5. EXISTING TREE REMOVAL IS REQUIRED WHERE EXCAVATION IS REQUIRED WITHIN EXISTING TREE DRIP LINES. EXISTING TREES TO REMAIN SHALL BE PROTECTED TO THE EXTENT PRACTICAL. REFER TO DRAWING 1, SECTION 7, NOTE 7 FOR ADDITIONAL REQUIREMENTS.
6. CONTRACTOR SHALL REMOVE EXISTING CONSTRUCTION DEBRIS FROM WORK AREAS, WHERE NECESSARY, AND DISPOSE OF IT OFFSITE AS PART OF SITE PREPARATION PRIOR TO EXCAVATION. EXISTING CONSTRUCTION DEBRIS GENERALLY CONSISTS OF DEMOLISHED ASPHALT PAVEMENT, SUB-BASE MATERIALS, CONCRETE CURBING, AND NON-HAZARDOUS BUILDING DEMOLITION DEBRIS.
7. IF ACCESS ROAD ENHANCEMENT IS REQUIRED WITHIN FLOODPLAIN LIMITS IT SHALL BE CONDUCTED BY EXCAVATING EXISTING SITE SOILS AND PLACING STONE TO AN ELEVATION EQUAL TO OR LESSER THAN PRE-CONSTRUCTION CONDITIONS SUCH THAT ROAD ENHANCEMENT RESULTS IN ZERO NET FILL WITHIN FLOODPLAIN LIMITS. ACCESS ROAD ENHANCEMENT WITHIN THE FLOODPLAIN SHALL BE AVOIDED IF POSSIBLE AND SHALL REQUIRE ENGINEER APPROVAL PRIOR TO CONDUCTING.

   MATERIALS EXCAVATED DURING ACCESS ROAD ENHANCEMENT (IF ANY) WILL BE EITHER:
   - REUSED ON-SITE ABOVE THE WATER TABLE IF SOIL CONCENTRATIONS ARE LESS THAN THE PROTECTION OF GROUNDWATER SCOS FOLLOWING THE STATEMENT OF BASIS (NYSDEC 2018);
   - MANAGED AS AN F-LISTED HAZARDOUS WASTE FOR OFF-SITE DISPOSAL; OR
   - MANAGED AS A NON-HAZARDOUS WASTE IN ACCORDANCE WITH NYSDEC'S CONTAINED-IN POLICY OUTLINED IN TECHNICAL ADMINISTRATIVE GUIDANCE MEMORANDUM 3028 (NYSDEC 1992) AND NON-HAZARDOUS WASTE DISPOSAL FACILITY REQUIREMENTS.
8. CONTRACTOR SUPPORT AREAS SHALL BE UTILIZED FOR TEMPORARY FACILITIES, MATERIALS STAGING AREAS, AND CONSTRUCTION EQUIPMENT STORAGE AS NEEDED TO COMPLETE THE WORK.
9. TEMPORARY CHECK DAMS SHALL BE UTILIZED AS NECESSARY, WITHIN STREAMS, AT LOCATIONS SHOWN ON THE PLANS AND ANY ADDITIONAL LOCATIONS NECESSARY TO MEET THE REQUIREMENTS OF THE NEW YORK STATE EROSION AND SEDIMENT MANUAL AND THE SWPPP, TO MINIMIZE EROSION POTENTIAL.
10. LOCATION OF CONTRACTOR SUPPORT AREAS ADJACENT TO HO-2, HO-6, AND HO-7 TO BE DETERMINED IN THE FIELD AT THE TIME OF CONSTRUCTION BASED ON CONTRACTOR'S DESIRED PHASING PLAN.
11. CONSTRUCTION VEHICLES SHALL PROCEED EASTBOUND ON ROUTE 20 UPON EXITING SITE TO AVOID TRAVEL THROUGH DOWNTOWN SENECA FALLS.



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EXCAV-DESIGN-X-PROPOSED

1"=125' SCALE(S) AS INDICATED (125' 0 125' 250')

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No.	Date	Revisions	By	Ckd
1	SEPT 2025	REVISED DRAFT 100%	SEM	CMD

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Professional Engineer's Name		
MICHAEL B. HIGGINS		
Professional Engineer's No.		
089643		
State	Date Signed	Project Mgr.
NY	10.01.2025	MAF
Designed by	Drawn by	Checked by
PTO	JLH	CMD

STATE OF NEW YORK MICHAEL B. HIGGINS 089643-1 LICENSED PROFESSIONAL ENGINEER
Oct. 1, 2025

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G.T.E. PRODUCTS CORPORATION, NYSDEC SITE NO. 850003 • FORMER PHILIPS DISPLAY COMPONENTS FACILITY • SENECA FALLS, NEW YORK

REMEDIAL DESIGN - OPERABLE UNIT 2

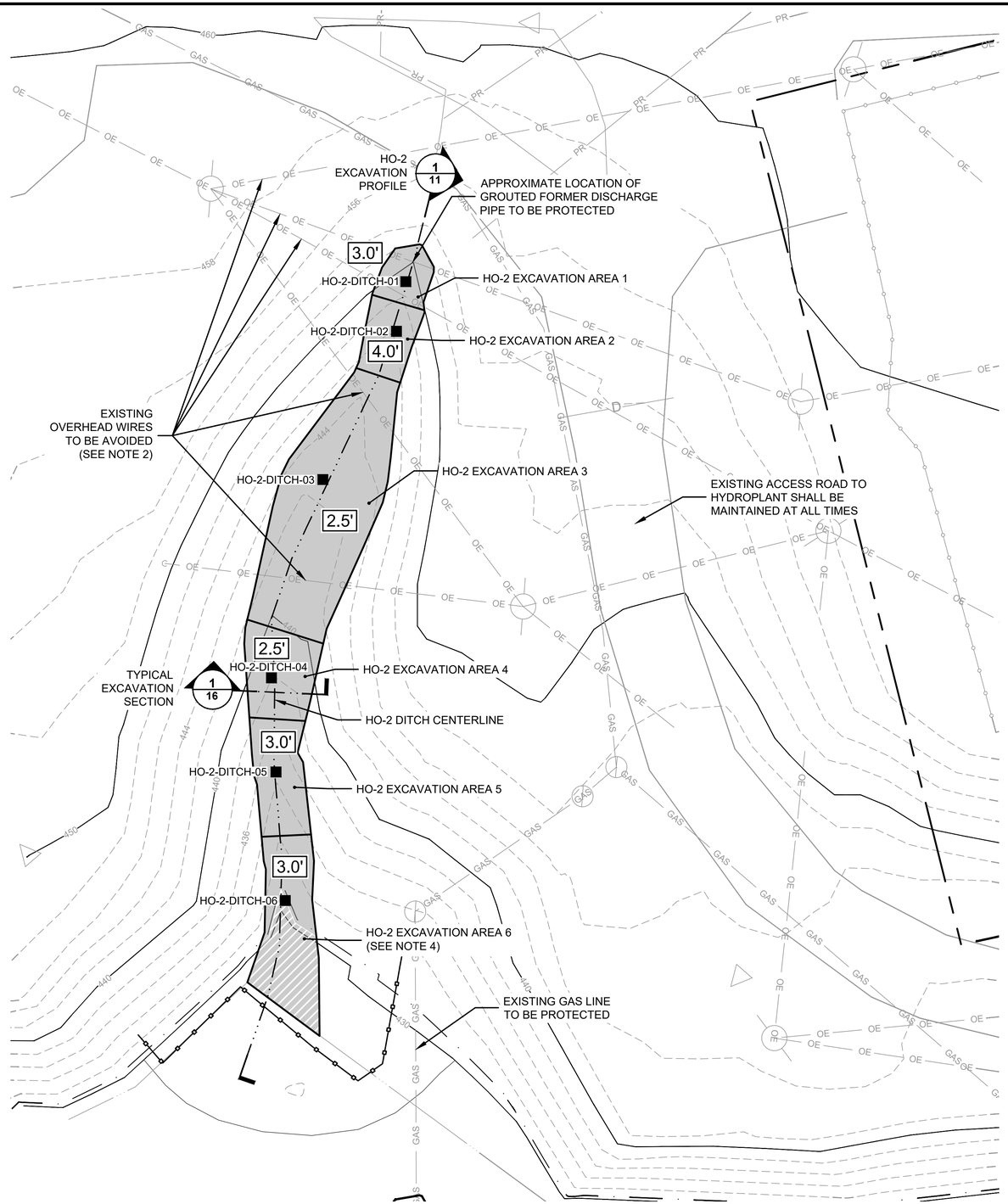
SITE PREPARATION PLAN

ARCADIS Project No. 30245593.00067

Date APRIL 2024

ARCADIS of New York, Inc.
646 Plank Road, Suite 100
Clifton Park, NY 12065
Tel: 518-250-7300

3



LEGEND:

- 2.0' — PROPOSED EXCAVATION DEPTH (SEE NOTE 8)
- PROPOSED EXCAVATION AREAS (SEE NOTE 3)
- APPROXIMATE LIMITS OF TAPERED EXCAVATION NEAR WATER EDGE (SEE NOTE 3 ON DRAWING 11)
- TEMPORARY SILT FENCE — 1/14
- PROPERTY BOUNDARY
- 100-YEAR FLOODPLAIN (430.54 FEET ABOVE SEA LEVEL AT THIS LOCATION)
- EDGE OF WATER
- CENTERLINE OF HISTORICAL OUTFALL (HO) DITCH
- 440 — EXISTING MAJOR TOPOGRAPHIC CONTOUR (20' INTERVAL)
- 438 — EXISTING MINOR TOPOGRAPHIC CONTOUR (2' INTERVAL)
- EXISTING PAVED ROAD
- W — WATER LINE
- OE — ELECTRIC LINE (OVERHEAD)
- GAS — GAS LINE
- D — STORM SEWER PIPE
- PR — PROCESS WASTE LINES (ABANDONED IN PLACE)
- UTILITY POLE
- HO-2-DITCH-01 — HISTORICAL OUTFALL DITCH SAMPLE LOCATION (COLLECTED 2020)
- X/X — DETAIL/SECTION REFERENCE NUMBER / DRAWING REFERENCE NUMBER

NOTES:

1. REFER TO DRAWING 1 FOR ADDITIONAL NOTES, LEGEND, AND BASEMAP INFORMATION.
2. CONTRACTOR IS RESPONSIBLE FOR COORDINATION WITH UTILITY PROVIDER FOR WORK WITHIN UTILITY RIGHT-OF-WAYS, AND IF NECESSARY, RELOCATION OF EXISTING SITE UTILITIES.
3. LIMITS OF EXCAVATION ARE APPROXIMATE BASED ON AVAILABLE TOPOGRAPHY. THE LIMITS ARE INTENDED TO EXTEND TO THE TOP OF BANKS, OR 2-FEET ABOVE THE DITCH INVERT, WHICHEVER IS CLOSER TO THE DITCH CENTERLINE. LIMITS MAY BE MODIFIED IN THE FIELD AT THE DIRECTION OF THE ENGINEER. ADDITIONAL EXCAVATION MAY BE REQUIRED BEYOND THE EXTENTS SHOWN TO MAINTAIN COMPLIANCE WITH APPLICABLE OSHA SLOPING REQUIREMENTS. CONTRACTOR SHALL UTILIZE A LAND SURVEYOR LICENSED IN THE STATE OF NEW YORK TO SET THE ACTUAL TARGET EXCAVATION EXTENTS.
4. **NOTES SPECIFIC TO HO-2 EXCAVATION AREAS 1 THROUGH 4 AND AREA 6:** THESE EXCAVATION AREAS SHALL BE EXCAVATED TO, AT MINIMUM, THE DEPTHS INDICATED ON THE PLAN, WITH THE EXCEPTION OF AREA 6 WHICH WILL BE EXCAVATED AS INDICATED ON DRAWING 11. IF, AT TIME OF EXCAVATION WITHIN EACH EXCAVATION AREA, GROUNDWATER AT THE SAMPLE LOCATION IS NOT ENCOUNTERED AT THE EXCAVATION DEPTH DEPICTED ON THE PLANS, THE CONTRACTOR SHALL EXCAVATE UP TO AN ADDITIONAL 6 INCH (MAXIMUM) DEPTH THROUGHOUT THAT EXCAVATION AREA, OR THE ADDITIONAL DEPTH TO THE OBSERVED GROUNDWATER ELEVATION AT THE SAMPLE LOCATION, WHICHEVER IS SHALLOWER. IF GROUNDWATER STILL IS NOT ENCOUNTERED AT THE SAMPLE LOCATION FOLLOWING ADDITIONAL EXCAVATION, A DOCUMENTATION SOIL SAMPLE SHALL BE COLLECTED AT THE SAMPLE LOCATION INDICATED ON THE PLANS TO DOCUMENT SOIL CONDITIONS AT THE BOTTOM OF THE EXCAVATION AREA. DOCUMENTATION SOIL SAMPLES WILL BE SUBMITTED FOR LABORATORY CADMIUM TESTING BY THE ENGINEER.
5. IF GROUNDWATER WITHIN AN EXCAVATION AREA IS SHALLOWER THAN THE EXCAVATION DEPTH DEPICTED ON THE PLANS, CONTRACTOR SHALL MANAGE GROUNDWATER IN ACCORDANCE WITH THE SWPPP (APPENDIX B OF THE 100% RDR) AND TECHNICAL SPECIFICATION SECTIONS 02 60 05 - CONTAMINATED MATERIAL MANAGEMENT AND DISPOSAL AND 02 73 00 - CONSTRUCTION WATER MANAGEMENT AND DISPOSAL (APPENDIX G OF THE 100% RDR) TO ACHIEVE THE REQUIRED EXCAVATION DEPTH FOR THAT EXCAVATION AREA.
6. CONTRACTOR SHALL INSTALL TEMPORARY EROSION AND SEDIMENT CONTROLS, WHICH INCLUDE TEMPORARY CHECK DAMS, SILT FENCE, AND COMPOST SILT SOCK, DOWNGRADIENT OF ALL WORK AREAS PRIOR TO SITE DISTURBANCE AND MAINTAIN UNTIL FINAL STABILIZATION IS ACHIEVED. ADDITIONAL EROSION AND SEDIMENT CONTROL LOCATIONS TO BE DETERMINED AT TIME OF CONSTRUCTION IN ACCORDANCE WITH THE SWPPP.
7. CONTRACTOR SHALL PROVIDE TEMPORARY DIVERSION OF STORMWATER RUNOFF UPGRADIENT OF EXCAVATION AREAS TO MINIMIZE CONTACT WITH CONTAMINANTS. CONTRACTOR SHALL MAINTAIN TEMPORARY STORMWATER DIVERSIONS UNTIL EXCAVATION AREAS HAVE BEEN RESTORED AND INSTALLATION OF EROSION CONTROL BLANKETS HAS BEEN COMPLETED.
8. EXCAVATION DEPTHS INDICATED FOR EACH EXCAVATION AREA ARE DEPTHS BELOW EXISTING GROUND SURFACE WITHIN THE LIMITS SHOWN, UNLESS OTHERWISE NOTED ABOVE.
9. REFER TO SPECIFICATION SECTION 01 71 26 (CONSTRUCTION SURVEYING AND LAYOUT) FOR POST-EXCAVATION, POST-BACKFILLING, AND POST-CONSTRUCTION SURVEYING REQUIREMENTS.

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EXCAV-DESIGN-X-UTILS

10' 0 10' 20'
1"=10'
SCALE(S) AS INDICATED

THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING: USE TO VERIFY FIGURE REPRODUCTION SCALE

No.	Date	Revisions	By	Ckd
1	SEPT 2025	REVISED DRAFT 100%	SEM	CMD

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Professional Engineer's Name		
MICHAEL B. HIGGINS		
Professional Engineer's No.		
089643		
State	Date Signed	Project Mgr.
NY	10.01.2025	MAF
Designed by	Drawn by	Checked by
PTO	JLH	CMD

MICHAEL B. HIGGINS — STATE OF NEW YORK — 089643-1 — LICENSED PROFESSIONAL ENGINEER — Oct 1, 2025

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REMEDIAL DESIGN - OPERABLE UNIT 2

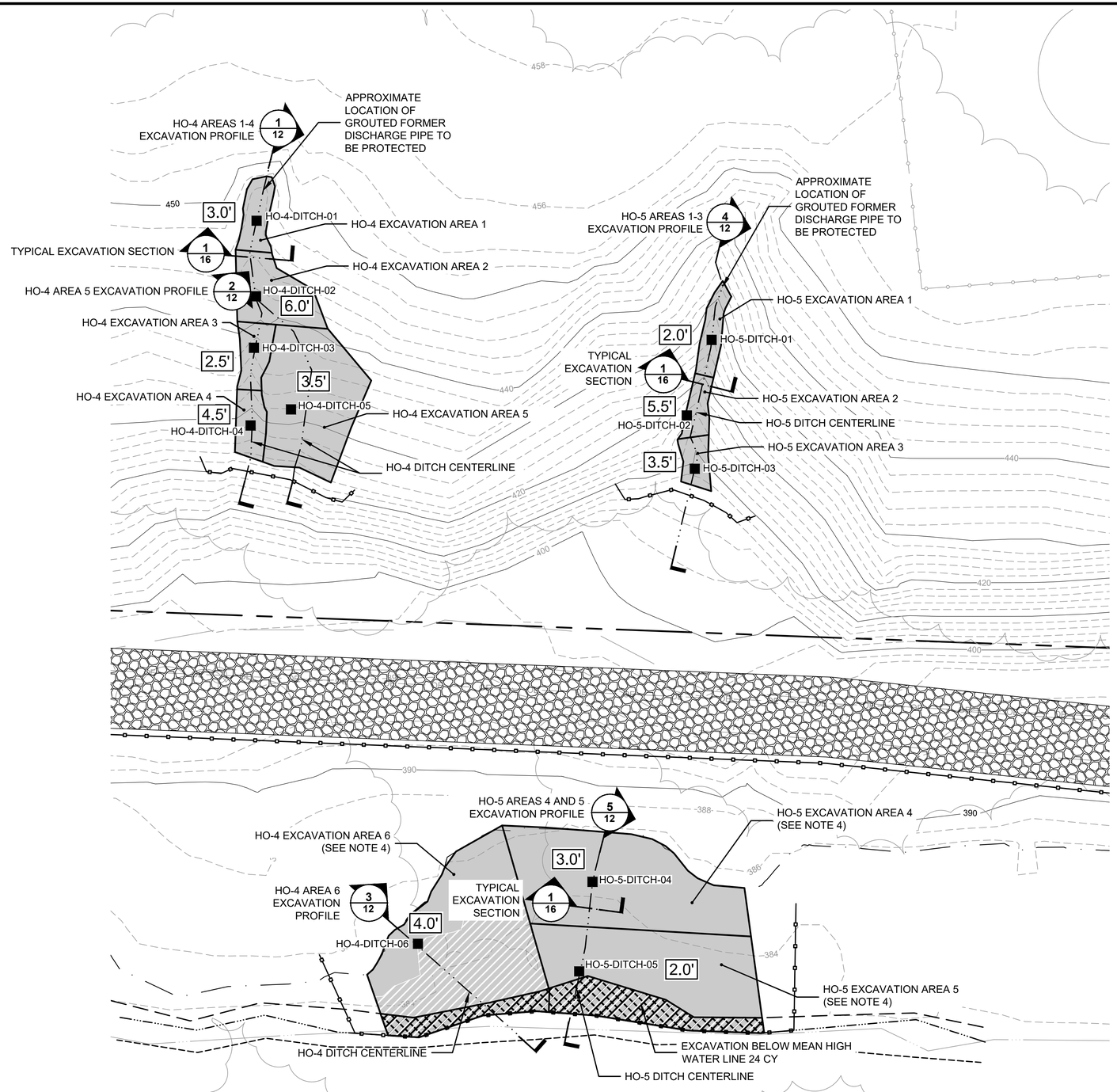
EXCAVATION PLAN HO-2

ARCADIS Project No. 30245593.00067

Date APRIL 2024

ARCADIS of New York, Inc.
646 Plank Road, Suite 100
Clifton Park, NY 12065
Tel: 518-250-7300

4



LEGEND:

- 2.0' — PROPOSED EXCAVATION DEPTH (SEE NOTE 9)
- PROPOSED EXCAVATION AREAS (SEE NOTE 3)
- APPROXIMATE LIMITS OF TAPERED EXCAVATION NEAR WATER EDGE (SEE NOTE 3 ON DRAWING 12)
- EXCAVATION AREA BELOW MEAN HIGH WATER LINE
- TEMPORARY SILT FENCE (1/14)
- PROPERTY BOUNDARY
- EXISTING ACCESS ROAD TO BE IMPROVED AS NEEDED (SEE NOTE 9) (2/17)
- 100-YEAR FLOODPLAIN (385.44 FEET ABOVE SEA LEVEL AT THIS LOCATION)
- EDGE OF WATER (2020)
- NORMAL EDGE OF WATER (SEE NOTE 11)
- EDGE OF WATER (2024 SURVEY) (SEE NOTE 11)
- MEAN HIGH WATER LINE (SEE NOTE 11)
- CENTERLINE OF HISTORICAL OUTFALL (HO) DITCH
- 440 — EXISTING MAJOR TOPOGRAPHIC CONTOUR (20' INTERVAL)
- 438 — EXISTING MINOR TOPOGRAPHIC CONTOUR (2' INTERVAL)
- EXISTING UNPAVED ROAD
- OE OE — ELECTRIC LINE (OVERHEAD)
- UTILITY POLE
- CHAIN-LINK FENCE
- APPROXIMATE EXISTING TREE LINE
- HO-4-DITCH-05 ■ — HISTORICAL OUTFALL DITCH SAMPLE LOCATION (COLLECTED 2020)
- X/X — DETAIL/SECTION REFERENCE NUMBER / DRAWING REFERENCE NUMBER

NOTES:

1. REFER TO DRAWING 1 FOR ADDITIONAL NOTES, LEGEND, AND BASEMAP INFORMATION.
2. CONTRACTOR IS RESPONSIBLE FOR COORDINATION WITH UTILITY PROVIDER FOR WORK WITHIN UTILITY RIGHT-OF-WAYS, AND IF NECESSARY, RELOCATION OF EXISTING SITE UTILITIES.
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4. **NOTES SPECIFIC TO HO-4 EXCAVATION AREA 6, AND HO-5 EXCAVATION AREAS 4 AND 5:** THESE EXCAVATION AREAS SHALL BE EXCAVATED TO, AT MINIMUM, THE DEPTHS INDICATED ON THE PLAN, AT THE SAMPLE LOCATION, AND UPGRADIENT OF THE SAMPLE LOCATION. IF, AT TIME OF EXCAVATION WITHIN EACH EXCAVATION AREA, GROUNDWATER AT THE SAMPLE LOCATION IS NOT ENCOUNTERED AT THE EXCAVATION DEPTH DEPICTED ON THE PLANS, THE CONTRACTOR SHALL EXCAVATE UP TO AN ADDITIONAL 6 INCH (MAXIMUM) DEPTH THROUGHOUT THAT EXCAVATION AREA, OR THE ADDITIONAL DEPTH TO THE OBSERVED GROUNDWATER ELEVATION AT THE SAMPLE LOCATION, WHICHEVER IS SHALLOWER. IF GROUNDWATER STILL IS NOT ENCOUNTERED AT THE SAMPLE LOCATION FOLLOWING ADDITIONAL EXCAVATION, A DOCUMENTATION SOIL SAMPLE SHALL BE COLLECTED AT THE SAMPLE LOCATION INDICATED ON THE PLANS TO DOCUMENT SOIL CONDITIONS AT THE BOTTOM OF THE EXCAVATION AREA. DOCUMENTATION SOIL SAMPLES WILL BE SUBMITTED FOR LABORATORY CADMIUM TESTING BY THE ENGINEER.
5. IF GROUNDWATER WITHIN AN EXCAVATION AREA IS SHALLOWER THAN THE EXCAVATION DEPTH DEPICTED ON THE PLANS, CONTRACTOR SHALL MANAGE GROUNDWATER IN ACCORDANCE WITH THE SWPPP (APPENDIX B OF THE 100% RDR) AND TECHNICAL SPECIFICATION SECTIONS 02 60 05 - CONTAMINATED MATERIAL MANAGEMENT AND DISPOSAL AND 02 73 00 - CONSTRUCTION WATER MANAGEMENT AND DISPOSAL (APPENDIX G OF THE 100% RDR) TO ACHIEVE THE REQUIRED EXCAVATION DEPTH FOR THAT EXCAVATION AREA.
6. CONTRACTOR SHALL INSTALL TEMPORARY EROSION AND SEDIMENT CONTROLS, WHICH INCLUDE TEMPORARY CHECK DAMS, SILT FENCE, AND COMPOST SILT SOCK, DOWNGRADIENT OFF ALL WORK AREAS PRIOR TO SITE DISTURBANCE AND MAINTAIN UNTIL FINAL STABILIZATION IS ACHIEVED. ADDITIONAL EROSION AND SEDIMENT CONTROL LOCATIONS TO BE DETERMINED AT TIME OF CONSTRUCTION IN ACCORDANCE WITH THE SWPPP.
7. CONTRACTOR SHALL PROVIDE TEMPORARY DIVERSION OF STORMWATER RUNOFF UPGRADIENT OF EXCAVATION AREAS TO MINIMIZE CONTACT WITH CONTAMINANTS. CONTRACTOR SHALL MAINTAIN TEMPORARY STORMWATER DIVERSIONS UNTIL EXCAVATION AREAS HAVE BEEN RESTORED AND INSTALLATION OF EROSION CONTROL BLANKETS HAS BEEN COMPLETED.
8. CONTRACTOR SHALL UTILIZE APPROPRIATELY SIZED (E.G., LONG REACH EXCAVATOR, ETC.) EQUIPMENT, EXCAVATION SUPPORT, AND VERTICAL CUTS WHERE FEASIBLE TO LIMIT RESULTING EXCAVATION VOLUME AND RESTORATION AREA.
9. EXCAVATION DEPTHS INDICATED FOR EACH EXCAVATION AREA ARE DEPTHS BELOW EXISTING GROUND SURFACE WITHIN THE LIMITS SHOWN UNLESS OTHERWISE NOTED ABOVE.
10. IF ACCESS ROAD ENHANCEMENT IS REQUIRED WITHIN FLOODPLAIN LIMITS IT SHALL BE CONDUCTED BY EXCAVATING EXISTING SITE SOILS AND PLACING STONE TO AN ELEVATION EQUAL TO OR LESSER THAN PRE-CONSTRUCTION CONDITIONS SUCH THAT ROAD ENHANCEMENT RESULTS IN ZERO NET FILL WITHIN FLOODPLAIN LIMITS. ACCESS ROAD ENHANCEMENT WITHIN THE FLOODPLAIN SHALL BE AVOIDED IF POSSIBLE AND SHALL REQUIRE ENGINEER APPROVAL PRIOR TO CONDUCTING.
11. MEAN HIGH WATER LINE, 2024 EDGE OF WATER, AND NORMAL WATER ELEVATION BASED ON FIELD DELINEATION BY ARCADIS ON 2/26/2024. NORMAL WATER ELEVATION IS THE TYPICAL WATER ELEVATION DURING PERIODS WHEN THE CANAL IS NAVIGABLE.
12. REFER TO SPECIFICATION SECTION 01 71 26 (CONSTRUCTION SURVEYING AND LAYOUT) FOR POST-EXCAVATION, POST-BACKFILLING, AND POST-CONSTRUCTION SURVEYING REQUIREMENTS.
13. NOTES SPECIFIC TO HO-4 EXCAVATION AREAS 2 AND 4, AND HO-5 EXCAVATION AREA 2: THESE EXCAVATION AREAS SHALL BE EXCAVATED TO, AT A MINIMUM, THE DEPTHS INDICATED ON THE PLAN OR THE DEPTH OF REFUSAL (WHICHEVER IS SHALLOWER). IF REFUSAL IS NOT ENCOUNTERED AT THE EXCAVATION DEPTH DEPICTED ON THE PLANS, THE CONTRACTOR SHALL EXCAVATE UP TO AN ADDITIONAL 6-INCH (MAXIMUM) DEPTH THROUGHOUT THAT PORTION OF THE EXCAVATION AREA WHERE REFUSAL WAS NOT ENCOUNTERED. IF REFUSAL IS STILL NOT ENCOUNTERED AFTER ADDITIONAL EXCAVATION, A DOCUMENTATION SOIL SAMPLE SHALL BE COLLECTED TO DOCUMENT SOIL CONDITIONS AT THE BOTTOM OF THE EXCAVATION AREA. DOCUMENTATION SOIL SAMPLES SHALL BE SUBMITTED FOR LABORATORY CADMIUM TESTING BY THE ENGINEER.

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EXCAV-DESIGN-X-BASEMAP
EXCAV-100PD-X-PROPOSED
EXCAV-DESIGN-X-UTILS

15' 0 15' 30'
1"=15'
SCALE(S) AS INDICATED

THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING: USE TO VERIFY FIGURE REPRODUCTION SCALE

No.	Date	Revisions	By	Ckd
1	SEPT 2025	REVISED DRAFT 100%	SEM	CMD

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Professional Engineer's Name: **MICHAEL B. HIGGINS**
Professional Engineer's No.: 089643
State: NY | Date Signed: 10.01.2025 | Project Mgr.: MAF
Designed by: PTO | Drawn by: JLH | Checked by: CMD

STATE OF NEW YORK — MICHAEL B. HIGGINS — 089643-1 — LICENSED PROFESSIONAL ENGINEER — Oct. 1, 2025

ARCADIS

ARCADIS OF NEW YORK, INC.

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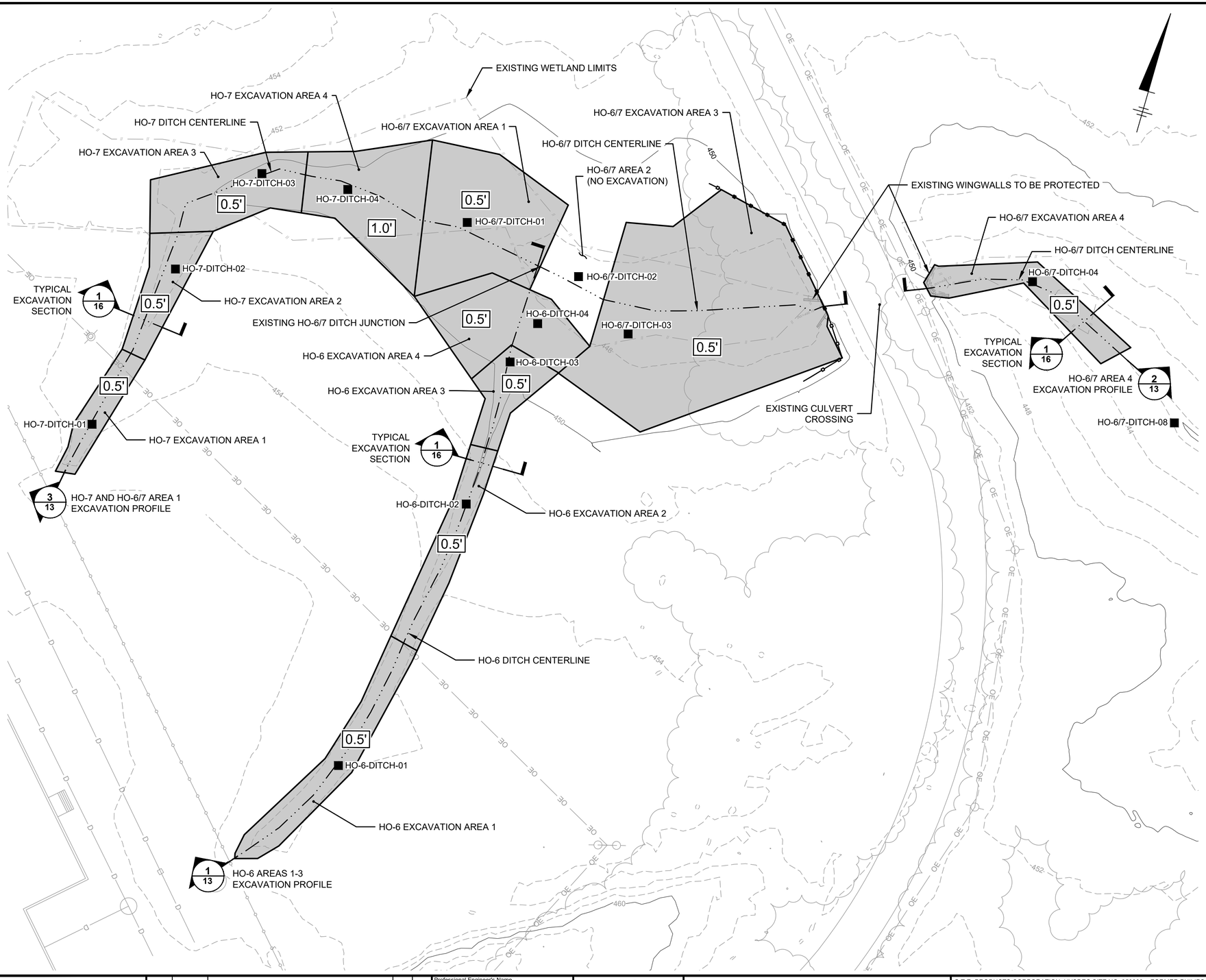
G.T.E. PRODUCTS CORPORATION, NYSDEC SITE NO. 850003 • FORMER PHILIPS DISPLAY COMPONENTS FACILITY • SENECA FALLS, NEW YORK

REMEDIAL DESIGN - OPERABLE UNIT 2

EXCAVATION PLAN HO-4 AND HO-5

ARCADIS Project No. 30245593.00067
Date APRIL 2024
ARCADIS of New York, Inc.
646 Plank Road, Suite 100
Clifton Park, NY 12065
Tel: 518-250-7300

5



LEGEND:

- 2.0' — PROPOSED EXCAVATION DEPTH (SEE NOTE 6)
- PROPOSED EXCAVATION AREAS (SEE NOTE 3)
- CENTERLINE OF HISTORICAL OUTFALL (HO) DITCH
- 440 — EXISTING MAJOR TOPOGRAPHIC CONTOUR (20' INTERVAL)
- 438 — EXISTING MINOR TOPOGRAPHIC CONTOUR (2' INTERVAL)
- EXISTING PAVED ROAD
- OE OE — ELECTRIC LINE (OVERHEAD)
- D — STORM SEWER PIPE
- MANHOLE / CATCH BASIN
- UTILITY POLE
- CHAIN-LINK FENCE
- APPROXIMATE EXISTING TREE LINE
- HO-7-DITCH-01 — HISTORICAL OUTFALL DITCH SAMPLE LOCATION (COLLECTED 2020)
- WETLANDS
- X / X — DETAIL/SECTION REFERENCE NUMBER / DRAWING REFERENCE NUMBER

NOTES:

1. REFER TO DRAWING 1 FOR ADDITIONAL NOTES, LEGEND, AND BASEMAP INFORMATION.
2. CONTRACTOR IS RESPONSIBLE FOR COORDINATION WITH UTILITY PROVIDER FOR WORK WITHIN UTILITY RIGHT-OF-WAYS, AND IF NECESSARY, RELOCATION OF EXISTING SITE UTILITIES.
3. LIMITS OF EXCAVATION ARE APPROXIMATE BASED ON AVAILABLE TOPOGRAPHY. THE LIMITS ARE INTENDED TO EXTEND TO THE TOP OF BANKS, OR 2-FEET ABOVE THE DITCH INVERT, WHICHEVER IS CLOSER TO THE DITCH CENTERLINE. LIMITS MAY BE MODIFIED IN THE FIELD AT THE DIRECTION OF THE ENGINEER. CONTRACTOR SHALL UTILIZE A LAND SURVEYOR LICENSED IN THE STATE OF NEW YORK TO SET THE ACTUAL TARGET EXCAVATION EXTENTS.
4. CONTRACTOR SHALL INSTALL TEMPORARY EROSION AND SEDIMENT CONTROLS, WHICH INCLUDE TEMPORARY CHECK DAMS, SILT FENCE, AND COMPOST SILT SOCK, DOWNGRADIENT OFF ALL WORK AREAS PRIOR TO SITE DISTURBANCE AND MAINTAIN UNTIL FINAL STABILIZATION IS ACHIEVED. ADDITIONAL EROSION AND SEDIMENT CONTROL LOCATIONS TO BE DETERMINED AT TIME OF CONSTRUCTION IN ACCORDANCE WITH THE SWPPP.
5. CONTRACTOR SHALL PROVIDE TEMPORARY DIVERSION OF STORMWATER RUNOFF UPGRADIENT OF EXCAVATION AREAS TO MINIMIZE CONTACT WITH CONTAMINANTS. CONTRACTOR SHALL MAINTAIN TEMPORARY STORMWATER DIVERSIONS UNTIL EXCAVATION AREAS HAVE BEEN RESTORED AND INSTALLATION OF EROSION CONTROL BLANKETS HAS BEEN COMPLETED. CONTRACTOR SHALL REMOVE TEMPORARY SILT FENCE WITHIN ACTIVE FLOW AREAS UPON COMPLETING INSTALLATION OF EROSION CONTROL BLANKET.
6. EXCAVATION DEPTHS INDICATED FOR EACH EXCAVATION AREA ARE DEPTHS BELOW EXISTING GROUND SURFACE WITHIN THE LIMITS SHOWN UNLESS OTHERWISE INDICATED.
7. CONTRACTOR SHALL MINIMIZE DISTURBANCE OF EXISTING WETLAND AREAS TO THE EXTENT PRACTICABLE. ALL DISTURBED WETLAND AREAS SHALL BE RESTORED IN ACCORDANCE WITH APPLICABLE PERMITTING REQUIREMENTS SUBMITTED UNDER SEPARATE COVER.
8. REFER TO SPECIFICATION SECTION 01 71 26 (CONSTRUCTION SURVEYING AND LAYOUT) FOR POST-EXCAVATION, POST-BACKFILLING, AND POST-CONSTRUCTION SURVEYING REQUIREMENTS.

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EXCAV-DESIGN-X-BASEMAP
EXCAV-100PD-X-PROPOSED
EXCAV-DESIGN-X-UTILS

25' 0 25' 50'
1"=25'
SCALE(S) AS INDICATED

THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING: USE TO VERIFY FIGURE REPRODUCTION SCALE

No.	Date	Revisions	By	Ckd
1	SEPT 2025	REVISED DRAFT 100%	SEM	CMD

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Professional Engineer's Name: **MICHAEL B. HIGGINS**
Professional Engineer's No.: 089643

State	Date Signed	Project Mgr.
NY	10.01.2025	MAF
Designed by	Drawn by	Checked by
PTO	JLH	CMD

STATE OF NEW YORK — MICHAEL B. HIGGINS — 089643 — LICENSED PROFESSIONAL ENGINEER
Oct 1, 2025

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G.T.E. PRODUCTS CORPORATION, NYSDEC SITE NO. 850003 • FORMER PHILIPS DISPLAY COMPONENTS FACILITY • SENECA FALLS, NEW YORK

REMEDIAL DESIGN - OPERABLE UNIT 2

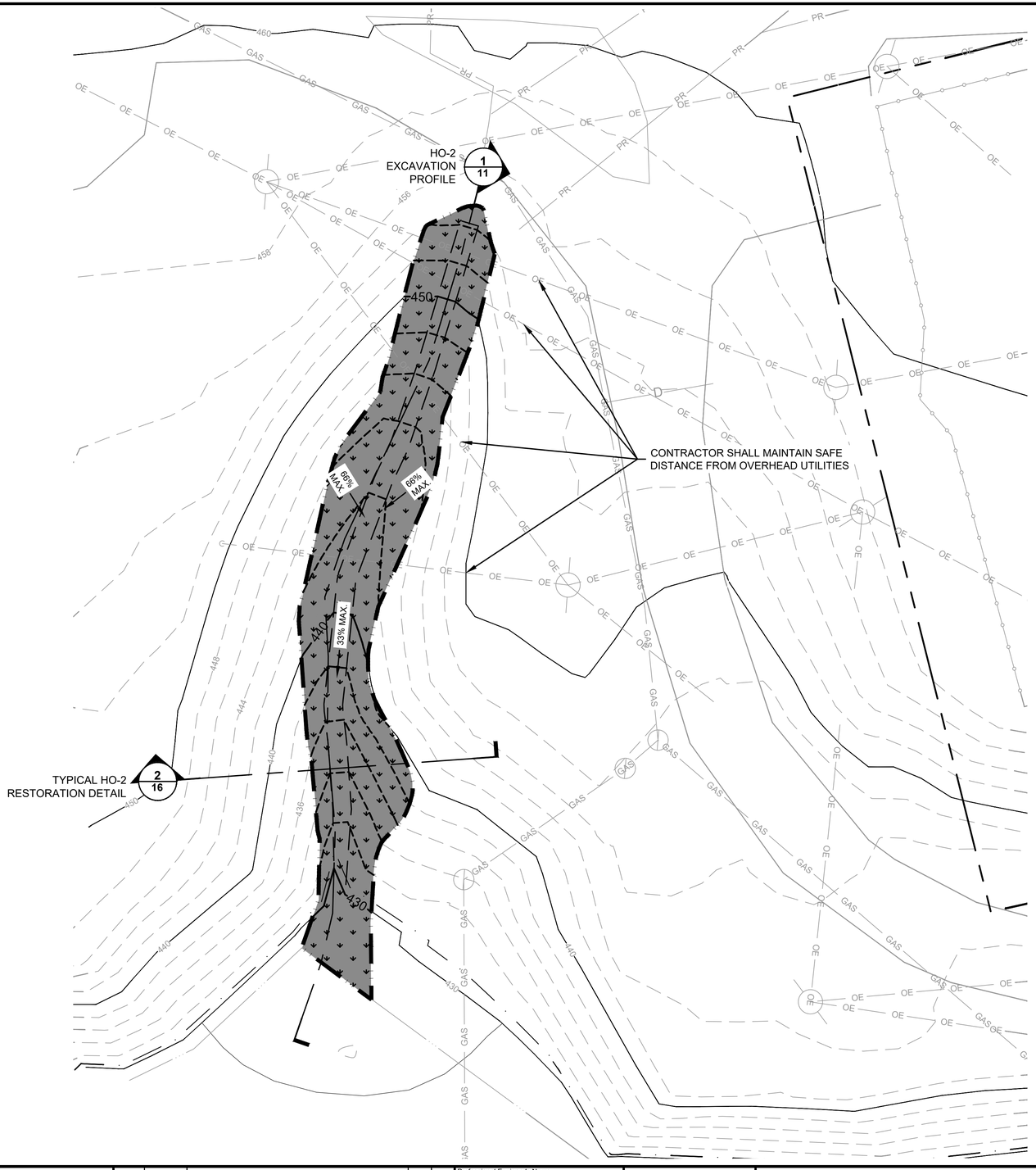
EXCAVATION PLAN HO-6, HO-7 AND HO-6/7

ARCADIS Project No.
30245593.00067

Date
APRIL 2024

ARCADIS of New York, Inc.
646 Plank Road, Suite 100
Clifton Park, NY 12065
Tel: 518-250-7300

6



LEGEND:

- 450 — PROPOSED MAJOR TOPOGRAPHIC CONTOUR (10' INTERVAL)
- PROPOSED MINOR TOPOGRAPHIC CONTOUR (2' INTERVAL)
- PROPOSED GRADE BREAK
- LIMITS OF TYPE A EROSION CONTROL MAT
- LIMITS OF VEGETATED RESTORATION AREA
- APPROXIMATE LIMITS OF GRADING
- PROPERTY BOUNDARY
- 100-YEAR FLOODPLAIN (430.54 FEET ABOVE SEA LEVEL AT THIS LOCATION)
- X / X — DETAIL/SECTION REFERENCE NUMBER / DRAWING REFERENCE NUMBER

2/14 3/14 5/16

NOTES:

1. REFER TO DRAWING 1 FOR ADDITIONAL NOTES, LEGEND, AND BASEMAP INFORMATION.
2. PROPOSED GRADES AND LIMITS OF EROSION CONTROL MAT ARE APPROXIMATE, BASED ON THE ANTICIPATED DISTURBANCE LIMIT REQUIRED FOR EXCAVATION. ACTUAL GRADES AND MATTING LIMITS MAY BE MODIFIED AT THE TIME OF CONSTRUCTION, AT THE DIRECTION OF THE ENGINEER, PROVIDED THE MINIMUM CHANNEL DIMENSIONS INDICATED ON THE PLANS ARE MAINTAINED AND THE MAXIMUM SLOPE GRADIENTS ARE MAINTAINED.
3. RESTORATION GRADES WITHIN FLOODPLAIN LIMITS SHALL RESULT IN ZERO NET FILL RELATIVE TO PRECONSTRUCTION GRADES.
4. REFER TO SPECIFICATION SECTION 01 71 26 (CONSTRUCTION SURVEYING AND LAYOUT) FOR POST-EXCAVATION, POST-BACKFILLING, AND POST-CONSTRUCTION SURVEYING REQUIREMENTS.

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EXCAV-DESIGN-X-BASEMAP
EXCAV-DESIGN-X-RESTORE
EXCAV-DESIGN-X-UTILS
EXCAV-100PD-X-SESC

1"=10' (10' 0 10' 20')
SCALE(S) AS INDICATED

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Professional Engineer's No.: 089643

State	Date Signed	Project Mgr.
NY	10.01.2025	MAF
Designed by	Drawn by	Checked by
PTO	JLH	CMD

STATE OF NEW YORK — MICHAEL B. HIGGINS — 089643-1 — LICENSED PROFESSIONAL ENGINEER

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REMEDIAL DESIGN - OPERABLE UNIT 2

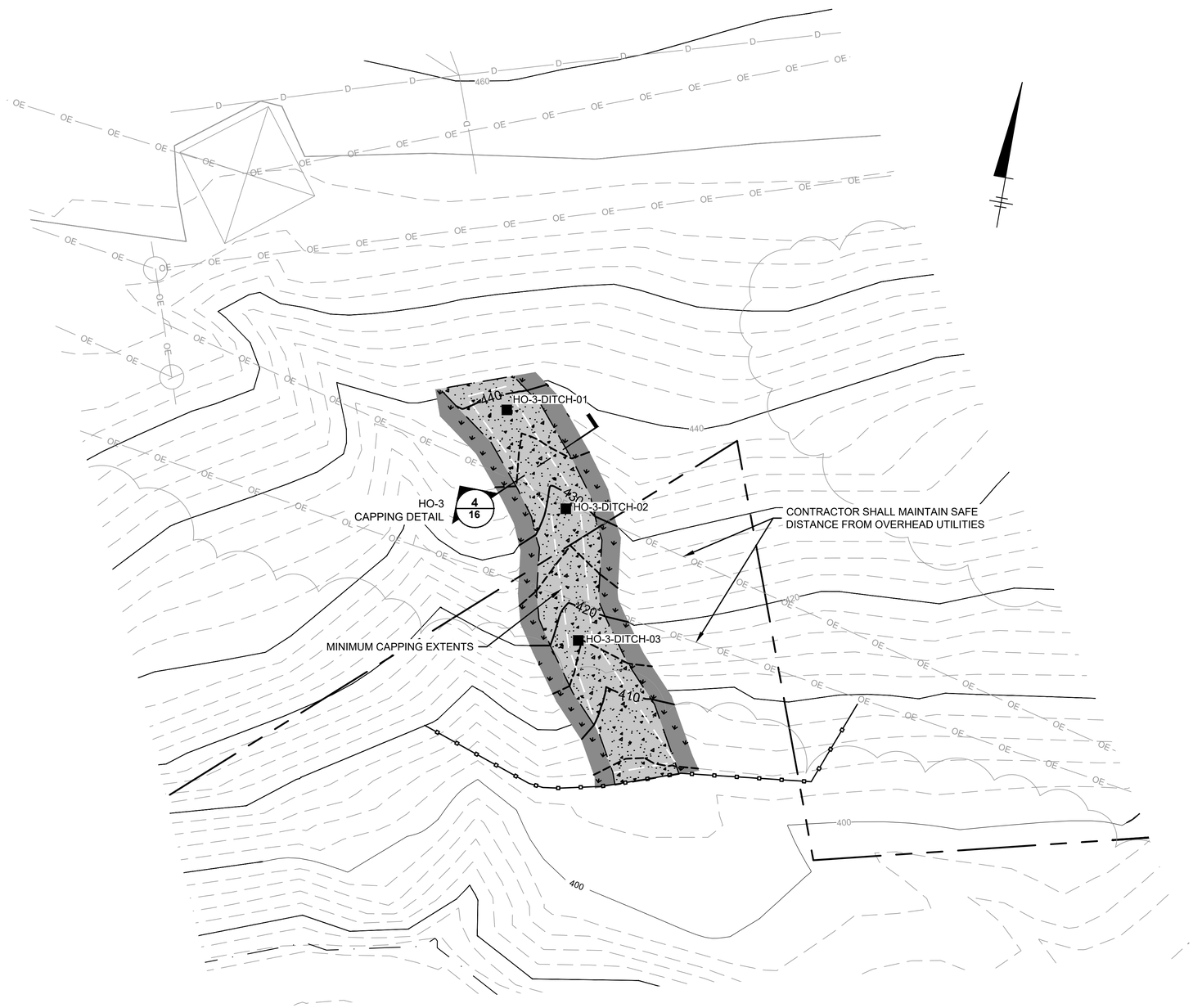
RESTORATION PLAN HO-2

ARCADIS Project No.
30245593.00067

Date
APRIL 2024

ARCADIS of New York, Inc.
646 Plank Road, Suite 100
Clifton Park, NY 12065
Tel: 518-250-7300

7



LEGEND:

- 430 — PROPOSED MAJOR TOPOGRAPHIC CONTOUR (10' INTERVAL)
- PROPOSED MINOR TOPOGRAPHIC CONTOUR (2' INTERVAL)
- LIMITS OF TYPE A EROSION CONTROL MAT — 2/14
- LIMITS OF CONCRETE CAP
- LIMITS OF VEGETATED RESTORATION AREA — 5/16
- PROPERTY BOUNDARY
- 100-YEAR FLOODPLAIN (385.44 FEET ABOVE SEA LEVEL AT THIS LOCATION)
- HO-3-DITCH-01 ■ HISTORICAL OUTFALL DITCH SAMPLE LOCATION (COLLECTED 2020)
- X/X — DETAIL/SECTION REFERENCE NUMBER / DRAWING REFERENCE NUMBER

NOTES:

1. REFER TO DRAWING 1 FOR ADDITIONAL NOTES, LEGEND, AND BASEMAP INFORMATION.
2. PROPOSED GRADES ARE APPROXIMATE AND MAY BE MODIFIED AT THE TIME OF CONSTRUCTION, AT THE DIRECTION OF THE ENGINEER, PROVIDED THE MINIMUM COVER THICKNESS INDICATED ON THE PLANS IS MAINTAINED.
3. MINIMUM LIMITS OF CONCRETE CAP BASED ON AVAILABLE TOPOGRAPHY. THE LIMITS ARE INTENDED TO EXTEND TO THE TOP OF BANKS OR 2-FEET ABOVE THE DITCH INVERT, WHICHEVER IS CLOSER TO THE DITCH CENTERLINE. LIMITS MAY BE MODIFIED IN THE FIELD AT THE DIRECTION OF THE ENGINEER. CONTRACTOR SHALL UTILIZE A LAND SURVEYOR LICENSED IN THE STATE OF NEW YORK TO SET THE ACTUAL TARGET CAP EXTENTS.
4. CONTRACTOR SHALL PROVIDE TEMPORARY DIVERSION OF STORMWATER RUNOFF UPGRADIENT OF CAPPING AREA TO MINIMIZE CONTACT WITH CONTAMINANTS AND PREVENT EROSION. CONTRACTOR SHALL MAINTAIN TEMPORARY STORMWATER DIVERSIONS UNTIL CAP AREA HAS BEEN RESTORED AND INSTALLATION OF EROSION CONTROL BLANKETS AND CONCRETE MATTRESS HAS BEEN COMPLETED.
5. REFER TO SPECIFICATION SECTION 01 71 26 (CONSTRUCTION SURVEYING AND LAYOUT) FOR POST-EXCAVATION, POST-BACKFILLING, AND POST-CONSTRUCTION SURVEYING REQUIREMENTS.

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EXCAV-DESIGN-X-RESTORE
EXCAV-DESIGN-X-UTILS
EXCAV-100PD-X-SESC

1"=10' SCALE(S) AS INDICATED (10' 0 10' 20')

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1	SEPT 2025	REVISED DRAFT 100%	SEM	CMD

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Professional Engineer's Name: MICHAEL B. HIGGINS
Professional Engineer's No.: 089643
State: NY | Date Signed: 10.01.2025 | Project Mgr.: MAF
Designed by: PTO | Drawn by: JLH | Checked by: CMD

STATE OF NEW YORK — MICHAEL B. HIGGINS — 089643-1 — LICENSED PROFESSIONAL ENGINEER — Oct 1, 2025

ARCADIS

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REMEDIAL DESIGN - OPERABLE UNIT 2

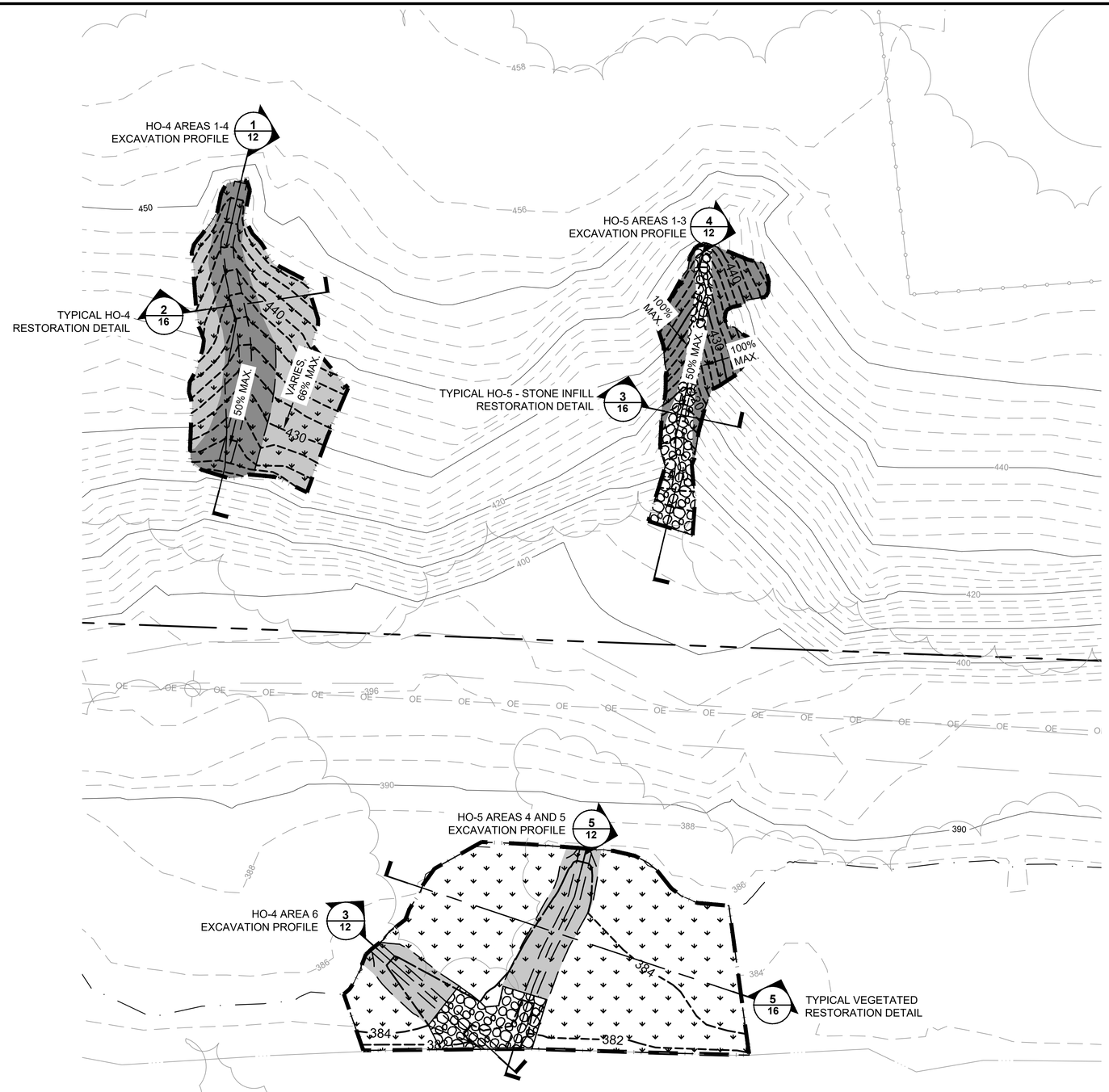
CAPPING PLAN HO-3

ARCADIS Project No. 30245593.00067

Date APRIL 2024

ARCADIS of New York, Inc.
646 Plank Road, Suite 100
Clifton Park, NY 12065
Tel: 518-250-7300

8



LEGEND:

- 450 — PROPOSED MAJOR TOPOGRAPHIC CONTOUR (10' INTERVAL)
- PROPOSED MINOR TOPOGRAPHIC CONTOUR (2' INTERVAL)
- PROPOSED GRADE BREAK
- LIMITS OF TYPE A EROSION CONTROL MAT — 2/14, 3/14
- LIMITS OF TYPE B EROSION CONTROL MAT
- LIMITS OF STONE INFILL RESTORATION — 3/16
- LIMITS OF VEGETATED RESTORATION AREA — 5/16
- APPROXIMATE LIMITS OF GRADING
- PROPERTY BOUNDARY
- 100-YEAR FLOODPLAIN (385.44 FEET ABOVE SEA LEVEL)
- X/X — DETAIL/SECTION REFERENCE NUMBER / DRAWING REFERENCE NUMBER

NOTES:

1. REFER TO DRAWING 1 FOR ADDITIONAL NOTES, LEGEND, AND BASEMAP INFORMATION.
2. PROPOSED GRADES AND LIMITS OF EROSION CONTROL MAT ARE APPROXIMATE, BASED ON THE ANTICIPATED DISTURBANCE LIMIT REQUIRED FOR EXCAVATION. ACTUAL GRADES AND MATTING LIMITS MAY BE MODIFIED AT THE TIME OF CONSTRUCTION, AT THE DIRECTION OF THE ENGINEER, PROVIDED THE MINIMUM CHANNEL DIMENSIONS AND THE MAXIMUM SLOPES INDICATED ON THE PLANS ARE MAINTAINED.
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EXCAV-DESIGN-X-RESTORE
EXCAV-DESIGN-X-UTILS
EXCAV-100PD-X-SESC

15' 0 15' 30'
1"=15'
SCALE(S) AS INDICATED

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Designed by	Drawn by	Checked by
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STATE OF NEW YORK — MICHAEL B. HIGGINS — 089643-1 — LICENSED PROFESSIONAL ENGINEER — OCT 1, 2025

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REMEDIAL DESIGN - OPERABLE UNIT 2

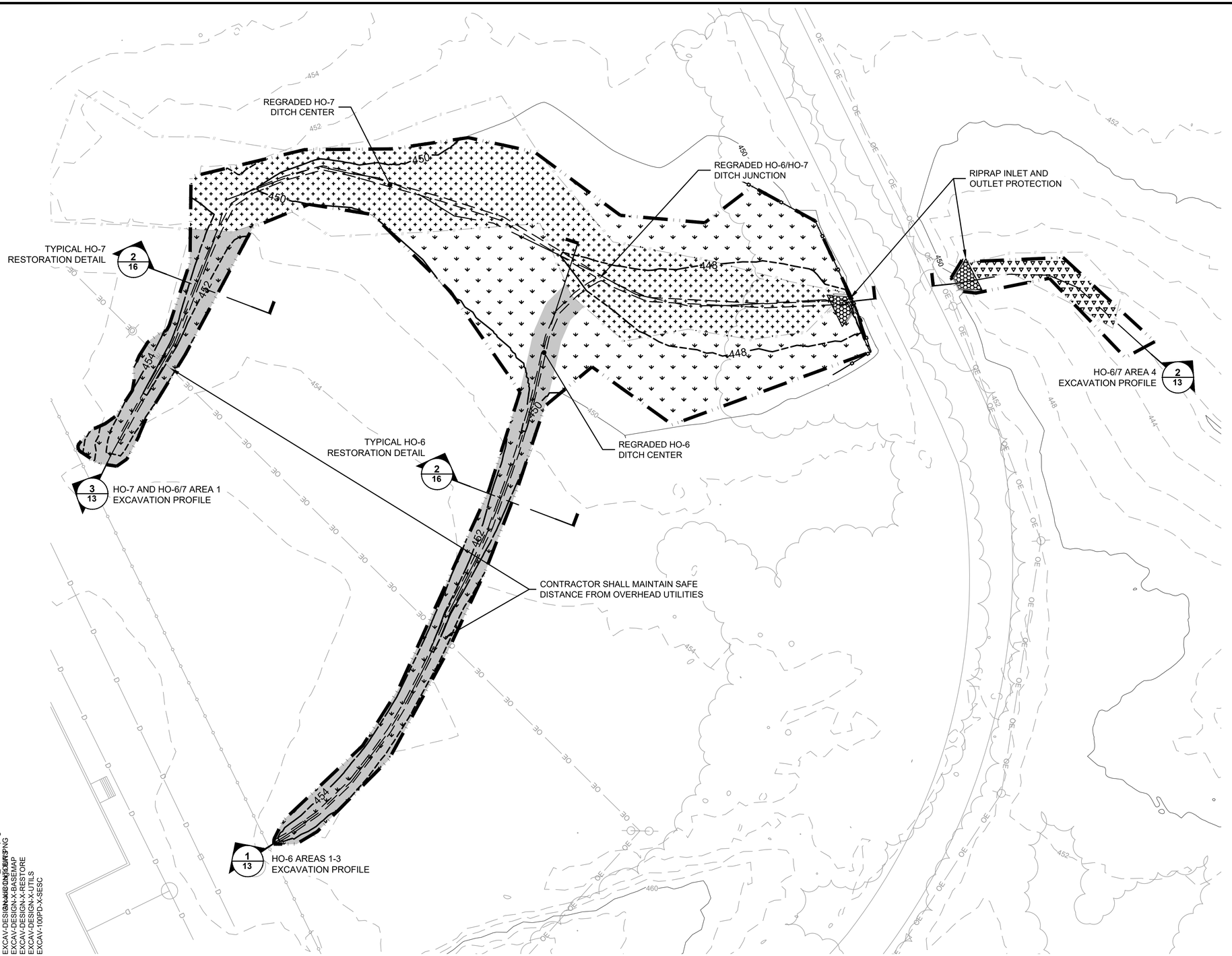
RESTORATION PLAN HO-4 AND HO-5

ARCADIS Project No. 30245593.00067

Date APRIL 2024

ARCADIS of New York, Inc.
646 Plank Road, Suite 100
Clifton Park, NY 12065
Tel: 518-250-7300

9



LEGEND:

- 450 — PROPOSED MAJOR TOPOGRAPHIC CONTOUR (10' INTERVAL)
- PROPOSED MINOR TOPOGRAPHIC CONTOUR (2' INTERVAL)
- PROPOSED GRADE BREAK
- LIMITS OF TYPE B EROSION CONTROL MAT (2/14, 3/14)
- LIMITS OF RIPRAP
- LIMITS OF VEGETATED RESTORATION AREA (5/16)
- LIMITS OF PEM WETLAND RESTORATION (SEE NOTE 3)
- LIMITS OF PSS WETLAND RESTORATION (SEE NOTE 3)
- APPROXIMATE LIMITS OF GRADING
- X/X — DETAIL/SECTION REFERENCE NUMBER / DRAWING REFERENCE NUMBER

NOTES:

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3. PEM AND PSS WETLAND RESTORATION AREAS WILL BE RESTORED IN ACCORDANCE WITH THE PLANTING SCHEDULE AND DETAILS SHOWN ON THIS SHEET AND THE RESTORATION NOTES AND DETAILS SHOWN ON SHEET 18.
4. REFER TO SPECIFICATION SECTION 01 71 26 (CONSTRUCTION SURVEYING AND LAYOUT) FOR POST-EXCAVATION, POST-BACKFILLING, AND POST-CONSTRUCTION SURVEYING REQUIREMENTS.

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EXCAV-DESIGN-X-BASEMAP
EXCAV-DESIGN-X-RESTORE
EXCAV-DESIGN-X-UTILS
EXCAV-100PD-X-SESC

1"=25' — 25' 0 25' 50'
SCALE(S) AS INDICATED

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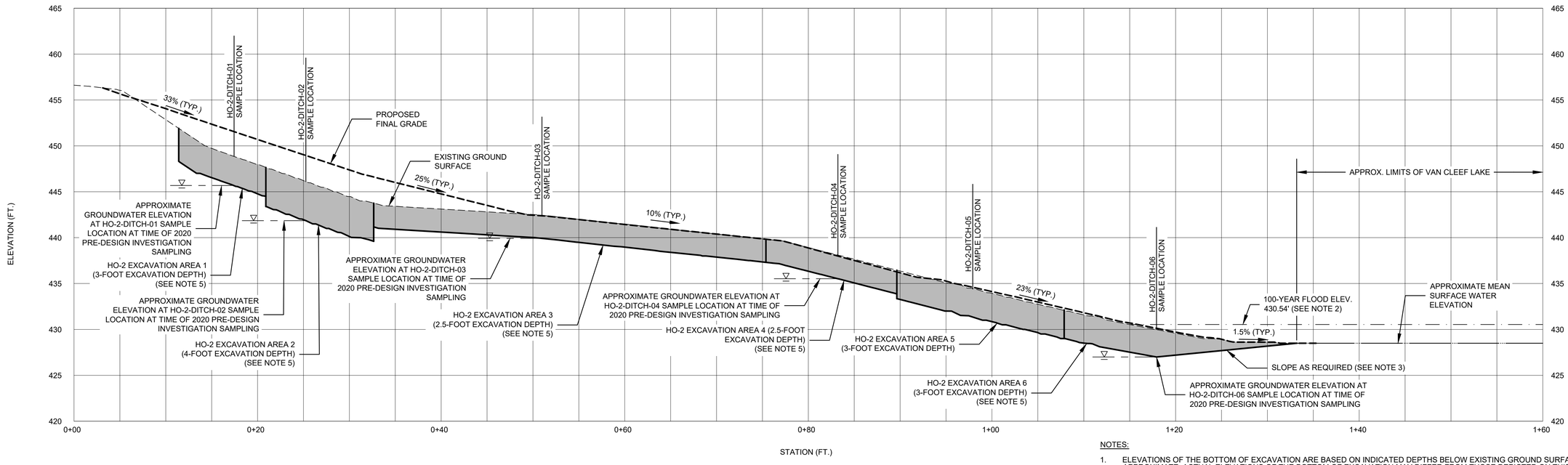
RESTORATION PLAN
HO-6, HO-7 AND HO-6/7

ARCADIS Project No. 30245593.00067

Date APRIL 2024

ARCADIS of New York, Inc.
646 Plank Road, Suite 100
Clifton Park, NY 12065
Tel: 518-250-7300

10



HO-2 EXCAVATION PROFILE 1

0 6' 12'

SCALE: 1"=6'

NOTES:

1. ELEVATIONS OF THE BOTTOM OF EXCAVATION ARE BASED ON INDICATED DEPTHS BELOW EXISTING GROUND SURFACE AND ARE APPROXIMATE. ACTUAL ELEVATIONS OF THE BOTTOM OF EXCAVATION MAY DIFFER FROM THOSE DEPICTED ON THIS DRAWING BASED ON FIELD OBSERVED TOPOGRAPHY.
2. 100 YEAR FLOOD ELEVATION BASED ON FEMA FLOOD INSURANCE STUDY FOR SENECA COUNTY EFFECTIVE AUGUST 3, 1981. DATUM IS NAVD 88.
3. BOTTOM OF EXCAVATION DOWNGRADIENT OF SAMPLE LOCATION HO-2-DITCH-06 SHALL TAPER GRADUALLY TO MEET THE PRE-CONSTRUCTION ELEVATION AT THE EDGE OF WATER AT THE TIME OF CONSTRUCTION. CONTRACTOR SHALL AVOID DISTURBANCE OF EXISTING STONE SHORE PROTECTION TO THE EXTENT POSSIBLE. CONTRACTOR SHALL RESTORE SHORELINE PROTECTION IN ACCORDANCE WITH THE APPROVED JOINT PERMIT APPLICATION WITH A COMBINATION OF ROCK INFILL, VEGETATIVE RESTORATION, AND TURF REINFORCEMENT MATTING.
4. EXISTING CHANNEL LINE VARIES PLANIMETRICALLY FROM PROPOSED GRADES. PROPOSED GRADING SHOWN IS REFERENCED TO PROPOSED OUTFALL INVERT LOCATION.
5. **NOTES SPECIFIC TO HO-2 EXCAVATION AREAS 1 THROUGH 4 AND AREA 6:** THESE EXCAVATION AREAS SHALL BE EXCAVATED TO, AT MINIMUM, THE DEPTHS INDICATED ON THE PLAN AT THE SAMPLE LOCATION, AND UPGRADIENT OF THE SAMPLE LOCATION.. IF, AT TIME OF EXCAVATION WITHIN EACH EXCAVATION AREA, GROUNDWATER AT THE SAMPLE LOCATION IS NOT ENCOUNTERED AT THE EXCAVATION DEPTH DEPICTED ON THE PLANS, THE CONTRACTOR SHALL EXCAVATE UP TO AN ADDITIONAL 6 INCH (MAXIMUM) DEPTH THROUGHOUT THAT EXCAVATION AREA, OR THE ADDITIONAL DEPTH TO THE OBSERVED GROUNDWATER ELEVATION AT THE SAMPLE LOCATION, WHICHEVER IS SHALLOWER. IF GROUNDWATER IS STILL NOT ENCOUNTERED AT THE SAMPLE LOCATION FOLLOWING ADDITIONAL EXCAVATION, A DOCUMENTATION SOIL SAMPLE SHALL BE COLLECTED AT THE SAMPLE LOCATION INDICATED ON THE PLANS TO DOCUMENT SOIL CONDITIONS AT THE BOTTOM OF THE EXCAVATION AREA. DOCUMENTATION SOIL SAMPLES WILL BE SUBMITTED FOR LABORATORY CADMIUM TESTING BY THE ENGINEER.
6. IF GROUNDWATER IS SHALLOWER THAN EXCAVATION DEPTH DEPICTED ON THE PLANS, CONTRACTOR SHALL MANAGE GROUNDWATER IN ACCORDANCE WITH THE SWPPP (APPENDIX B OF THE 100% RDR) AND TECHNICAL SPECIFICATION SECTIONS 02 60 05 - CONTAMINATED MATERIAL MANAGEMENT AND DISPOSAL AND 02 73 00 - CONSTRUCTION WATER MANAGEMENT AND DISPOSAL (APPENDIX G OF THE 100% RDR) TO ACHIEVE REQUIRED EXCAVATION DEPTHS.
7. CONTRACTOR SHALL PROVIDE MEANS OF LIMITING WATER FROM ENTERING EXCAVATION AREAS (E.G. SANDBAGS, ETC.) AS NECESSARY DURING SEDIMENT REMOVAL ADJACENT TO SURFACE WATER.
8. REFER TO SPECIFICATION SECTION 01 71 26 (CONSTRUCTION SURVEYING AND LAYOUT) FOR POST-EXCAVATION, POST-BACKFILLING, AND POST-CONSTRUCTION SURVEYING REQUIREMENTS.

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SCALE(S) AS INDICATED

THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING: USE TO VERIFY FIGURE REPRODUCTION SCALE

No.	Date	Revisions	By	CMD
1	SEPT 2025	REVISED DRAFT 100%	SEM	CMD

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Professional Engineer's Name: MICHAEL B. HIGGINS
Professional Engineer's No.: 089643
State: NY | Date Signed: 10.01.2025 | Project Mgr.: MAF
Designed by: PTO | Drawn by: JLH | Checked by: CMD

STATE OF NEW YORK — MICHAEL B. HIGGINS — 089643-1 — LICENSED PROFESSIONAL ENGINEER
Oct. 1, 2025

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REMEDIAL DESIGN - OPERABLE UNIT 2

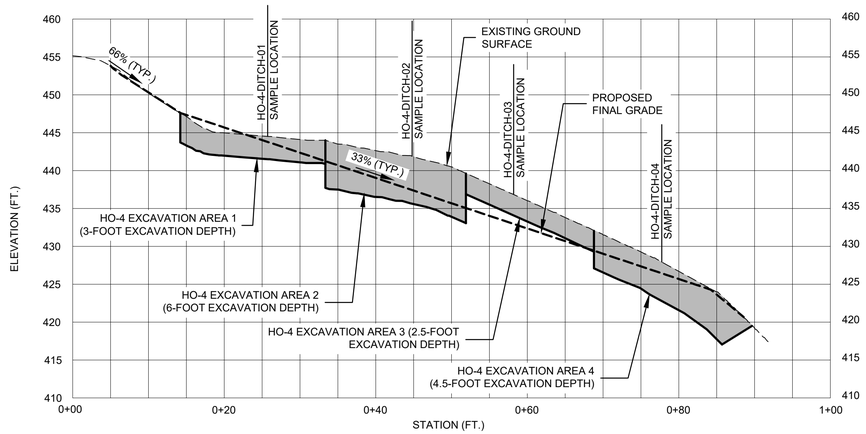
PROFILE HO-2

ARCADIS Project No. 30245593.00067

Date APRIL 2024

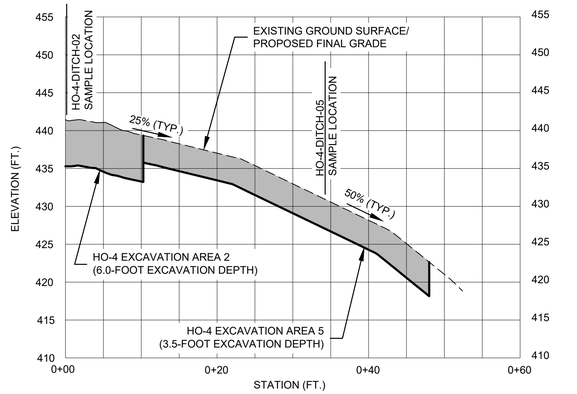
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Clifton Park, NY 12065
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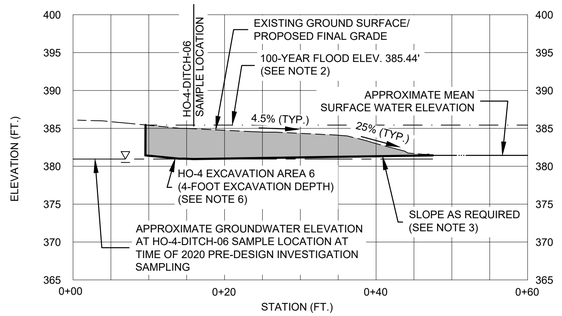
HO-4 AREAS 1 - 4 EXCAVATION PROFILE 1

SCALE: 1"=10'



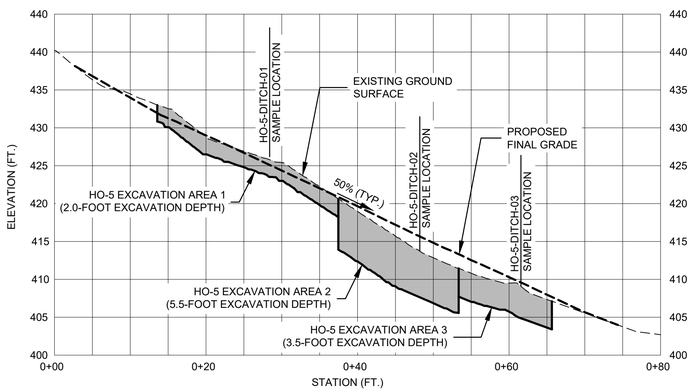
HO-4 AREA 5 EXCAVATION PROFILE 2

SCALE: 1"=10'



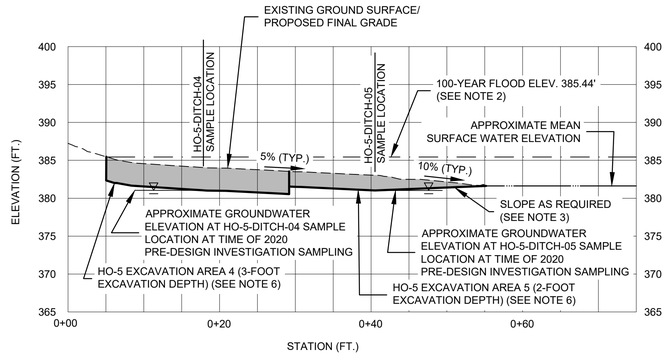
HO-4 AREA 6 EXCAVATION PROFILE 3

SCALE: 1"=10'



HO-5 AREAS 1 - 3 EXCAVATION PROFILE 4

SCALE: 1"=10'



HO-5 AREAS 4 AND 5 EXCAVATION PROFILE 5

SCALE: 1"=10'

NOTES:

1. ELEVATIONS OF THE BOTTOM OF EXCAVATION ARE BASED ON INDICATED DEPTHS BELOW EXISTING GROUND SURFACE AND ARE APPROXIMATE. ACTUAL ELEVATIONS OF THE BOTTOM OF EXCAVATION MAY DIFFER FROM THOSE DEPICTED ON THIS DRAWING BASED ON FIELD OBSERVED TOPOGRAPHY.
2. 100 YEAR FLOOD ELEVATION BASED ON FEMA FLOOD INSURANCE STUDY FOR SENECA COUNTY EFFECTIVE AUGUST 3, 1981. DATUM IS NAVD 88.
3. BOTTOM OF EXCAVATION DOWNGRADIENT OF SAMPLE LOCATIONS HO-4-DITCH-06 AND HO-5-DITCH-05 SHALL TAPER GRADUALLY TO MEET THE PRE-CONSTRUCTION ELEVATION AT THE EDGE OF WATER AT THE TIME OF CONSTRUCTION. CONTRACTOR SHALL AVOID DISTURBANCE OF EXISTING STONE SHORE PROTECTION TO THE EXTENT POSSIBLE. CONTRACTOR SHALL RESTORE SHORELINE PROTECTION IN ACCORDANCE WITH THE APPROVED JOINT PERMIT APPLICATION WITH A COMBINATION OF ROCK INFILL, VEGETATIVE RESTORATION, AND TURF REINFORCEMENT MATTING.
4. EXISTING CHANNEL INVERTS VARY PLANIMETRICALLY FROM PROPOSED CHANNEL INVERTS. PROPOSED GRADING SHOWN IS REFERENCED TO PROPOSED CHANNEL INVERT LOCATION.
5. CONTRACTOR SHALL PROVIDE MEANS OF LIMITING WATER FROM ENTERING EXCAVATION AREAS (E.G. SANDBAGS, ETC.) AS NECESSARY DURING SEDIMENT REMOVAL ADJACENT TO SURFACE WATER.
6. **NOTES SPECIFIC TO HO-4 EXCAVATION AREA 6, AND HO-5 EXCAVATION AREAS 4 AND 5:** THESE EXCAVATION AREAS SHALL BE EXCAVATED TO, AT MINIMUM, THE DEPTHS INDICATED ON THE PLAN AT THE SAMPLE LOCATION, AND UPGRADIENT OF THE SAMPLE LOCATION. IF, AT TIME OF EXCAVATION WITHIN EACH EXCAVATION AREA, GROUNDWATER AT THE SAMPLE LOCATION IS NOT ENCOUNTERED AT THE EXCAVATION DEPTH DEPICTED ON THE PLANS, THE CONTRACTOR SHALL EXCAVATE UP TO AN ADDITIONAL 6 INCH (MAXIMUM) DEPTH THROUGHOUT THAT EXCAVATION AREA, OR THE ADDITIONAL DEPTH TO THE OBSERVED GROUNDWATER ELEVATION AT THE SAMPLE LOCATION, WHICHEVER IS SHALLOWER. IF GROUNDWATER STILL IS NOT ENCOUNTERED AT THE SAMPLE LOCATION FOLLOWING ADDITIONAL EXCAVATION, A DOCUMENTATION SOIL SAMPLE SHALL BE COLLECTED AT THE SAMPLE LOCATION INDICATED ON THE PLANS TO DOCUMENT SOIL CONDITIONS AT THE BOTTOM OF THE EXCAVATION AREA. DOCUMENTATION SOIL SAMPLES WILL BE SUBMITTED FOR LABORATORY CADMIUM TESTING BY THE ENGINEER.
7. IF GROUNDWATER IS SHALLOWER THAN EXCAVATION DEPTH DEPICTED ON THE PLANS, CONTRACTOR SHALL MANAGE GROUNDWATER IN ACCORDANCE WITH THE SWPPP (APPENDIX B OF THE 100% RDR) AND TECHNICAL SPECIFICATION SECTIONS 02 60 05 - CONTAMINATED MATERIAL MANAGEMENT AND DISPOSAL AND 02 73 00 - CONSTRUCTION WATER MANAGEMENT AND DISPOSAL (APPENDIX G OF THE 100% RDR) TO ACHIEVE REQUIRED EXCAVATION DEPTHS.
8. REFER TO SPECIFICATION SECTION 01 71 26 (CONSTRUCTION SURVEYING AND LAYOUT) FOR POST-EXCAVATION, POST-BACKFILLING, AND POST-CONSTRUCTION SURVEYING REQUIREMENTS.
9. NOTES SPECIFIC TO HO-4 EXCAVATION AREAS 2 AND 4, AND HO-5 EXCAVATION AREA 2: THESE EXCAVATION AREAS SHALL BE EXCAVATED TO, AT A MINIMUM, THE DEPTHS INDICATED ON THE PLAN OR THE DEPTH OF REFUSAL (WHICHEVER IS SHALLOWER). IF REFUSAL IS NOT ENCOUNTERED AT THE EXCAVATION DEPTH DEPICTED ON THE PLANS, THE CONTRACTOR SHALL EXCAVATE UP TO AN ADDITIONAL 6-INCH (MAXIMUM) DEPTH THROUGHOUT THAT PORTION OF THE EXCAVATION AREA WHERE REFUSAL WAS NOT ENCOUNTERED. IF REFUSAL IS STILL NOT ENCOUNTERED AFTER ADDITIONAL EXCAVATION, A DOCUMENTATION SOIL SAMPLE SHALL BE COLLECTED TO DOCUMENT SOIL CONDITIONS AT THE BOTTOM OF THE EXCAVATION AREA. DOCUMENTATION SOIL SAMPLES SHALL BE SUBMITTED FOR LABORATORY CADMIUM TESTING BY THE ENGINEER.

SCALE(S) AS INDICATED

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No.	Date	Revisions	By	Ckd
1	SEPT 2025	REVISED DRAFT 100%	SEM	CMD

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Professional Engineer's Name: MICHAEL B. HIGGINS
Professional Engineer's No.: 089643

State	Date Signed	Project Mgr.
NY	10.01.2025	MAF
Designed by	Drawn by	Checked by
PTO	JLH	CMD

STATE OF NEW YORK · MICHAEL B. HIGGINS · 089643-1 · LICENSED PROFESSIONAL ENGINEER · Oct. 1, 2025

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REMEDIAL DESIGN - OPERABLE UNIT 2

PROFILES HO-4 AND HO-5

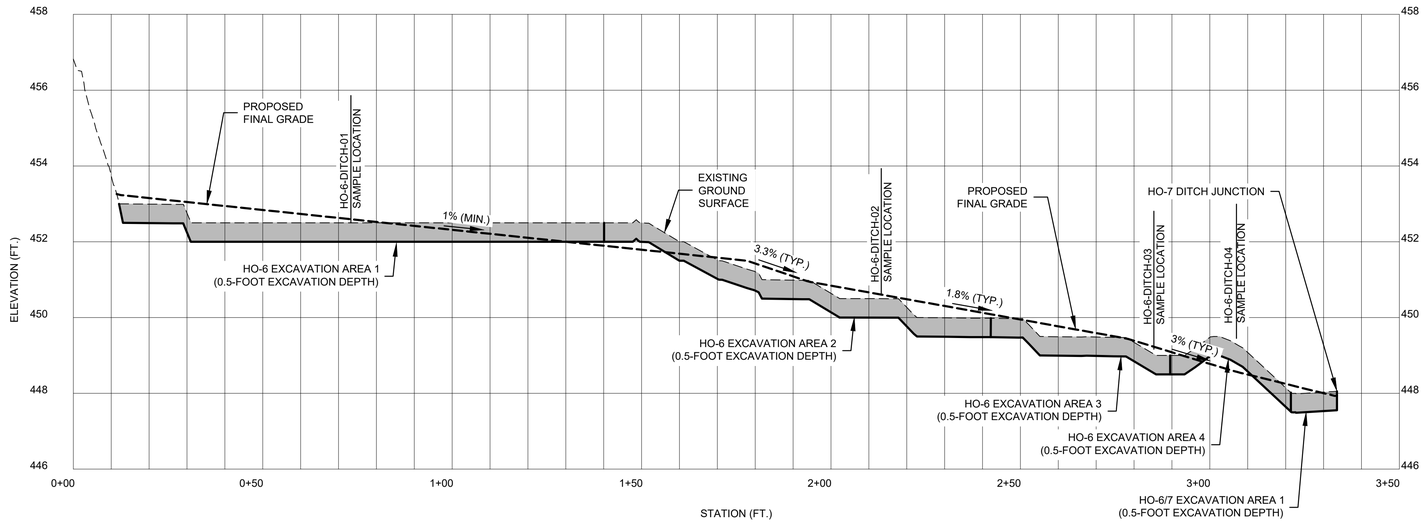
ARCADIS Project No. 30245593.00067

Date APRIL 2024

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Clifton Park, NY 12065
Tel: 518-250-7300

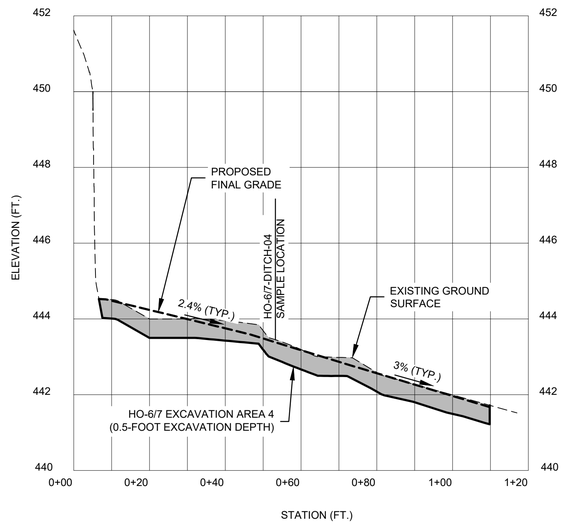
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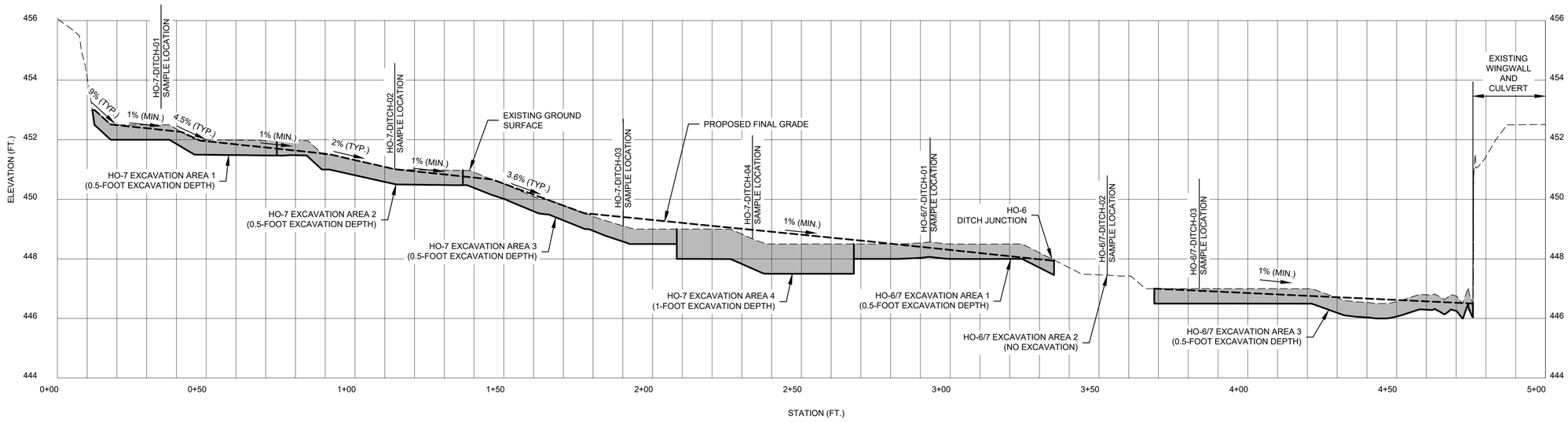
HO-6 AREAS 1 - 3 EXCAVATION PROFILE (1)

HORIZONTAL SCALE: 1"=20' VERTICAL SCALE: 1"=2'



HO-6/7 AREA 4 EXCAVATION PROFILE (2)

HORIZONTAL SCALE: 1"=20' VERTICAL SCALE: 1"=2'



HO-7 AND HO-6/7 AREA 1 EXCAVATION PROFILE (3)

HORIZONTAL SCALE: 1"=20' VERTICAL SCALE: 1"=2'

NOTES:

1. ELEVATIONS OF THE BOTTOM OF EXCAVATION ARE BASED ON INDICATED DEPTHS BELOW EXISTING GROUND SURFACE AND ARE APPROXIMATE. ACTUAL ELEVATIONS OF THE BOTTOM OF EXCAVATION MAY DIFFER FROM THOSE DEPICTED ON THIS DRAWING BASED ON FIELD OBSERVED TOPOGRAPHY.
2. EXISTING CHANNEL INVERT VARIES PLANIMETRICALLY FROM PROPOSED CHANNEL INVERT. PROPOSED GRADING SHOWN IS REFERENCED TO PROPOSED CHANNEL INVERT LOCATION.
3. REFER TO SPECIFICATION SECTION 01 71 26 (CONSTRUCTION SURVEYING AND LAYOUT) FOR POST-EXCAVATION, POST-BACKFILLING, AND POST-CONSTRUCTION SURVEYING REQUIREMENTS.

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Professional Engineer's Name: MICHAEL B. HIGGINS
Professional Engineer's No.: 089643

State	Date Signed	Project Mgr.
NY	10.01.2025	MAF
Designed by	Drawn by	Checked by
PTO	JLH	CMD

STATE OF NEW YORK · MICHAEL B. HIGGINS · 089643-1 · REGISTERED PROFESSIONAL ENGINEER
Oct. 1, 2025

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REMEDIAL DESIGN - OPERABLE UNIT 2

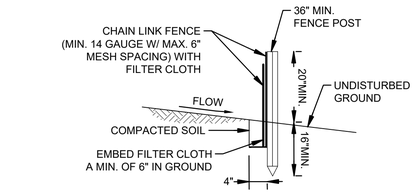
PROFILES HO-6, HO-7 AND HO-6/7

ARCADIS Project No. 30245593.00067

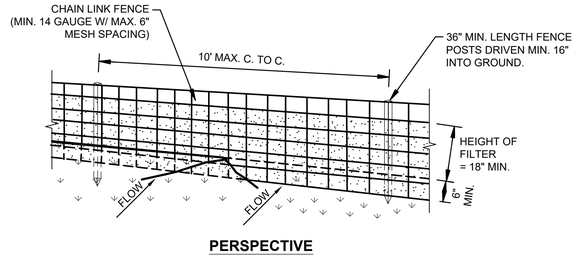
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13



SECTION



PERSPECTIVE

NOTES:

1. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES. POSTS SHALL BE STEEL EITHER "T" OR "U" TYPE OR HARDWOOD.
2. FILTER CLOTH TO BE TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION. FENCE SHALL BE 14 GAUGE MINIMUM, 6" MAXIMUM MESH OPENING.

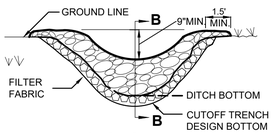
TEMPORARY SILT FENCE

NOT TO SCALE

1

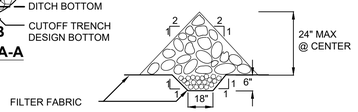


PROFILE



SECTION A-A

$$X = \frac{H\ (Ft)}{SLOPE\ (FT/FT)}$$



SECTION B-B

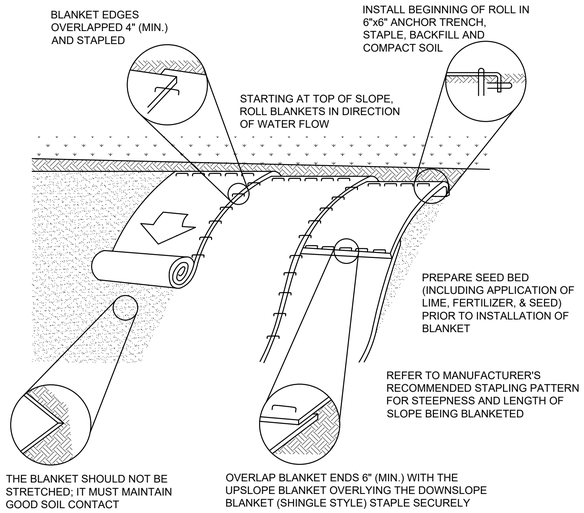
NOTES:

1. SET SPACING OF CHECK DAMS SUCH THAT THE ELEVATIONS OF THE CREST OF THE DOWNSTREAM DAM IS AT THE SAME ELEVATION OF THE TOE OF THE UPSTREAM DAM.
2. PROTECT THE CHANNEL DOWNSTREAM OF THE LOWEST CHECK DAM FROM SCOUR AND EROSION USING STONE OR LINER, AS APPROPRIATE.
3. ENSURE THAT CHANNEL APPURTENANCES DOWNSTREAM OF CHECK DAMS, SUCH AS CULVERT ENTRANCES, ARE NOT SUBJECT TO DAMAGE OR BLOCKAGE FROM DISPLACED CHECK DAM MATERIAL.
4. MAXIMUM DRAINAGE AREA 2 ACRES.
5. PLACE STONE ON FILTER FABRIC FOUNDATION ACCORDING TO THE LINES, GRADES, AND LOCATIONS SHOWN IN THE PLAN.
6. EXTEND THE STONE A MINIMUM OF 1.5 FEET BEYOND THE DITCH BANKS TO PREVENT CUTTING AROUND THE DAM.

CHECK DAM

NOT TO SCALE

4



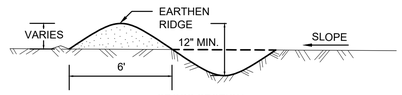
NOTES:

1. SEED AND SOIL AMENDMENTS SHALL BE APPLIED PRIOR TO INSTALLING THE BLANKET.
2. SLOPE SURFACE SHALL BE FREE OF ROCKS, CLODS, AND STICKS PRIOR TO PLACEMENT OF THE BLANKET.
3. BLANKET SHALL HAVE GOOD CONTINUOUS CONTACT WITH UNDERLYING SOIL THROUGHOUT ENTIRE LENGTH. LAY BLANKET LOOSELY AND STAKE OR STAPLE TO MAINTAIN DIRECT CONTACT WITH SOIL. DO NOT STRETCH BLANKET.
4. BLANKETED AREAS SHALL BE INSPECTED WEEKLY BY THE CONTRACTOR UNTIL PERENNIAL VEGETATION IS ESTABLISHED TO A MINIMUM UNIFORM 80% COVERAGE THROUGHOUT THE BLANKETED AREA. DAMAGED OR DISPLACED BLANKETS SHALL BE RESTORED OR REPLACED BY THE CONTRACTOR.
5. REFER TO THE SWPPP (APPENDIX B), SECTION 4.3 FOR MAINTENANCE REQUIREMENTS.

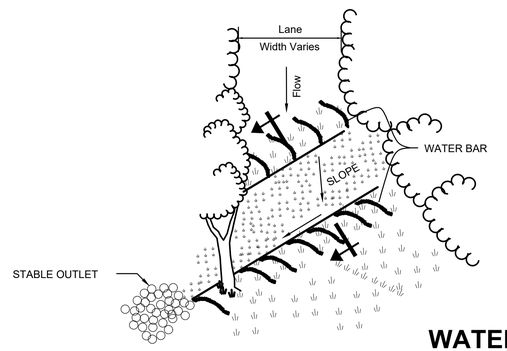
EROSION CONTROL MAT - SLOPE APPLICATION

NOT TO SCALE

2



CROSS SECTION
NOT TO SCALE



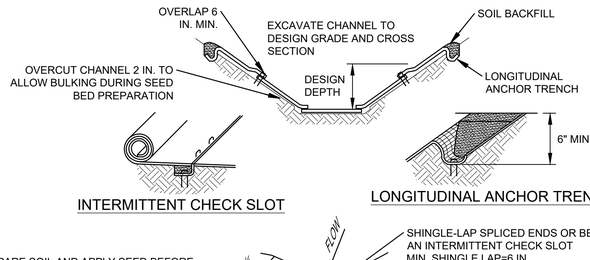
NOTES:

1. INSTALL THE WATER BARS AS SOON AS THE RIGHT OF WAY IS CLEARED AND GRADED.
2. DISK OR STRIP THE SOD FROM THE BASE FOR THE CONSTRUCTED RIDGE BEFORE PLACING FILL.
3. TRACK THE RIDGE TO COMPACT IT TO THE DESIGN CROSS SECTION.
4. THE OUTLET SHALL BE LOCATED ON AN UNDISTURBED AREA. FIELD SPACING WILL BE ADJUSTED TO USE THE MOST STABLE OUTLET AREAS. OUTLET PROTECTION WILL BE PROVIDED BY THE CONTRACTOR WHEN NATURAL AREAS ARE NOT ADEQUATE.
5. VEHICLE CROSSING SHALL BE STABILIZED WITH GRAVEL. EXPOSED AREAS SHALL BE SEEDED AND MULCHED WITHIN 2 DAYS.
6. LONGITUDINAL GRADE OF THE WATER BAR SHALL NOT EXCEED 2%.
7. PERIODICALLY INSPECT WATER BARS FOR EROSION DAMAGE AND SEDIMENT. CHECK OUTLET AREAS AND MAKE REPAIRS AS NEEDED TO RESTORE OPERATION.
8. REFER TO THE SWPPP (APPENDIX B), SECTION 4.3 FOR INSPECTION AND MAINTENANCE REQUIREMENTS.
9. SIDE SLOPES SHALL BE GRADED WITH AN APPROPRIATE SLOPE TO ALLOW FOR VEHICLE ACCESS.

WATER BAR

NOT TO SCALE

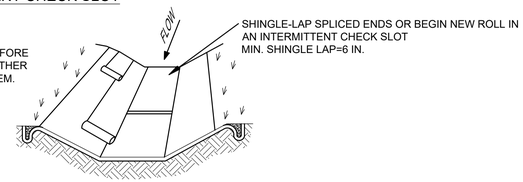
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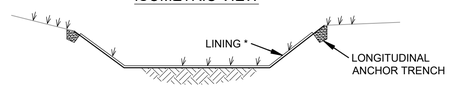
INTERMITTENT CHECK SLOT

LONGITUDINAL ANCHOR TRENCH

PREPARE SOIL AND APPLY SEED BEFORE INSTALLING BLANKETS, MATS, OR OTHER TEMPORARY CHANNEL LINER SYSTEM.



ISOMETRIC VIEW



(LOOKING DOWNSTREAM)

CHANNEL CROSS-SECTION

* SEE MANUFACTURER'S LINING INSTALLATION DETAIL FOR STAPLE PATTERNS, VEGETATIVE STABILIZATION FOR SOIL AMENDMENTS, SEED MIXTURES AND MULCHING INFORMATION

NOTES:

1. SEED AND SOIL AMENDMENTS SHALL BE SELECTED BY THE CONTRACTOR AND SUBMITTED TO THE ENGINEER FOR APPROVAL BASED ON LAND USE AND APPLIED ACCORDING TO THE RATES IDENTIFIED IN THE TECHNICAL SPECIFICATIONS PRIOR TO INSTALLING THE BLANKET.
2. SLOPE SURFACE SHALL BE FREE OF ROCKS, CLODS, STICKS, AND GRASS PRIOR TO PLACEMENT OF THE BLANKET.
3. BLANKET SHALL HAVE GOOD CONTINUOUS CONTACT WITH UNDERLYING SOIL THROUGHOUT ENTIRE LENGTH. LAY BLANKET LOOSELY AND STAKE OR STAPLE TO MAINTAIN DIRECT CONTACT WITH SOIL. DO NOT STRETCH BLANKET.
4. BLANKETED AREAS SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT BY THE CONTRACTOR UNTIL PERENNIAL VEGETATION IS ESTABLISHED TO A MINIMUM UNIFORM 80% COVERAGE THROUGHOUT THE BLANKETED AREA. DAMAGED OR DISPLACED BLANKETS SHALL BE RESTORED OR REPLACED WITHIN 2 CALENDAR DAYS BY THE CONTRACTOR.
5. ANCHOR TRENCHES SHALL BE INSTALLED AT BEGINNING AND END OF CHANNEL IN THE SAME MANNER AS LONGITUDINAL ANCHOR TRENCHES.
6. EROSION CONTROL BLANKET WILL NOT BE INSTALLED WITHIN WETLANDS.
7. REFER TO THE SWPPP (APPENDIX B), SECTION 4.3 FOR MAINTENANCE REQUIREMENTS.

EROSION CONTROL MAT - CHANNEL APPLICATION

NOT TO SCALE

3

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Professional Engineer's Name: MICHAEL B. HIGGINS
Professional Engineer's No.: 089643
State: NY | Date Signed: 10.01.2025 | Project Mgr.: MAF
Designed by: PTO | Drawn by: JLH | Checked by: CMD



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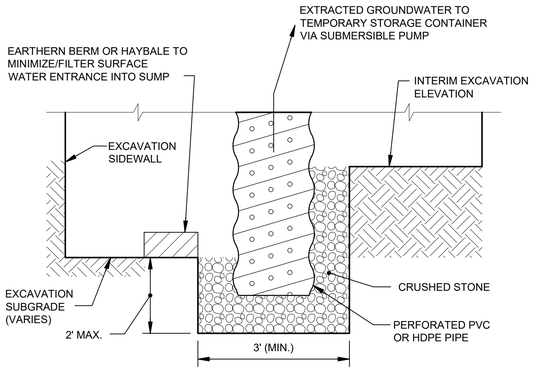
REMEDIAL DESIGN - OPERABLE UNIT 2

EROSION AND SEDIMENT CONTROL DETAILS

ARCADIS Project No.: 30245593.00067
Date: APRIL 2024

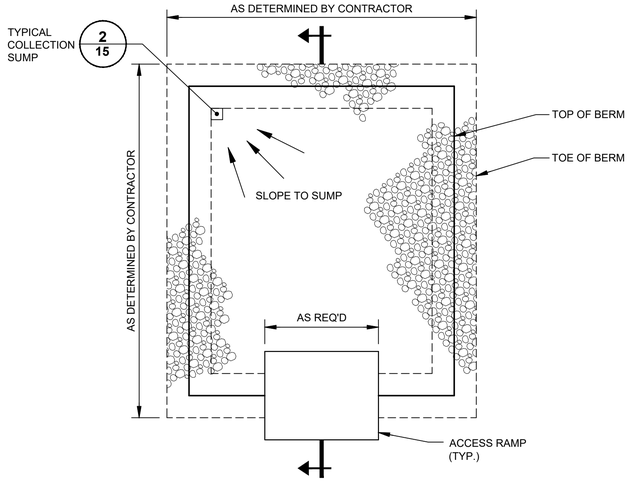
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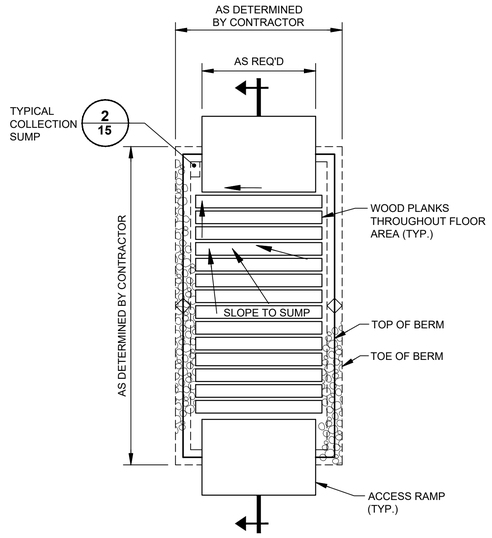


TYPICAL EXCAVATION DEWATERING SUMP (1)

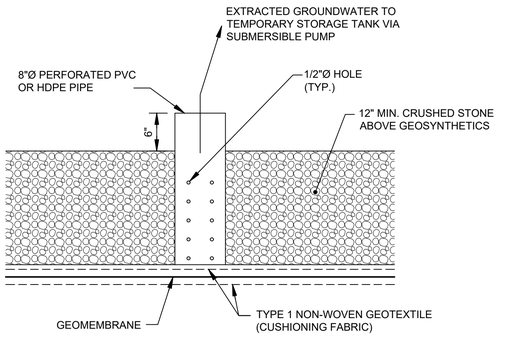
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PLAN

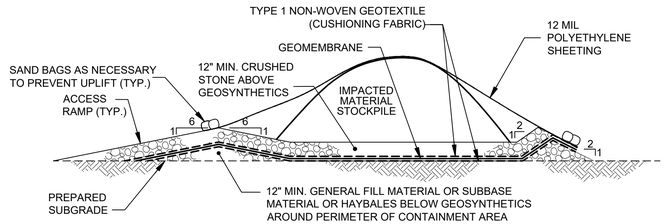


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TYPICAL COLLECTION SUMP (2)

NOT TO SCALE



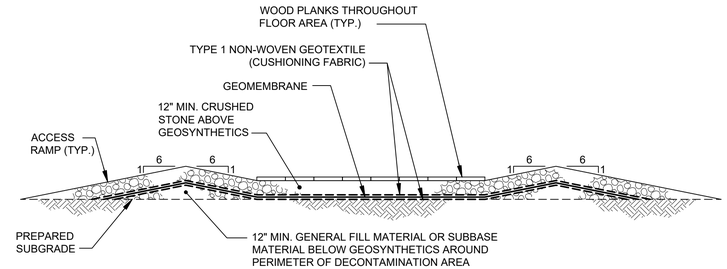
PROFILE

NOTES:

1. TEMPORARY CONTAINMENT AREA SHALL HAVE A GENERAL SLOPE TOWARD A COLLECTION SUMP TO FACILITATE COLLECTION OF LIQUIDS THAT DRAIN FROM MATERIAL.
2. CONSTRUCT OVER AN AREA SIZED FOR AMOUNT OF MATERIAL TO BE STAGED. ENSURE SUBGRADE IS UNIFORM AND FREE OF DEBRIS, STONES, AND SHARP OBJECTS. SIZE AND LOCATION TO BE DETERMINED BY CONTRACTOR CONSIDERING EXCAVATION SEQUENCING AND PRODUCTION. ENGINEER SHALL REVIEW AND APPROVE LOCATIONS OF TEMPORARY CONTAINMENT AREAS PRIOR TO CONSTRUCTION.
3. STOCKPILED MATERIAL SHALL BE COVERED AT THE END OF EACH WORK DAY OR IN ANTICIPATION OF PRECIPITATION. CONTRACTOR SHALL MAINTAIN COVER AND PREVENT WATER FROM ACCUMULATING ON STOCKPILED MATERIAL OR WITHIN THE CONTAINMENT AREA.

TYPICAL TEMPORARY CONTAINMENT AREA (3)

NOT TO SCALE



PROFILE

NOTES:

1. TEMPORARY DECONTAMINATION PAD SHALL BE INSTALLED AT EACH REMEDIAL AREA AT AN APPROPRIATE LOCATION TO BE DETERMINED BY CONTRACTOR. DIMENSIONS AND AGGREGATE THICKNESS SHALL BE BASED ON VEHICLE AND EQUIPMENT USAGE. ENGINEER SHALL REVIEW AND APPROVE LOCATIONS OF DECONTAMINATION PADS PRIOR TO CONSTRUCTION. ENSURE SUBGRADE IS UNIFORM AND FREE OF DEBRIS, STONES, AND SHARP OBJECTS.
2. PREFABRICATED STEEL PADS MAY BE USED IN LIEU OF CONSTRUCTING STONE PADS.
3. TEMPORARY DECONTAMINATION PADS SHALL HAVE A GENERAL SLOPE TOWARDS A COLLECTION SUMP TO FACILITATE COLLECTION OF LIQUIDS GENERATED FROM DECONTAMINATION ACTIVITIES.

TYPICAL TEMPORARY DECONTAMINATION AREA (4)

NOT TO SCALE

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Professional Engineer's Name: **MICHAEL B. HIGGINS**
Professional Engineer's No.: 089643
State: NY | Date Signed: 10.01.2025 | Project Mgr.: MAF
Designed by: PTO | Drawn by: JLH | Checked by: CMD

STATE OF NEW YORK — MICHAEL B. HIGGINS — 089643-1 — LICENSED PROFESSIONAL ENGINEER — Oct 1, 2025

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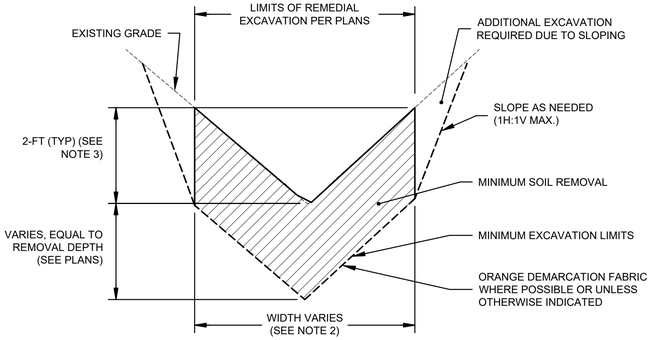
TEMPORARY CONSTRUCTION DETAILS

ARCADIS Project No.
30245593.00067

Date
APRIL 2024

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646 Plank Road, Suite 100
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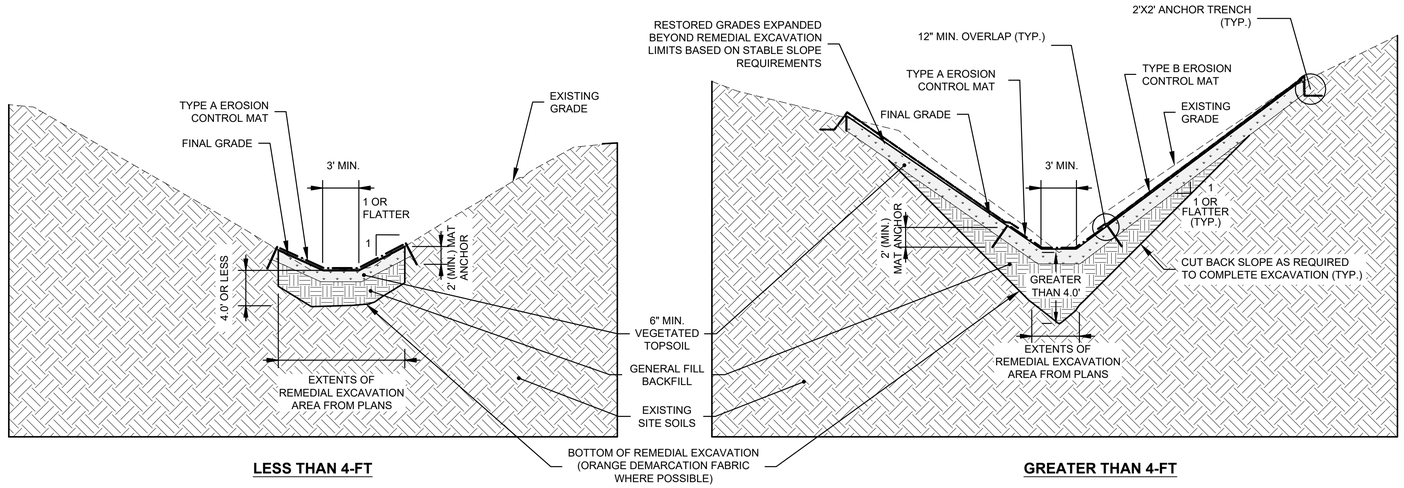


NOTES:

1. SOIL REMOVAL SHALL BE CONDUCTED TO THE DEPTHS BELOW GROUND SURFACE SHOWN ON THE PLANS.
2. WIDTH VARIES BASED ON TOPOGRAPHY. REFER TO PLANS FOR REMOVAL LIMITS.
3. EXCAVATION LIMITS SHALL CORRESPOND TO THE POINT EQUIVALENT TO A 2-FT FLOW DEPTH. IF SWALE DEPTH DOES NOT MEET OR EXCEED 2 FEET, EXCAVATION SHALL BE CONDUCTED TO THE TOP OF BANK LIMITS.

TYPICAL EXCAVATION SECTION 1

NOT TO SCALE

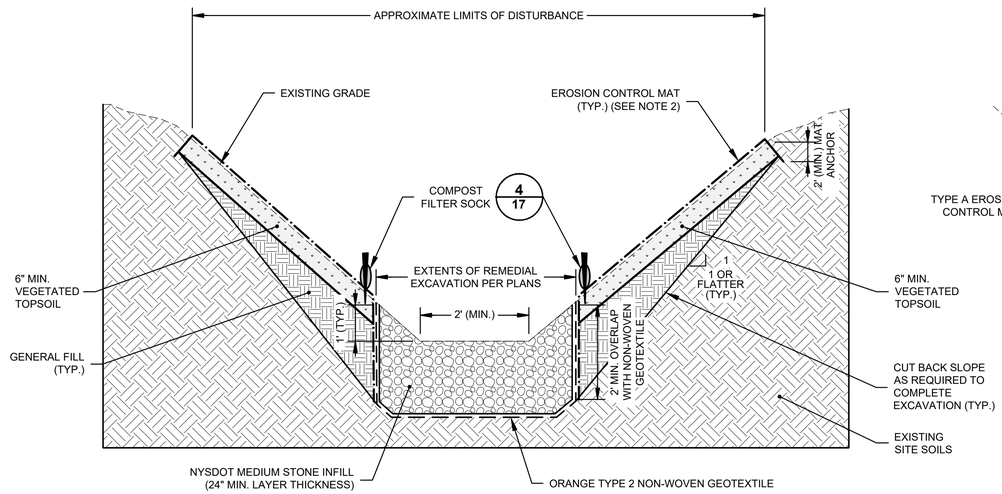


NOTE:

1. TYPE B EROSION CONTROL MATTING APPLIES TO RESTORATION LOCATIONS WHERE SLOPES OUTSIDE OF CHANNEL BEDS EXCEED SLOPE GRADIENTS OF 3H:1V.

TYPICAL HO-2, HO-4, HO-6, AND HO-7 RESTORATION DETAILS 2

NOT TO SCALE

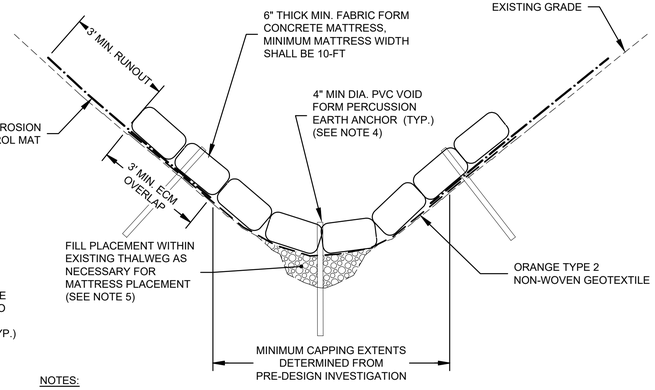


NOTES:

1. REFER TO DRAWING 9 FOR EXTENTS OF STONE FILL PLACEMENT.
2. EROSION CONTROL MAT TYPE AS SHOWN ON DRAWING 9.

TYPICAL HO-5 - STONE INFILL RESTORATION DETAIL 3

NOT TO SCALE

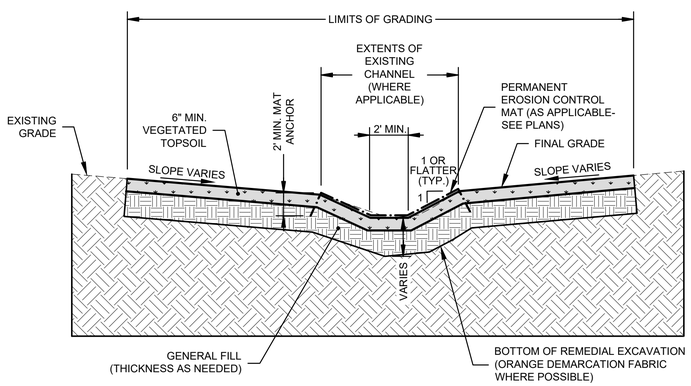


NOTES:

1. CONTRACTOR SHALL CLEAR AND GRUB AS NECESSARY FOR INSTALLATION OF CRUSHED STONE AND NON-WOVEN GEOTEXTILE.
2. CONTRACTOR SHALL NOT DISTURB SOILS WITHIN COVER LIMITS DURING MATTRESS INSTALLATION.
3. ANCHOR DIMENSIONS ALSO APPLY TO TOP AND TOE OF MATTRESS PLACEMENT LIMITS.
4. ANCHOR SHALL BE GALVANIZED PERCUSSION TYPE DUCKBILL ANCHORS WITH MINIMUM PULLOUT STRENGTH OF 5,000 LBS. ANCHORS SHALL BE INSTALLED TO A MINIMUM DEPTH OF 42 INCHES. ANCHORS SHALL BE SPACED AT A MAXIMUM DISTANCE OF 3 FEET BOTH PARALLEL TO AND PERPENDICULAR TO THE SLOPE. A MINIMUM OF 50 ANCHORS SHALL BE INSTALLED. CONTRACTOR SHALL SUBMIT ANCHOR TYPE AND PROPOSED ANCHORING PATTERN TO THE ENGINEER FOR APPROVAL PRIOR TO CONSTRUCTION.
5. CONTRACTOR SHALL PREPARE SUBGRADE IN A MANNER THAN WILL MAINTAIN CONTACT BETWEEN EXISTING GRADE, NON-WOVEN GEOTEXTILE, AND CONCRETE MATTRESS.

TYPICAL HO-3 CAPPING DETAIL 4

NOT TO SCALE



NOTES:

1. AREAS WITHIN THE LIMITS OF DISTURBANCE DEPICTED ON PLANS SHALL BE RESTORED WITH A MINIMUM OF 6-INCHES OF TOPSOIL AND GENERAL FILL AS NEEDED TO PROVIDE THE GRADES INDICATED ON THE RESTORATION PLANS UNLESS OTHERWISE INDICATED ON THE PLANS.

TYPICAL VEGETATED RESTORATION DETAIL 5

NOT TO SCALE

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Professional Engineer's Name: MICHAEL B. HIGGINS
Professional Engineer's No.: 089643

State	Date Signed	Project Mgr.
NY	10.01.2025	MAF
Designed by: PTO	Drawn by: JLH	Checked by: CMD

STATE OF NEW YORK — MICHAEL B. HIGGINS — 089643-1 — LICENSED PROFESSIONAL ENGINEER — Oct 1, 2025

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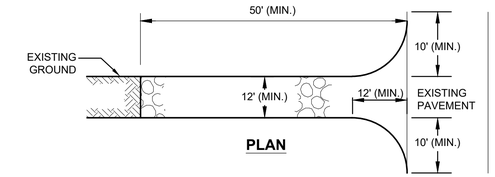
MISCELLANEOUS DETAILS

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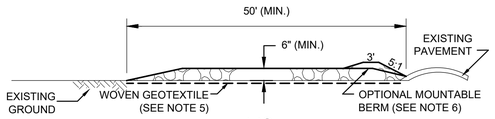
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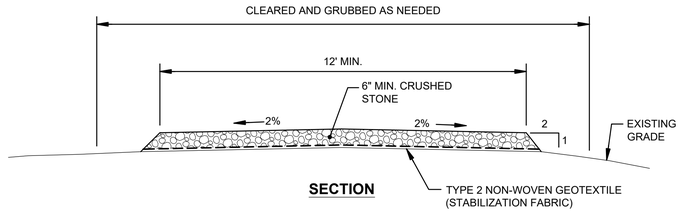
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PLAN



PROFILE



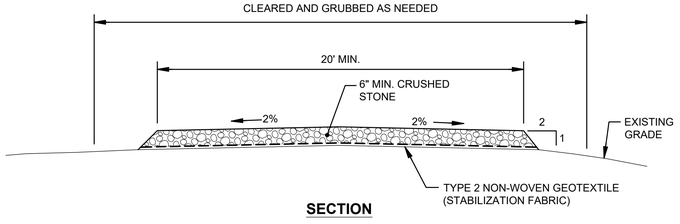
SECTION

NOTE:

1. INSTALL/IMPROVE CONSTRUCTION ENTRANCE AT ALL ACCESS POINTS TO PUBLIC ROADWAYS.

TEMPORARY CONSTRUCTION ENTRANCE 1

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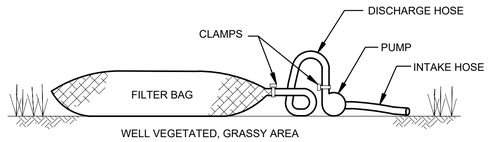
SECTION

NOTE:

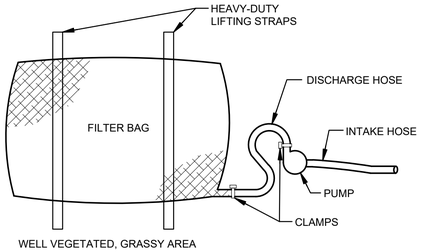
1. IF ACCESS ROAD ENHANCEMENT IS REQUIRED WITHIN FLOODPLAIN LIMITS IT SHALL BE CONDUCTED BY EXCAVATING EXISTING SITE SOILS AND PLACING STONE TO AN ELEVATION EQUAL OR LESSER THAN PRE-CONSTRUCTION CONDITIONS SUCH THAT ROAD ENHANCEMENT RESULTS IN ZERO NET FILL WITHIN FLOODPLAIN LIMITS . ACCESS ROAD ENHANCEMENT WITHIN THE FLOODPLAIN SHALL BE AVOIDED IF POSSIBLE AND SHALL REQUIRE ENGINEER APPROVAL PRIOR TO CONDUCTING.

TYPICAL ACCESS ROAD ENHANCEMENT 2

NOT TO SCALE



PROFILE



PLAN

NOTES:

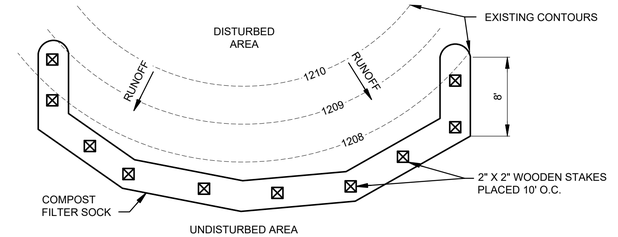
1. LOW VOLUME FILTER BAGS SHALL BE MADE FROM NON-WOVEN GEOTEXTILE MATERIAL SEWN WITH HIGH STRENGTH, DOUBLE STITCHED "J" TYPE SEAMS; AND SHALL BE CAPABLE OF TRAPPING PARTICLES LARGER THAN 150 MICRONS.
2. HIGH VOLUME FILTER BAGS SHALL BE MADE FROM WOVEN GEOTEXTILES THAT MEET THE STANDARDS INCLUDED IN THE TABLE BELOW.

PROPERTY	MINIMUM STANDARD
ROLL STRENGTH	100 LB/IN
GRAB TENSILE STRENGTH	200 LB
GRAB TENSILE ELONGATION	50%
TRAPEZOID TEAR STRENGTH	80 LB
PUNCTURE	130 LB
MULLEN BURST	380 PSI
UV RESISTANCE	70%
APPARENT OPENING SIZE	40 - 80 US SIEVE
FLOW THRU RATE	70 GPM/SQ FT

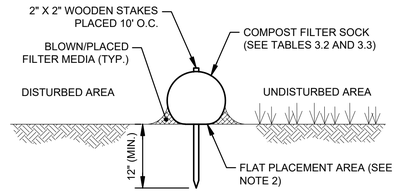
3. SUITABLE MEANS OF ACCESSING THE BAG WITH MACHINERY FOR DISPOSAL PURPOSES SHALL BE PROVIDED BY THE CONTRACTOR.
4. BAGS SHALL BE PLACED ON STRAPS TO FACILITATE REMOVAL UNLESS BAGS COME WITH LIFTING STRAPS ALREADY ATTACHED.
5. BAGS SHALL BE LOCATED TO MINIMIZE INTERFERENCE WITH CONSTRUCTION ACTIVITIES AND TRAFFIC. BAG SHALL BE LOCATED IN A RELATIVELY LEVEL AREA THAT CAN BE ACCESSED EASILY BY HEAVY EQUIPMENT FOR CLEANOUT, DISPOSAL OF TRAPPED SEDIMENT, AND PROPER RELEASE OF FILTERED WATER.
6. BAGS SHALL HAVE AN OPENING LARGE ENOUGH TO ACCOMMODATE A 4-INCH DIAMETER DISCHARGE HOSE WITH AN ATTACHED STRAP TO TIE OFF THE BAG TO THE HOSE TO PREVENT BACK FLOW.
7. BAGS SHALL BE PLACED ON A VEGETATED FILTER STRIP, A 2-INCH THICK GRAVEL BED, OR A 4-INCH THICK STRAW MAT TO ALLOW WATER TO FLOW OUT OF THE BAG IN ALL DIRECTIONS.
8. COMPOST FILTER SOCK SHALL BE INSTALLED BELOW BAGS LOCATED WITHIN 50 FEET OF ANY RECEIVING SURFACE WATER OR WHERE GRASSY AREA IS NOT AVAILABLE.
9. THE PUMP DISCHARGE HOSE SHALL BE INSERTED INTO THE BAGS IN THE MANNER SPECIFIED BY THE MANUFACTURER AND SECURELY CLAMPED.
10. THE PUMPING RATE SHALL BE NO GREATER THAN 750 GPM OR ½ THE MAXIMUM FLOW SPECIFIED BY THE FILTER BAG MANUFACTURER, WHICHEVER IS LESS. PUMP INTAKES SHALL BE FLOATING AND SCREENED.
11. FILTER BAGS SHALL BE INSPECTED DAILY. IF ANY PROBLEM IS DETECTED, PUMPING SHALL CEASE IMMEDIATELY AND NOT RESUME UNTIL THE PROBLEM IS CORRECTED.
12. FILTER BAGS SHALL BE REPLACED WHEN THEY BECOME HALF-FULL OF SEDIMENT (OR SOONER IF RECOMMENDED BY THE MANUFACTURER). SPARE BAGS SHALL BE KEPT AVAILABLE FOR REPLACEMENT OF THOSE THAT HAVE FAILED OR ARE FILLED.
13. SEDIMENT FILTER BAGS SHALL NOT BE UTILIZED TO FILTER CONTAMINATED WATER, SUCH AS WATER THAT HAS ACCUMULATED IN REMEDIAL EXCAVATIONS.

SEDIMENT FILTER BAG 3

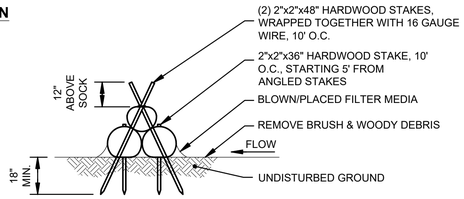
NOT TO SCALE



PLAN



SECTION



STACKING DETAIL

NOTES:

1. COMPOST FILTER SOCK SHALL BE PLACED AT EXISTING LEVEL GRADE. BOTH ENDS OF THE SOCK SHALL BE EXTENDED AT LEAST 8 FEET UP SLOPE AT 45 DEGREES TO THE MAIN SOCK ALIGNMENT.
2. THE FLAT DIMENSION OF THE SOCK SHALL BE AT LEAST 1.5 TIMES THE NOMINAL DIAMETER.
3. COMPOST INFILL SHALL BE WELL DECOMPOSED (MATURED AT LEAST 3 MONTHS), WEED-FREE, ORGANIC MATTER. IT SHALL BE AEROBICALLY COMPOSTED, POSSESS NO OBJECTIONABLE ODORS, AND CONTAIN LESS THAN 1% (BY DRY WEIGHT) OF MAN-MADE FOREIGN MATTER.
4. TRAFFIC SHALL NOT BE PERMITTED TO CROSS FILTER SOCKS.
5. ACCUMULATED SEDIMENT SHALL BE REMOVED AND MANAGED FOR DISPOSAL IN THE SAME MANNER AS EXCAVATED SOILS FROM THE SAME AREA AS DESCRIBED FOR SOILS IN SPECIFICATION SECTION 02 60 05 (CONTAMINATED MATERIAL MANAGEMENT AND DISPOSAL), SUBSECTION 1.01.
6. SOCKS SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT. DAMAGED SOCKS SHALL BE REPAIRED ACCORDING TO MANUFACTURER'S SPECIFICATIONS OR REPLACED BY THE CONTRACTOR WITHIN 24 HOURS OF INSPECTION.
7. BIODEGRADABLE FILTER SOCKS SHALL BE REPLACED AFTER 6 MONTHS; PHOTODEGRADABLE SOCKS AFTER 1 YEAR. POLYPROPYLENE SOCKS SHALL BE REPLACED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.
8. UPON STABILIZATION OF THE AREA TRIBUTARY TO THE SOCK, STAKES SHALL BE REMOVED. THE SOCK MAY BE LEFT IN PLACE AND VEGETATED, OR REMOVED. IN THE LATTER CASE, THE MESH SHALL BE CUT OPEN AND THE MULCH SPREAD AS A SOIL SUPPLEMENT.
9. CONTRACTOR SHALL ENSURE THAT ACTUAL COMPOST FILTER SOCK DIMENSIONS MEET SPECIFIED DESIGN DIMENSIONS.
10. COMPOST FILTER SOCKS SHALL BE SIZED IN ACCORDANCE WITH TABLE 3.1, THIS DETAIL.
11. COMPOST FILTER SOCKS PLACED ON HARD SURFACES WHERE STAKE INSTALLATION IS IMPRACTICAL (E.G., ASPHALT, CONCRETE) MAY BE ANCHORED UTILIZING ALTERNATE METHODS SUCH AS CINDER BLOCKS OR SANDBAGS. ALTERNATIVE ANCHORS MUST BE PLACED IN SUFFICIENT NUMBER AND SPACING TO PREVENT THE SOCK FROM SHIFTING OR SEPARATING THE CONTACT BETWEEN THE SOCK AND GROUND SURFACE.
12. LARGE DIAMETER COMPOST FILTER SOCKS (I.E., 18", 24", AND 32") MAY BE REPLACED WITH SMALLER DIAMETER COMPOST FILTER SOCKS STACKED TO AN EQUIVALENT HEIGHT IN ACCORDANCE WITH THE STACKING DETAIL SHOWN ABOVE.

TABLE 3.2 – COMPOST SOCK FABRIC MINIMUM SPECIFICATIONS					
MATERIAL TYPE	3 MIL HDPE	5 MIL HDPE	5 MIL HDPE	MULTI-FILAMENT POLYPROPYLENE (MFPP)	HEAVY DUTY MULTI-FILAMENT POLYPROPYLENE (HDMFPP)
MATERIAL CHARACTERISTICS	PHOTO-DEGRADABLE	PHOTO-DEGRADABLE	BIO-DEGRADABLE	PHOTO-DEGRADABLE	PHOTO-DEGRADABLE
SOCK DIAMETERS	12"	12"	12"	12"	12"
	18"	18"	18"	18"	18"
		24"	24"	24"	24"
		32"	32"	32"	32"
MESH OPENING	3/8"	3/8"	3/8"	3/8"	1/8"
TENSILE STRENGTH		26 PSI	26 PSI	44 PSI	202 PSI
ULTRAVIOLET STABILITY % ORIGINAL STRENGTH (ASTM G-155)	23% AT 1000 HR.	23% AT 1000 HR.		100% AT 1000 HR.	100% AT 1000 HR.
MINIMUM FUNCTIONAL LONGEVITY	6 MONTHS	9 MONTHS	6 MONTHS	1 YEAR	2 YEARS

TABLE 3.1 – COMPOST SOCK MAXIMUM SLOPE LENGTH IN FEET							
DIAMETER (INCHES)	UPGRADIENT SLOPE (%)						
	2	5	10	20	25	33	50
12	250	225	125	65	50	40	25
18	275	250	150	70	55	45	30
24	350	275	200	130	100	60	35
32	450	325	275	150	120	75	50

TABLE 3.3 – COMPOST STANDARDS	
ORGANIC MATTER CONTENT	25% - 100% (DRY WEIGHT BASIS)
ORGANIC PORTION	FIBROUS AND ELONGATED
PH	6.0 - 8.0
MOISTURE CONTENT	30% - 60%
PARTICLE SIZE	100% PASS THROUGH 1" SIEVE AND 10%-50% PASS THROUGH 3/8" SIEVE
SOLUBLE SALT CONCENTRATION	5.0 DS/M (MMHOS/CM) MAXIMUM

COMPOST FILTER SOCK 4

NOT TO SCALE

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Professional Engineer's Name: **MICHAEL B. HIGGINS**
Professional Engineer's No.: 089643

State	Date Signed	Project Mgr.
NY	10.01.2025	MAF
Designed by: PTO	Drawn by: JLH	Checked by: CMD

STATE OF NEW YORK · MICHAEL B. HIGGINS · 089643-1 · LICENSED PROFESSIONAL ENGINEER · Oct 1, 2025

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REMEDIAL DESIGN - OPERABLE UNIT 2

MISCELLANEOUS DETAILS

ARCADIS Project No.: 30245593.00067
Date: APRIL 2024

ARCADIS of New York, Inc.
646 Plank Road, Suite 100
Clifton Park, NY 12065
Tel: 518-250-7300

SITE WORK NOTES

1. ALL WORK WILL BE DONE IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE AND LOCAL REGULATIONS.
2. THE ENGINEER WILL PROVIDE THE SERVICES OF A PROFESSIONAL WETLAND SCIENTIST (PWS) TO SUPERVISE THE RESTORATION WORK.
3. COORDINATE WITH ENGINEER TO NOTIFY REGULATORY AGENCIES, AS REQUIRED BY THE PERMITS.
4. CONTRACTOR SHALL ALLOW ENOUGH TIME TO COMPLETE ALL ACTIVITIES INCLUDING SEEDING/PLANTING BY THE DATES LISTED IN THE PLANT SCHEDULE.
5. NO WORK WILL BE ALLOWED ON SITE WHEN ANY AREA IS FLOODED OR INUNDATED TO A DEGREE THAT DAMAGE MAY RESULT FROM WORK.
6. MACHINERY SHALL NOT BE STORED OR SERVICED IN WETLAND RESTORATION ZONES. CARE MUST BE TAKEN IN MOVING HEAVY EQUIPMENT FROM THESE ZONES OVERNIGHT.
7. FAULTY EQUIPMENT (I.E., LEAKING OIL) MUST BE DECANTED IF NECESSARY AND REMOVED FROM THE SITE IMMEDIATELY AND REPAIRED OFF-SITE PRIOR TO RETURN TO THE SITE. ANY SOIL IMPACTED BY LEAKING EQUIPMENT OR DURING EQUIPMENT SERVICING SHALL BE EXCAVATED AND DISPOSED OFF-SITE IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE AND LOCAL REGULATIONS.

PLANT MATERIALS

1. AS A MEASURE OF GENERAL HEALTH AND TO PROMOTE SUCCESSFUL PLANT ESTABLISHMENT, ALL PLANTS SHALL BE FREE OF DISEASE AND SHOW TYPICAL SIZE AND SHAPE FOR THEIR SPECIES.
2. ALL PROPOSED PLANTINGS SHALL CONFORM TO THE AMERICAN STANDARD FOR NURSERY STOCK (ANSI Z60.1-2004), PUBLISHED MAY 22, 2004) BY THE AMERICAN NURSERY AND LANDSCAPE ASSOCIATION, 10000 VERMONT AVENUE, NW, SUITE 300, WASHINGTON DC 20005, AS AMENDED AND SUPPLEMENTED. PLANTINGS SHALL ALSO CONFORM TO HARDINESS ZONE 6 STANDARDS OF THE UNITED STATES DEPARTMENT OF AGRICULTURE (USDA) PLANT HARDINESS ZONE MAP, AS AMENDED AND SUPPLEMENTED.
3. PLANTS MUST BE TRUE TO SCIENTIFIC NAME, AS SPECIFIED IN THE PLANTING SCHEDULE. COMMON NAMES ARE NOT ACCEPTABLE. STOCK MUST BE SUPPLIED WITH THE SCIENTIFIC NAME ON EACH CONTAINER OR PLANT. USE PLANTS FROM LOCAL/REGIONAL ECOTYPES AS MUCH AS POSSIBLE.
4. STOCK MUST BE THE ORIGINAL SIZE SPECIFIED OR LARGER.
5. ALL UPRIGHT SHRUBS SHALL BE NO LESS THAN 24 TO 30 INCHES IN HEIGHT AT THE TIME OF PLANTING; ALL SPREADING SHRUBS SHALL BE NO LESS THAN 24 TO 30 INCHES IN SPREAD AT THE TIME OF PLANTING.
6. WETLAND SEED MIX SOURCE SHALL BE APPROVED BY THE ENGINEER PRIOR TO APPLICATION. WETLAND SEED MIX SHALL NOT INCLUDE THE FOLLOWING SPECIES: FESCUE (FESTUCA SPP.), DEER TONGUE (DICANTHELIUM CLANDESTINUM), OR REED CANARY GRASS (PHALARIS ARUNDINACEA) AND SHALL INCLUDE AN ANNUAL RYE GRASS. WETLAND SEEDS MAY BE CUSTOM ORDER DEPENDING UPON AVAILABILITY. ALLOW ADEQUATE TIME FOR PRODUCTION.
7. SEEDS SHALL BE DELIVERED IN SUPPLIERS' ORIGINAL PACKAGING. SEEDS SHALL BE STORED DRY OR WET, DEPENDING ON SPECIES SUPPLIED AND ACCORDING TO SUPPLIERS' SPECIFICATIONS. CONTAMINATION OF SEEDS SHALL BE PREVENTED AT ALL TIMES. CONDITIONS FAVORING MOLD MUST BE AVOIDED.
8. PLANTS MUST ARRIVE AT THE SITE UNDER PROTECTIVE COVERING. PLANT MATERIAL SHALL ONLY BE DELIVERED WHEN TEMPERATURES ARE ABOVE FREEZING.
9. PLANT STOCK NOT INSTALLED IMMEDIATELY WILL BE SHADED, WATERED, AND MAINTAINED BY THE CONTRACTOR. CONTRACTOR IS RESPONSIBLE FOR ALL UNINSTALLED MATERIALS LEFT ON THE SITE. THERE SHALL BE NO PROLONGED STORAGE OF MATERIAL ON THE SITE. PLANT STOCK SHALL NOT BE STORED ON SITE FOR MORE THAN THREE (3) DAYS.

EXCAVATION AND GRADING DETAILS

1. CONTRACTOR SHALL SECURE AREAS WHERE SHRUBS WILL NOT BE REMOVED WITH HIGH VISIBILITY FENCING OR MARKING TAPE SUCH THAT IT WILL BE CLEARLY VISIBLE TO MACHINERY OPERATORS. DAMAGE TO THE PROTECTED VEGETATION SHALL BE ADDRESSED BY THE CONTRACTOR AND MAY INCLUDE PRUNING, FERTILIZER APPLICATION, AND/OR REPLANTING WITH APPROPRIATE MATERIAL.
2. TO ACHIEVE FINAL GRADE IN WETLAND RESTORATION ZONES, THE CONTRACTOR SHALL IMPORT SIX (6) INCHES OF WETLAND TOPSOIL IN 4 TO 6 INCH LIFTS AND ROTO-TILL. WETLAND TOPSOIL SHALL BE A MIXTURE OF PEAT MOSS AND CLEAN SAND IN A 2:1 MIXTURE BY VOLUME. IMPORTED PEAT MOSS SHALL BE SPHAGNUM GRADE PEAT MOSS.
3. WITHIN 5 DAYS FOLLOWING FINAL GRADING OF THE SITE, A DISC OR ROTO-TILL WILL BE RUN OVER THE SITE TO ELIMINATE COMPACTION.
4. FOLLOWING ACHIEVEMENT OF FINAL GRADE, TEMPORARILY STABILIZE WETLAND RESTORATION ZONES, AND UZ1 WITH APPROPRIATE SEED MIXES, EROSION CONTROL NETTING AND/OR MULCH, HAY, OR WHEAT STRAW. A PERIOD OF TWO WEEKS SHALL ELAPSE TO ALLOW MATERIAL TO SETTLE PRIOR TO THE CONTRACTOR VERIFYING THESE ELEVATIONS. CONTRACTOR SHALL PREPARE AND SUBMIT FOR APPROVAL A POST-GRADING AND ELEVATION SURVEY OF THE RESTORATION AREA PRIOR TO PLANT INSTALLATION.
5. THE NEWLY INSTALLED WETLAND TOPSOIL IN THE RESTORATION AREA ARE TO BE DISTURBED AS LITTLE AS POSSIBLE. LIMITED AMOUNTS OF MOVEMENT AND COMPACTION IN THESE AREAS SHALL BE DONE BY USING HANDWORK, LOW GROUND PRESSURE MACHINERY, OR MATTING.
6. ALL AREAS ARE TO BE GRADED SMOOTH AND FREE OF ROCKS, BOULDERS, COBBLES, LOGS, BRANCHES, MISCELLANEOUS DEBRIS, ETC. ALL VEHICLE TRACKS OR ALTERATION OF SOIL WORK AND GRADES SHALL BE REMOVED SO THE SITE IS FREE OF EXCESS COMPACTION AND DISTURBANCE MARKS.

EROSION AND SEDIMENT CONTROL

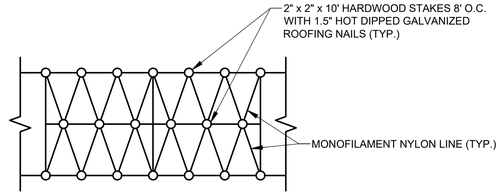
1. DISTURBED AREAS WITHIN THE RESTORATION AREA SHALL BE SEEDED, PLANTED, SECURED, AND PROTECTED WITH EROSION CONTROL MEASURES WITHIN ONE DAY OF WORK BEING COMPLETED IN SUCH AREA.
2. SEEDED AREAS IN THE WETLAND RESTORATION ZONES MUST BE COVERED WITH BIODEGRADABLE EROSION CONTROL NETTING.

PLANTING AND INSTALLATION NOTES

1. PLANTINGS IN THE RESTORATION AREA SHALL BE IN ACCORDANCE WITH WETLAND NOTES AND DETAILS SHOWN ON SHEET 10.
2. PREPARE SEEDBED AND INCORPORATE AMENDMENTS AS NEEDED IN ACCORDANCE WITH THE NOTES AND DETAILS SHOWN ON THIS SHEET.
3. APPLY APPROVED SEED MIX TO RESTORATION ZONES PRIOR TO INSTALLATION OF BIODEGRADABLE EROSION CONTROL NET OR MULCHING. SEEDING OF ALL ZONES IS TO BE PERFORMED VIA HAND BROADCAST METHOD.
4. SPRAY WATER OVER THE SEEDED AREAS IN FINE DROPLETS AFTER SEEDING AND PLACEMENT OF EROSION CONTROL NET IS COMPLETED. TO PROVIDE COMPLETE WETTING OF THE MATERIAL, SEEDING SHOULD NOT BE PERFORMED WHILE AREAS ARE INUNDATED OR HAVE STANDING WATER. FOR PLANT MATERIAL AND SEEDS REQUIRED, SEE PLANTING SCHEDULE.
5. LAYOUT AND STAKE SHRUB PLANTING LOCATIONS. PRIOR TO PLANTING, LOCATIONS WILL BE REVIEWED/APPROVED BY PWS.
6. INSTALL PLANT MATERIAL IN ACCORDANCE WITH SHEET 10 AND THE RESTORATION NOTES.
7. ALL PLANTING PATCHES ARE TO BE DELINEATED WITH A SERIES OF MARKER STAKES DURING THE PLANTING PERIOD SUCH THAT PLANT MATERIALS ARE APPROXIMATELY PLACED AS PER PLAN. THE CONTRACTOR IS TO MEASURE AND MARK PLANTING PATCH BOUNDARIES ACCURATELY. A SERIES OF 1X2X24 HARDWOOD STAKES WITH RED FLAGGING ATTACHED TO TOP SHALL BE PLACED AT APPROXIMATELY TWENTY (20) FOOT INTERVALS AROUND EACH PLANTING PATCH.
8. EACH PLANTED SHRUB SHALL BE GIVEN A TWO FINGER PINCH OR EQUIVALENT DOSE OF OSMOCOTE OR AN EQUIVALENT 14-4-6 SLOW RELEASE BEADS FERTILIZER IN THE BOTTOM OF THE PLANTING HOLE. OSMOCOTE OR EQUIVALENT SHALL BE USED AS PER MANUFACTURERS' RECOMMENDATIONS.
9. ALL RESTORED AREAS SHALL BE WATERED. SOILS SHALL BE SMOOTHED AND ADDITIONAL SOIL INSTALLED TO ACCOMMODATE SETTLING OF SOIL AS NECESSARY. STOCK WILL BE WATERED PERIODICALLY DURING FIRST WEEK FOLLOWING INSTALLATION AND CONTINUE THROUGH THE NEXT MONTH. AFTER ALL SHRUB PLANTING IS COMPLETE, HARDWOOD MULCH (WEATHERED) SHALL BE IN PLACE THREE (3) INCHES THICK OVER ENTIRE SHRUB PATCH.
10. FOLLOWING PLANTING, WATERFOWL EXCLUSION FENCING WILL BE INSTALLED ABOVE WETLAND RESTORATION ZONES.

MAINTENANCE NOTES

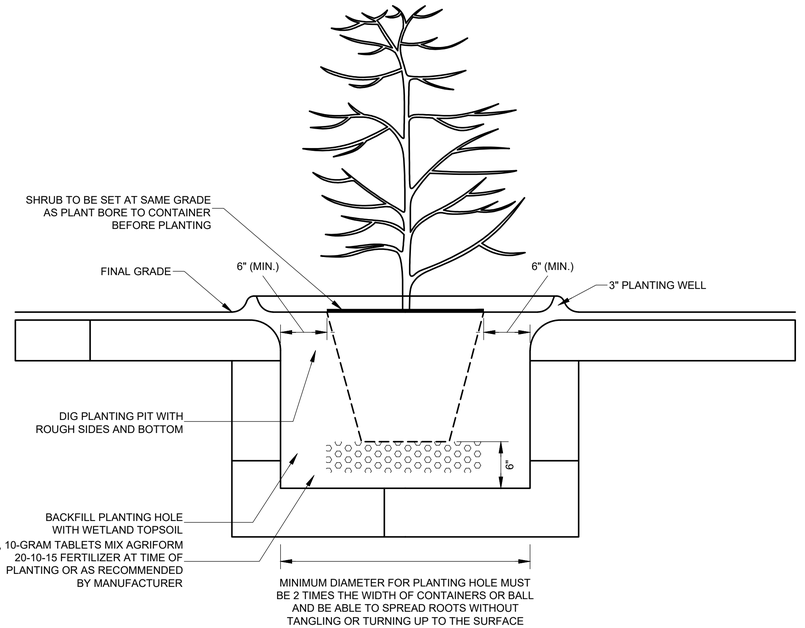
1. CONTRACTOR SHALL PERFORM MAINTENANCE OF THE RESTORED AREA BEGINNING IMMEDIATELY AFTER THE RESTORATION AREA IS PLANTED AND SEEDED, AND CONTINUING THROUGH THE END OF A GUARANTEE PERIOD OF ONE CALENDAR YEAR FOLLOWING THE LAST PLANTING DATE, AFTER WHICH MAINTENANCE MONITORING WILL BE THE RESPONSIBILITY OF THE ENGINEER.
2. CONTRACTOR SHALL MAKE PERIODIC INSPECTIONS DURING THE GUARANTEE PERIOD TO DETERMINE WHAT CORRECTIVE MEASURES ARE REQUIRED TO ENSURE SUCCESS.
3. CONTRACTOR SHALL PROVIDE AT LEAST 85 PERCENT SURVIVAL OF PLANTED SHRUBS AND 85 PERCENT COVER OF HERBACEOUS COVER EVENLY DISTRIBUTED THROUGHOUT DISTURBED AREAS WITH PLANTED SPECIES WITHIN THE GUARANTEE PERIOD.
4. CONTRACTOR SHALL REPLACE DEAD PLANTINGS OR TAKE CORRECTIVE ACTIONS IF 85 PERCENT THRESHOLD IS NOT MET AS SOON AS WEATHER CONDITIONS PERMIT AND WITHIN THE SPECIFIED PLANTING PERIOD. INSTALL THE SAME SPECIES REPLACEMENT STOCK AS ORIGINALLY SPECIFIED, UNLESS APPROVED OTHERWISE BY THE ENGINEER.
5. DURING THE GROWING SEASON OF THE GUARANTEE PERIOD, OCCASIONAL BARE SPOTS NOT MEASURING MORE THAN 1-FOOT IN DIAMETER MAY EXIST.
6. CONTRACTOR SHALL REMOVE ALL TEMPORARY PROTECTION MEASURES EMPLOYED DURING THE CONSTRUCTION PERIOD AT THE END OF THE GUARANTEE PERIOD, OR EARLIER IF DEEMED NECESSARY, INCLUDING ALL GUYS, WIRES, RUBBER HOSE SECTIONS, OR STAKES USED FOR TEMPORARY BRACING, UNLESS DIRECTED OTHERWISE BY THE ENGINEER.
7. IF 85 PERCENT SURVIVAL OF PLANTED SHRUBS AND 85 PERCENT COVER OF PLANTED OR TARGET SPECIES IS NOT ACHIEVED AND WOODY SPECIES DO NOT INCREASE STEM DENSITY/HEIGHT EACH YEAR IN THE WETLAND RESTORATION ZONES DURING YEARS 2 THROUGH 5 FOLLOWING PLANTING, AS DETERMINED DURING MONITORING EVENTS, ENGINEER WILL BE REQUIRED TO RE-SEED, AND/OR RE-PLANT APPROPRIATE SPECIES OR TAKE OTHER CORRECTIVE ACTIONS IN ORDER TO REMEDY THE SITUATION.
8. TARGET SPECIES INCLUDE NON-INVASIVE NATIVE SPECIES SIMILAR TO THOSE INCLUDED IN THE PLANTING SCHEDULE.



PLAN VIEW

TYPICAL WATERFOWL EXCLUSION FENCING 1

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TYPICAL SHRUB PLANTING DETAIL 2

NOT TO SCALE

WATERWAY IMPACT TABLE

WATERWAY NAME	WATERWAY ID	WATER LOCATION	EXCAVATION VOLUME (CY)	FILL VOLUME (CY) [RIPRAP, GENERAL FILL, TOPSOIL]	PLACEMENT AREA (ACRES)
SENECA RIVER/ CAYUGA-SENECA BARGE CANAL	0705-0023, ONT66-12 (PORTION 6)	SENECA FALLS, NY	24	24	0.0011
VAN CLEEF LAKE	0705-0023, ONT66-12 (PORTION 6a)/ P366a	SENECA FALLS, NY	0	0	0

PLANTING SCHEDULE

WETLAND RESTORATION ZONE	PLANTING DETAIL	COMMON NAME	SCIENTIFIC NAME	INDICATOR STATUS	PLANT SIZE	SPACING	ESTIMATED QUANTITY	PLANTING SEASON
PEM	N/A	WETLAND SEED MIX			BROADCAST SEED	15 LB/ACRE	N/A	APRIL 15 TO JUNE 1 OR SEPT 1 TO NOV 15
PSS	1	SILKY DOGWOOD	*CORNUS AMOMUM*	FACW	24-36" 2-GALLON CONTAINER	10 FEET OFF CENTER	20	APRIL 15 TO JUNE 1 OR SEPT 1 TO NOV 15
	N/A	WETLAND SEED MIX			BROADCAST SEED	15 LB/ACRE	N/A	APRIL 15 TO JUNE 1 OR SEPT 1 TO NOV 15

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Professional Engineer's Name: MICHAEL B. HIGGINS
Professional Engineer's No.: 089643
State: NY | Date Signed: 10.01.2025 | Project Mgr.: MAF
Designed by: PTO | Drawn by: JLH | Checked by: CMD

STATE OF NEW YORK · MICHAEL B. HIGGINS · 089643-1 · LICENSED PROFESSIONAL ENGINEER

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REMEDIAL DESIGN - OPERABLE UNIT 2

RESTORATION NOTES AND DETAILS

ARCADIS Project No. 30245593.00067

Date SEPTEMBER 2025

ARCADIS of New York, Inc.
646 Plank Road, Suite 100
Clifton Park, NY 12065
Tel: 518-250-7300

18

SPECIFICATIONS

SECTION 00 01 10

TABLE OF CONTENTS

Section No.	Name or Description	Initial Page
PROCUREMENT AND CONTRACTING REQUIREMENTS		
Division 00 – Procurement and Contracting Requirements		
00 01 10	Table of Contents	00 01 10 – 1
SPECIFICATIONS		
GENERAL REQUIREMENTS SUBGROUP		
Division 01 – General Requirements		
01 11 00	Summary of Work	01 11 00 – 1
01 14 15	Coordination with the Owner's Operation	01 14 15 – 1
01 15 00	Contractor's Project Operations Plan	01 15 00 – 1
01 25 00	Substitution Procedures	01 25 00 – 1
01 26 00	Contract Modification Procedures	01 26 00 – 1
01 29 76	Progress Payment Procedures	01 29 76 – 1
01 31 13	Project Coordination	01 31 13 – 1
01 31 19.13	Pre-Construction Conference	01 31 19.13 – 1
01 31 19.23	Progress Meetings	01 31 19.23 – 1
01 32 16	Construction Project Schedule	01 32 16 – 1
01 32 26	Construction Progress Reporting	01 32 26 – 1
01 33 00	Submittal Procedures	01 33 00 – 1
01 35 23	Safety Requirements	01 35 23 – 1
01 35 29	Contractor's Health and Safety Plan	01 35 29 – 1
01 35 43.13	Environmental Procedures for Hazardous Materials	01 35 43.13 – 1
01 41 26	Stormwater Pollution Prevention Plan and Permit	01 41 26 – 1
01 51 05	Temporary Utilities	01 51 05 – 1
01 52 13	Field Offices and Sheds	01 52 13 – 1
01 52 16	First-Aid Facilities	01 52 16 – 1
01 52 19	Sanitary Facilities	01 52 19 – 1
01 55 13	Temporary Access Roads and Parking Areas	01 55 13 – 1
01 55 26	Maintenance and Protection of Traffic	01 55 26 – 1
01 57 05	Temporary Controls	01 57 05 – 1
01 61 00	Common Product Requirements	01 61 00 – 1
01 62 00	Product Options	01 62 00 – 1
01 65 00	Product Delivery Requirements	01 65 00 – 1
01 66 00	Product Storage and Handling Requirements	01 66 00 – 1
01 71 26	Construction Surveying and Layout	01 71 26 – 1
01 71 33	Protection of Work and Property	01 71 33 – 1
01 74 05	Cleaning	01 74 05 – 1
01 74 19	Construction Waste Management and Disposal	01 74 19 – 1
01 77 19	Closeout Requirements	01 77 19 – 1
01 78 39	Project Record Documents	01 78 39 – 1

FACILITY CONSTRUCTION SUBGROUP

Division 02 – Existing Conditions

02 51 00 Decontamination ..... 02 51 00 – 1
02 60 05 Contaminated Material Management and Disposal ..... 02 60 05 – 1
02 73 00 Construction Water Management and Disposal ..... 02 73 00 – 1

Division 03 – Concrete

03 37 00 Fabric Formed Concrete ..... 03 37 00 – 1

Division 04 – Masonry (Not Used)

Division 05 – Metals (Not Used)

Division 06 – Wood, Plastics, And Composites (Not Used)

Division 07 – Thermal and Moisture Protection (Not Used)

Division 08 – Openings (Not Used)

Division 09 – Finishes (Not Used)

Division 10 – Specialties (Not Used)

Division 11 – Equipment (Not Used)

Division 12 – Furnishings (Not Used)

Division 13 – Special Construction (Not Used)

Division 14 – Conveying Equipment (Not Used)

FACILITY SERVICES SUBGROUP (NOT USED)

SITE AND INFRASTRUCTURE SUBGROUP

Division 31 – Earthwork

31 05 16 Aggregates for Earthwork ..... 31 05 16 – 1
31 05 19 Geosynthetics for Earthwork ..... 31 05 19 – 1
31 11 00 Clearing and Grubbing ..... 31 11 00 – 1
31 23 00 Excavation and Fill ..... 31 23 00 – 1

Division 32 – Exterior Improvements

32 21 00 Site Restoration ..... 32 21 00 – 1

Division 33 – Utilities (Not Used)

Division 34 – Transportation (Not Used)

Division 35 – Waterway and Marine Construction (Not Used)

PROCESS EQUIPMENT SUBGROUP (NOT USED)

END OF TABLE OF CONTENTS

SECTION 01 11 00

SUMMARY OF WORK

PART 1 - GENERAL

1.01 LOCATION AND DESCRIPTION OF WORK

A. The Site is approximately 64.2-acres and is located at 50 Johnston Street in the Town of Seneca Falls, New York. The Site contains approximately 13 acres of interconnected buildings constructed between 1914 and the 1970s, and 51 acres of asphalt parking lots and roadways, grassy areas, and woods. Residential and undeveloped properties surround the site to the west, north, and east. The Cayuga-Seneca Canal (canal), which includes Van Cleef Lake and portions of the Seneca River, which are part of the New York State Barge Canal, borders the southern edge of the Site.

B. The Work to be performed under this Contract is spread around the Site at the following locations as depicted on the Design Drawings:
   1. Historical Outfalls (HO) 2 through 7.
   2. Contractor Staging/Support Areas.

C. The Work to be performed under this Contract includes, but is not limited to, the following Operable Unit 2 Remedial Activities:
   1. Soil Excavation and Handling.
   2. Waste/Water Management/Disposal.
   3. Soil Backfilling and Site Restoration.
   4. Capping for HO 3 Area.
   5. Erosion and Sediment Control

D. Contracting Method: The Contractor awarded the Work shall enter into agreement with the Engineer for the performance of the Work.

E. Contaminants of potential concern (COPCs): cadmium.

F. Regulatory Requirements and Restrictions:
   1. Contractor shall be responsible for understanding and complying with all required local, state, and federal permits (or permit equivalency) provided by the Owner or Engineer. In addition, Contractor shall be responsible for understanding, obtaining, and paying all fees, and complying with all other permits required to complete the Work as shown on the Design Drawings and Project Specifications.

1.02 DEFINITIONS

A. Entities: The term “Owner” refers to GTE Operations Support Incorporated. The term “Engineer” refers to Arcadis of New York, Inc acting as the Professional Engineer of Record and will be certifying the Final Engineering Report and stamping record drawings in the Final Engineering Report. The term “Property Owner” refers to Seneca Falls Specialties and Logistics Company. The term “Contractor” refers to the entity that has entered into agreement with the Engineer to perform the Work.

B. The term “Laws and Regulations” refers to all Federal, State, or local laws or requirements pertaining to the specific work described herein.

1.03 OTHER CONSTRUCTION CONTRACTS/WORK BY OTHERS

A. Other construction contracts have been or will be awarded by the Owner that are in close proximity to, or border the Work of this Contract. Work under these other contracts is briefly described as follows:
   1. In Situ Thermal Remediation within Areas of Concern 1 and 3.
      In Situ Thermal Remediation will generally involve heating impacted soil and groundwater within the treatment areas to volatilize or destroy dense non-aqueous phase liquid and adsorbed phase and dissolved phase COPCs that may be present in the target treatment areas.

1.04 SEQUENCE AND PROGRESS OF WORK

A. Sequencing:
   1. Incorporate sequencing of the Work into the Project Schedule in accordance with Section 01 32 16 – Construction Project Schedule.
   2. Sequencing requirements are provided on the Design Drawings.

B. Allowable Workdays and Hours:
   1. Except as otherwise specified, work activities may be performed five (5) days per week (Monday through Friday) up to 12 hours per day.
      a. Total work hours shall not exceed 64 hours per week per individual without prior written approval from the Engineer.
      b. Saturdays and nights may be utilized by the Contractor for maintenance or to catch up on the schedule with the approval of the Engineer at least one week in advance.
      c. Contractor may alter work hours only after receiving written approval from the Engineer.
   2. Contractor shall conduct Stormwater management and water pretreatment operations up to 24 hours per day and 7 days per week, as necessitated by field conditions, to treat Stormwater and water produced by the excavation dewatering and material handling operations. See Section 02 60 06 – Contaminated Material Management and Disposal and Section 02 70 00 – Construction Water Management and Disposal.
   3. Transportation of any wastes/materials to approved disposal areas shall only be performed during daylight hours.
   4. Contractor shall ensure that any night work, if approved, is not disruptive to the local community.
   5. Noise-generating work operations shall not be performed on Federal holidays or holiday weekends.

1.05 CONTRACTOR'S USE OF SITE

A. Use of Premises:
   1. Confine construction operations to the work areas shown or indicated on the Design Drawings. Do not disturb portions of the Site beyond areas of the Work. Resolve all conflicts over use of the premises without additional cost to the Owner. Costs related to the Contractor's use of the property (e.g., telephone, electric, etc.) shall be borne by the Contractor.
   2. To the extent practicable, conduct all work in such manner that will cause the minimum inconvenience and disturbance to the Property Owner and surrounding community.
   3. Confine storage of materials and equipment, and locations of temporary facilities to the areas shown. Move stored products that interfere with operations of the Property Owner, Owner, other contractors, and others performing work for the Owner. Contractors shall

obtain approval from the Engineer for any areas to be proposed for storage of materials and equipment or temporary facilities other than those shown on the Design Drawings.

4. Authorities having jurisdiction at the Site and others performing work for the Owner shall, for all purposes that may be required by their contracts be provided safe and proper access to the Site and the premises used by Contractor. Specifically, the Contractor shall maintain access to the New York Canal Corporation Access Road and the NYSEG power substation at all times or as noted on the Design Drawings.

B. Promptly repair damage to premises caused by construction operations. Upon completion of the Work, restore premises to specified condition. If condition is not specified, restore to pre-construction condition.

1.06 EASEMENTS AND RIGHTS-OF-WAY

A. Confine construction operations within the limits shown on the Design Drawings. Use care in placing construction tools, equipment, excavated materials, and materials and equipment to be incorporated into the Work to avoid damaging property and interfering with traffic. Do not enter private property outside the construction limits without permission from the Engineer.

B. On Private Property:

1. The Contractor shall notify the Engineer if access is deemed necessary for any additional properties to support the Work activities and shall provide a detailed description of the proposed use of the property. The Contractor shall be responsible for all activities associated with siting, development, and restoration of any additional properties, if needed, to support the Work activities. The Engineer shall coordinate access agreements for any properties not owned by the Property Owner. Any such access agreements shall be developed by the Contractor in coordination with the Engineer and shall be subject to approval by the Engineer.

1.07 NOTICES TO THE OWNER'S AND AUTHORITIES OF PROPERTIES ADJACENT TO THE WORK

A. Notify the Engineer when execution of the Work may affect adjacent properties or use of adjacent properties. The Engineer will notify adjacent property owners; do not contact adjacent property owners directly unless authorized by the Engineer to do so.

B. When it is necessary to temporarily obstruct access to an adjacent property, or when utility service connection will be interrupted, provide notices sufficiently in advance to enable affected persons to provide for their needs.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

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SECTION 01 14 15

COORDINATION WITH THE OWNER'S OPERATIONS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Definitions:
   1. In this Section, the term Owner shall be defined as Property Owner as described in Section 01 11 00 – Summary of Work.

B. Scope:
   1. This Section includes requirements for coordinating with the Owner's operations during the Project and includes requirements for utility coordination and shutdowns if necessary to complete the Work without impact on the Owner's operations except as allowed in this Section.
   2. Contractor shall provide all labor, materials, equipment, tools, and incidentals shown, specified, and required to coordinate with the Owner's operations during the Work in accordance with this Section.

C. Coordination:
   1. Review construction procedures under other Project Specifications sections and coordinate Work that will be performed with or before the Work specified in this Section.

D. Related Sections:
   1. Section 01 11 00 – Summary of Work.
   2. Section 01 25 00 – Substitution Procedures.
   3. Section 02 60 05 – Contaminated Material Management and Disposal.
   4. Section 02 73 00 – Construction Water Management and Disposal.
   5. Section 31 23 00 – Excavation and Fill.

E. Except for shutdowns specified in this Section, perform the Work such that the Owner's facilities remain in continuous satisfactory operation during the Project. Schedule and conduct the Work such that the Work does not: impede the Owner's production or processes, create potential hazards to operating equipment and personnel, reduce the quality of the facility's products or effluent, cause odors or other nuisances, or affect the public health, safety, and convenience.

F. Work not specifically covered in this Section or in referenced Sections may, in general, be completed, within the Project Schedule, at any time during regular working hours in accordance with the Contract Documents, subject to the requirements in this Section.

G. As a substitute to the procedures specified in this Section, Contractor may propose providing additional temporary facilities that can eliminate or mitigate a constraint without additional cost to the Owner or Engineer, provided such additional temporary facilities: do not present hazards to the public, personnel, structures, and equipment; that such additional temporary facilities do not adversely affect the Owner's or Engineer's ability to comply with Laws and Regulations, permits, and operating requirements; that such temporary facilities do not generate or foster the generation of odors and other nuisances; and that requirements of the Contract Documents are fulfilled.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 GENERAL

A. Conduct all work in accordance with appropriate OSHA requirements.

END OF SECTION

SECTION 01 15 00

CONTRACTOR'S PROJECT OPERATIONS PLAN

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope:
   1. Prepare and submit a Project Operations Plan (POP) in accordance with this Section to the Engineer for review and approval.
   2. Describe proposed means, methods, and sequence of construction operations, and compliance with the Contract Documents.

B. Related Sections:
   1. Section 01 32 16 – Construction Project Schedule.
   2. Section 01 35 43.13 – Environmental Procedures for Hazardous Materials.
   3. Section 01 57 05 – Temporary Controls.
   4. Section 01 71 26 – Construction Surveying and Layout.
   5. Section 01 74 19 – Construction Waste Management and Disposal.
   6. Section 02 60 05 – Contaminated Material Management and Disposal.
   7. Section 31 23 00 – Excavation and Fill.

1.02 SUBMITTALS:

A. Informational Submittals:
   1. Contractor's POP: Submit in accordance with Part 1.03 of this Section.

1.03 PROJECT OPERATIONS PLAN

A. Address and include the following in POP:
   1. Contractor's Organizational Structure: Specific chain of command and overall responsibilities of Contractor personnel. Include the following:
      a. Name and general functions and responsibilities of the following:
         1) Project manager.
         2) Site superintendent.
         3) Field engineer.
         4) Foreman.
         5) Equipment operators and laborers.
         6) Others as appropriate.
      b. Designation of Contractor personnel that will reside at Site for the duration of Work.
   2. Work Schedule: Proposed workdays and work hours. Include copy of Contractor's initial Project Schedule, prepared in accordance with Section 01 32 16 – Construction Project Schedule.
   3. List of major construction equipment.
   4. List of major Subcontractors and Suppliers. Include name, role, and contact information for the following:
      a. Safety representative.
      b. Surveyor.
      c. Suppliers and sources of off-site fill.
      d. Impacted material transporters.
      e. Others as appropriate.

5. Site Utilization Plan: Site plan showing the proposed location and layout of the following:
    a. Temporary facilities (i.e., sanitary, first-aid, parking/storage, exclusion zones, frac tanks, etc.).
    b. Temporary access roads and parking areas.
    c. Equipment storage and fueling area(s).
    d. Temporary decontamination area(s). Clearly identify location and size of each.
    e. Temporary material staging area(s). Clearly identify location and size of each.
6. Comprehensive Work Plan: Written description of the general sequence and scope of the following:
    a. Mobilization and Site Preparation – including a proposed layout of project support areas within the Area for Contractor use as shown on the Design Drawings.
    b. Site Access Controls and Security.
    c. Utility Clearance, Mark-Out, and Verification.
    d. Odor, Dust and Vapor Control (in accordance with the requirements presented in Section 01 57 05 – Temporary Controls).
    e. Erosion and Sediment Control (in accordance with the requirements presented in Section 01 57 05 – Temporary Controls).
    f. Survey Control (in accordance with the Survey Control Plan requirements presented in Section 01 71 26 – Construction Surveying and Layout).
    g. Site Clearing.
    h. Excavation (in accordance with the Excavation and Backfilling Plan requirements presented in Section 31 23 00 – Excavation and Fill).
    i. Material Handling and Dewatering (in accordance with the Material Handling and Dewatering Plan in Section 02 60 05 – Contaminated Material Management and Disposal).
    j. Waste Management (including excavated soil/sediment in accordance with Section 01 74 19 – Construction Waste Management and Disposal and Section 02 60 05 – Contaminated Material Management and Disposal).
    k. Hazardous Materials Communications (in accordance with the Hazardous Materials Communication Plan requirements presented in Section 01 35 43.13 – Environmental Procedures for Hazardous Materials).
    l. Emergency Spill Response (in accordance with the Emergency/Spill Response Plan requirements presented in Section 01 35 43.13 – Environmental Procedures for Hazardous Materials).
    m. Site Restoration (in accordance with the Restoration Plan requirements presented in Section 32 21 00 - Site Restoration).
    n. Decontamination.
    o. Project Close-Out and Demobilization.
7. Contractor's Construction Quality Assurance Plan: Written description of the quality assurance measures to be performed by the Contractor. Such measures will be used to demonstrate and/or document that all work has been performed in full satisfaction of the requirements for all aspects of the Work.

B. Submit POP to Engineer seven days prior to pre-construction conference, or 30 days prior to Contractor's scheduled mobilization to the Site, whichever is sooner.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

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SECTION 01 25 00

SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope: Section includes:
   1. Administrative and procedural requirements for selecting materials and equipment for the Work.
   2. Procedural requirements for substitutions of materials and equipment.
   3. Procedural requirements for substitute of construction methods or procedures when construction methods or procedures are specified.

B. A proposed substitute will not be accepted for review if:
   1. Approval would require changes in design concept or a substantial revision of the Contract Documents.
   2. Approval would delay completion of the Work or the work of other contractors.
   3. Substitution request is indicated or implied on a Shop Drawing or other submittal, or on a request for interpretation or clarification, and is not accompanied by Contractor's formal and complete request for substitution.

C. If proposed substitute is not approved, Contractor shall provide the specified materials, equipment, method, or procedure, as applicable.

D. Approval of a substitute does not relieve Contractor from requirement for submitting Shop Drawings and other submittals in accordance with the Contract Documents.

E. Engineer and the Owner have the right to rely upon the completeness and accuracy of the information included in Contractor's request for approval of a substitute, and Contractor accepts full responsibility for the completeness and accuracy thereof.

F. If approved substitute is defective or fails to perform in accordance with the Contract Documents, responsibility for remedying the defect or failure resides solely with Contractor and Supplier.

1.02 SUBSTITUTE MATERIALS AND EQUIPMENT

A. Procedure:
   1. Submit requests for substitution in accordance with requirements for furnishing submittals, as indicated in Section 01 33 00, Submittal Procedures.
   2. Submit separate request for each proposed substitute.
   3. Submit request for substitution using forms attached to this Section. Complete all information requested on each form and enclose with the forms supplementary information as required. Include with each substitute request the following:
      a. Identification of the materials and equipment (as applicable), including manufacturer's name and address.
      b. Manufacturer's literature with description of the materials and equipment, performance and test data, and reference standards with which materials and equipment comply.

c. Samples, when appropriate.
d. Name and address of similar projects on which the materials and equipment were used, date of installation, and names and contact information (including telephone number) for the facility operations and maintenance manager.

1.03 SUBSTITUTE CONSTRUCTION METHODS OR PROCEDURES

A. Procedure:
1. Submit requests for substitution in accordance with requirements for furnishing submittals, as indicated in Section 01 33 00, Submittal Procedures.
2. Submit separate request for each proposed substitute.
3. Submit request for substitution using forms attached to this Section. Complete all information requested on each form and enclose with the forms supplementary information as required. Include with each substitute request the following:
a. Detailed description of proposed method or procedure.
b. Itemized comparison of the proposed substitution with the specified method or procedure.
c. Drawings illustrating method or procedure.
d. Other data required by Engineer to establish that proposed substitution is equivalent to specified method or procedure.

1.04 CONTRACTOR'S REPRESENTATIONS

A. In submitting request for substitution, Contractor represents that:
1. Contractor has read and fully understands the provisions regarding substitutes as indicated in Contract Documents.
2. Substitution request is complete and includes all information required by the Contract Documents.
3. Contractor certifications required by the Contract Documents are valid and made with Contractor's full knowledge, information, and belief.
4. Contractor will provide same or better guarantees or warranties for proposed substitute as for the specified materials, equipment, methods, or procedures, as applicable.
5. Contractor waives all Claims for additional costs or extension of time related to proposed substitute that subsequently may become apparent.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 ATTACHMENTS

A. The documents attached following this Section's "End of Section" designation listed below are part of this Project Specifications Section.
1. Attachment A: Substitution Request Form (two pages).
2. Attachment B: Product Substitution Checklist (one page).

END OF SECTION

SUBSTITUTION REQUEST

Project: _____ Substitution Request Number: _____

_____ From: _____

To: _____ Date: _____

_____ Engineer Project. No. _____

Re: _____ Contract For: _____

Specification Title: ____ Description: ___

Section: _____ Page: __ Part/Paragraph: _____

Proposed Substitute: _____

Manufacturer: _____ Address: _____ Phone: _____

Trade Name: _____ Model No.: _____

Installer: _____ Address: _____ Phone:_____

History: ☐ New product ☐ 1 to 4 years old ☐ 5 to 10 years old ☐ More than 10 years old

Differences between proposed substitute and specified item: _____

_____

_____

☐ Point-by-point comparative data attached — REQUIRED BY THE CONTRACT DOCUMENTS

Reason for not providing specified item: _____

_____

Similar Installation:

Project: _____ Engineer: _____

Address: _____ the Owner: _____

_____ Date Installed: _____

Proposed substitution affects other parts of Work: ☐ No ☐ Yes; explain _____

_____

Savings to the Engineer for accepting substitute: ($) (attach detailed, itemized estimate)

Proposed substitute changes Contract Time: ☐ No ☐ Yes [Add] [Deduct] _____days.

(clarify whether change is to Substantial Completion, Milestone, or time for readiness for final payment)

Supporting Data Attached: ☐ Drawings ☐ Product Data ☐ Samples ☐ Tests ☐ Reports
☐ _____

SUBSTITUTION REQUEST
(Continued)

☐ Substitute product, method, or procedure is subject to payment of licensing fee or royalty (check if "yes" and attach information)

☐ Substitute product, method, or procedure is patented or copyrighted (check if "yes" and attach information)

The undersigned certifies:

- Representations in the Contract Documents and in Section 01 25 00, Substitution Procedures, regarding substitutions are valid.
- Same or better warranty and guarantee will be furnished for proposed substitution as for specified item.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitute will have no adverse effect on other trades and will not affect or delay Project Schedule.
- Cost data as stated above is complete. Claims for additional costs or time related to accepted substitution which may subsequently become apparent are waived.
- Proposed substitute does not affect dimensions and functional clearances.
- Payment will be made for Engineer's review and changes, if any, to the design and Contract Documents, and construction costs caused by the substitute.
- Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.

Submitted by: _____

Signed by _____

Firm: _____

Address: _____

Telephone: _____

Attachments: ☐

ENGINEER'S REVIEW AND ACCEPTANCE (OR NON-ACCEPTANCE) WILL BE DOCUMENTED IN A FIELD ORDER OR CHANGE ORDER, AS APPROPRIATE.

Additional Comments: ☐ Contractor ☐ Subcontractor ☐ Supplier ☐ Manufacturer ☐ Engineer
☐ Other:

Adapted from CSI Form No. 13.0B, 2004 edition

END OF SUBSTITUTION REQUEST

PRODUCT SUBSTITUTION CHECKLIST

Date: _____ Re: _____

Engineer Proj No.: _____ Manufacturer's Project No.: _____

Filing No.: _____ Contract For: _____

Item Equivalence:

☐ Is the submitted item equivalent to the specified item? _____

☐ Does it serve the same function? _____

☐ Does it have the same dimensions? _____

☐ Does it have the same appearance? _____

☐ Will it last as long? _____

☐ Does it comply with the same codes, and standards and performance requirements? _____

☐ Has the item been used locally, and where are the projects? _____

_____

☐ Has a problem occurred with the item, and what was the remedy? _____

_____

Effect on the Project:

☐ Will the substitute affect other aspects of the construction? _____

☐ Are any details affected and are changes required? _____

☐ What is the cost of the changes? _____

☐ Who pays for the required changes? _____

☐ Is the Project Schedule affected? _____

_____

Effect on the Warranty:

☐ How does the proposed warranty differ from the specified warranty? _____

_____

☐ Does the manufacturer have a track record of standing behind the warranty? _____

_____

_____

Adapted from CSI Form No. 20.3, 1998 edition

END OF PRODUCT SUBSTITUTION CHECKLIST

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SECTION 01 26 00

CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope:
   1. This Section includes administrative and procedural requirements for the following:
      a. Requests for interpretation.
      b. Clarification notices.
      c. Minor changes in the Work and Field Orders.
      d. Work Change Directives.
      e. Proposal requests.
      f. Change Order requests.
      g. Change Orders.

B. Submit Contract Modification Documents to Engineer (electronically or via hardcopy, as stated herein).

C. Retain at Contractor's office and at the Site a complete copy of each Contract Modification Document and related documents, and Engineer's Response.

1.02 REQUESTS FOR INTERPRETATION

A. General:
   1. Submit requests for interpretation to obtain clarification or interpretation of the Contract Documents. Report conflicts, errors, ambiguities, and discrepancies in the Contract Documents using a Request for Interpretation (RFI).
   2. Do not submit RFI's when other form of communication is appropriate, such as submittals, requests for substitutions or "or equals", notices, ordinary correspondence, or other form of communication. Improperly prepared or inappropriate RFI's will be returned without response or action.
   3. Submit written RFI's to Engineer. Contractor and the Owner may submit RFI's.

B. Procedure:
   1. Submit one original and one copy of each RFI. Submit each RFI with separate letter of transmittal.
   2. Engineer will provide timely review of requests for interpretation. Allow sufficient time for review and response.
   3. Engineer will maintain a log of all RFI's. A copy of the log will be provided upon request.
   4. Engineer will provide written response to each RFI. One copy of Engineer's response will be distributed to:
      a. Contractor.
      b. Owner.
      c. Engineer.
   5. If Engineer requests additional information to make an interpretation, provide requested information within ten days, unless Engineer allows additional time, via correspondence referring to RFI number.
   6. If Contractor believes that a change in the Contract Price or Project Schedule or other change to the Contract is required, notify Engineer in writing before proceeding with the Work associated with the RFI.

C. Submit each RFI on the Request for Interpretation Form included with this Section, or other form acceptable to Engineer.
   1. Number each request for interpretation using a two-digit sequential number. First request for interpretation will be “01”.
   2. In space provided on form, describe the interpretation requested. Provide additional sheets as necessary. Include text and sketches as required in sufficient detail for Engineer’s response.
   3. When applicable, RFI shall include Contractor’s recommended resolution.

1.03 CLARIFICATION NOTICES

A. General:
   1. Clarification Notices provide clarification or interpretation of conflicts, errors, ambiguities, and discrepancies in the Contract Documents that are identified by the Engineer.
   2. Clarification notices do not change the Contract Price or Project Schedule, and do not alter the Contract Documents.
   3. Clarification Notices, when required, will be initiated and issued by the Engineer as correspondence with additional information as required.

B. Procedure:
   1. One copy of each written clarification notice will be distributed to:
      a. Contractor.
      b. Owner.
      c. Engineer.
   2. If Contractor believes that a change in the Contract Price or the Project Schedule or other change to the Contract is required, notify Engineer in writing before proceeding with the Work associated with Clarification Notice.
   3. If Clarification Notice is unclear, submit Request for Interpretation.

1.04 MINOR CHANGES IN THE WORK AND FIELD ORDERS

A. General:
   1. Field Orders authorize minor variations in the Work, but do not change the Contract Price or Project Schedule.
   2. Field Orders, when required, will be initiated and issued by Engineer on the Field Order form included with this Section, or other form acceptable to Engineer.
   3. Engineer will maintain a log of all Field Orders issued.

B. Procedure:
   1. One copy of each Field Order will be distributed to:
      a. Contractor.
      b. Owner.
      c. Engineer.
   2. If Contractor believes that a change in the Contract Price or the Project Schedule or other change to the Contract is required, immediately notify Engineer in writing before proceeding with the Work associated with the Field Order.
   3. If Field Order is unclear, submit Request for Interpretation.

1.05 WORK CHANGE DIRECTIVES

A. General:
   1. Work Change Directives, when required, order additions, deletions, or revisions to the Work.
   2. Work Change Directives do not change the Contract Price or Project Schedule but is evidence that the parties to the Contract expect that the change ordered or documented

by the Work Change Directive will be included in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Project Schedule.

3. Work Change Directives, when required, will be initiated and issued by the Engineer on the Work Change Directive form included with this Section, or other form acceptable to the Owner and Engineer.

B. Procedure:
   1. Four originals of Work Change Directive signed by the Owner and Engineer will be furnished to the Contractor, who shall promptly sign each original Work Change Directive and, within five days of receipt, return all originals to the Engineer.
   2. Signed Work Change Directives will be distributed as follows:
      a. Contractor: One original.
      b. Owner: Two originals.
      c. Engineer: One original.
   3. When required by the Engineer, document Work performed under each separate Work Change Directive. For each day, document the following in a format acceptable to Engineer:
      a. Number and type of workers employed, and hours worked.
      b. Equipment used, including manufacturer, model, and year of equipment, and number of hours for each.
      c. Materials used.
      d. Receipts for and descriptions of materials and equipment incorporated into the Work.
      e. Invoices and labor and equipment breakdowns for Subcontractors and Suppliers.
      f. Other information required by the Owner or Engineer.
   4. Submit documentation to Engineer as a Change Order request.

1.06 PROPOSAL REQUESTS

A. General:
   1. Proposal Requests are for requesting the effect on the Contract Price and the Project Schedule and other information relative to contemplated changes in the Work.
   2. Proposal Requests do not authorize changes or variations in the Work, and do not change the Contract Price or Project Schedule, or terms of the Contract.
   3. Proposal Requests may be initiated by Engineer or the Owner.
   4. Proposal Requests will be issued on the Proposal Request form included with this Section, or other form acceptable to the Owner and Engineer.

B. Procedure:
   1. One copy of each signed Proposal Request will be furnished to Contractor, with one copy each distributed to:
      a. Owner.
      b. Engineer.
   2. Submit Request for Interpretation to clarify conflicts, errors, ambiguities, and discrepancies in Proposal Request.
   3. Upon receipt of proposal request, prepare and submit a Change Order, in accordance with Part 1.07 of this Section, for the proposed Work described in the Proposal Request.

1.07 CHANGE ORDER REQUESTS

A. General:
   1. Submit written Change Order requests to Engineer in response to each Proposal Request, and when Contractor believes a change in the Contract Price or Project Schedule, or other change to the terms of the Contract is required.

B. Procedure:
   1. Submit to Engineer one original and one copy of each Change Order. Submit each Change Order request with separate letter of transmittal.
   2. If Engineer requests additional information to render a decision, submit required information within five days of receipt of Engineer's request, unless Engineer allows more time. Submit the required information via correspondence that identifies the Change Order request number.
   3. Upon completing review, one copy of Engineer's written response, if any, will be distributed to:
      a. Contractor.
      b. Owner.
   4. If Change Order request is approved by Engineer, a Change Order will be issued.

C. Submit each Change Order request on the Change Order request form included with this Section, or other form acceptable to Engineer.
   1. Number each Change Order request using a two-digit sequential number. First Change Order request will be "01".
   2. In space provided on the form:
      a. Describe the scope of each proposed change. Include text and sketches on additional sheets as required to provide detail sufficient for Engineer's review and response. If the proposed change is submitted in response to a proposal request, write in as scope, "In accordance with Proposal Request No." followed by the proposal request number. Provide written clarifications, if any, to scope of change.
      b. Provide justification for each proposed change. If the proposed change is submitted in response to a proposal request, write in as justification, "In accordance with Proposal Request No." followed by the proposal request number.
      c. List the total change in the Contract Price and Project Schedule for each proposed change.
   3. Unless otherwise directed by Engineer, attach to the Change Order request detailed breakdowns of pricing (Cost of the Work and Contractor's fee), including:
      a. List of Work tasks to accomplish the change.
      b. For each task, labor cost breakdown including labor classification, total hours per labor classification, and hourly cost rate for each labor classification.
      c. Construction equipment and machinery to be used, including manufacturer, model, and year of manufacture, and number of hours for each.
      d. Detailed breakdown of materials and equipment to be incorporated into the Work, including quantities, unit costs, and total cost, with Supplier's written quotations.
      e. Breakdowns of the Cost of the Work and fee for Subcontractors, including labor, construction equipment and machinery, and materials and equipment incorporated into the Work, other costs, and Subcontractor fees.
      f. Breakdown of other eligible costs, in accordance with the Contract Documents.
      g. Other information required by Engineer.
      h. Contractor's fees applied to eligible Contractor costs and eligible Subcontractor costs.

1.08 CHANGE ORDERS

A. General:
   1. Change Orders will be signed by the Engineer and Contractor, to authorize additions, deletions, or revisions to the Work, or changes to the Contract Price or Contract Times.
   2. Change Orders will be issued on the Change Order form included with this Section or other form acceptable to Engineer.

B. Procedure:
   1. The Engineer will furnish four originals of each Change Order to Contractor, who shall promptly sign each original Change Order and, within five days of receipt, return all originals to Engineer.
   2. Engineer will sign each original Change Order.
   3. After approval and signature by Engineer, signed Change Orders will be distributed as follows:
      a. Contractor: One original.
      b. Owner: Two originals.
      c. Engineer: One original.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 ATTACHMENTS

A. The attachments listed below, which follow the “End of Section” designation, are part of this Section:
   1. Attachment A: Request for interpretation form (one page).
   2. Attachment B: Field Order form (one page).
   3. Attachment C: Work Change Directive form (two pages).
   4. Attachment D: Proposal request form (one page).
   5. Attachment E: Change Order request form (two pages).
   6. Attachment F: Change Order form (two pages).

END OF SECTION

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GTE OPERATIONS SUPPORT INCORPORATED
FORMER PHILLIPS DISPLAY COMPONENTS FACILITY
SENECA FALLS, NEW YORK

REQUEST FOR INTERPRETATION
NO. ___

Contractor: _____ Purchase Order No.: _____

Date Transmitted: _____ Date Received: _____

Date Response Requested: _____ Date Response Transmitted: _____

Subject: _____

Reference(s): _____ _____
Specification Section(s) Drawing(s) / Note(s) / Detail(s)

Interpretation Requested:

Signature: _____ Date: _____

Engineer's Response:

Signature: _____ Date: _____

END OF REQUEST FOR INTERPRETATION

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GTE OPERATIONS SUPPORT INCORPORATED
FORMER PHILLIPS DISPLAY COMPONENTS FACILITY
SENECA FALLS, NEW YORK

FIELD ORDER
NO. ___

Contractor: _____ Purchase Order No.: _____

Date Issued: _____ Effective Date: _____

Subject: _____

Reference(s): _____ _____
Specification Section(s) Drawing(s) / Note(s) / Detail(s)

Attention:

Contractor is hereby directed to promptly execute this Field Order for minor changes in the Work without changes in Contract Price or Project Schedule. If Contractor considers that a change in Contract Price or Project Schedule is required, please notify Engineer immediately and before proceeding with this Work.

Description:

Attachments:

Issued by Engineer:

Signature: _____ Date: _____

Receipt Acknowledged by Contractor:

Signature: _____ Date: _____

END OF FIELD ORDER

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GTE OPERATIONS SUPPORT INCORPORATED
FORMER PHILLIPS DISPLAY COMPONENTS FACILITY

SENECA FALLS, NEW YORK

WORK CHANGE DIRECTIVE
NO. ___

Contractor: _____ Purchase Order No.: _____

Date Issued: _____ Effective Date: _____

Contractor is directed to proceed promptly with the following change(s):

Item No.	Description

Scope of Work:

Attachments:

Purpose for Work Change Directive:

Authorization for the Work described herein to proceed on the basis of Cost of the Work due to:

☐ Non-agreement on pricing of proposed change.

☐ Necessity to expedite Work described herein prior to agreeing to changes in Contract Price and Project Schedule.

Estimated Change in Contract Price and Project Schedule:

Contract Price:

$_____ ☐ Increase ☐ Decrease ☐ No Change

Project Schedule:

_____ Days ☐ Increase ☐ Decrease ☐ No Change

Recommended for Approval by Engineer:

Signature: _____ Date: _____

Authorized by the Owner:

Signature: _____ Date: _____

Receipt Acknowledged by Contractor:

Signature: _____ Date: _____

END OF WORK CHANGE DIRECTIVE

GTE OPERATIONS SUPPORT INCORPORATED
FORMER PHILLIPS DISPLAY COMPONENTS FACILITY
SENECA FALLS, NEW YORK

PROPOSAL REQUEST
NO. ___

Contractor: _____ Purchase Order No.: _____

Date: _____

Subject: _____

Please submit a complete Change Order request for the proposed modifications described below. If the associated Change Order request is approved, a Change Order will be issued to authorize adjustment to the scope of the Work. This proposal request is not a Change Order, Work Change Directive, or an authorization to proceed with the proposed Work described below.

Scope of Proposed Work:

Requested by Engineer:

Signature: _____ Date: _____

END OF PROPOSAL REQUEST

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GTE OPERATIONS SUPPORT INCORPORATED
FORMER PHILLIPS DISPLAY COMPONENTS FACILITY
SENECA FALLS, NEW YORK

CHANGE ORDER REQUEST
NO. ___

Contractor: _____ Purchase Order No.: _____

Date: _____ Submitted in Response to Proposal Request No.: _____

Subject: _____

Scope of Work:

Attach and list supporting information as required.

Justification:

Changes in Contract Price and Project Schedule:

For Contract Price, when requested by Engineer, attach detailed cost breakdowns for Contractor and Subcontractors, Supplier quotations, and other information required. For the Project Schedule, state increase, decrease, or no change to Project Schedule for Substantial Completion, readiness for final payment, and Milestones, if any. If increase or decrease, state specific number of days for changes to the Project Schedule.

The following changes are proposed to the Contract Price and Project Schedule:

Description	Contract Price (dollars)	Project Schedule (days)	
		Substantial	Final
1.	$		
2.	$		
Total This Change Order Proposal:	**$**		

Changes to Milestones (if any): _____

The adjustment proposed is the entire adjustment to the Contract to which Contractor believes it is entitled as a result of the proposed change.

Requested by Contractor:

Signature: _____ Date: _____

END OF CHANGE ORDER REQUEST

GTE OPERATIONS SUPPORT INCORPORATED
FORMER PHILLIPS DISPLAY COMPONENTS FACILITY
SENECA FALLS, NEW YORK

CHANGE ORDER
NO. ___

Contractor: _____ Purchase Order No.: _____

Date Issued: _____ Effective Date: _____

The Contract Documents are modified as follows upon execution of this Change Order:

Description:

Attachments:

Change in Contract Price:

A. Original Contract Price: $_____

B. ☐ Increase ☐ Decrease ☐ No Change
from previously approved Change Order Nos. ___ to ___: $_____

C. Contract Price prior to this Change Order (Lines A+B): $_____

D. ☐ Increase ☐ Decrease ☐ No Change
of this Change Order: $_____

E. Contract Price incorporating this Change Order (Lines C+D): $_____

Change in Project Schedule:

A. Original Project Schedule ☐ Working days ☐ Calendar days:

Substantial Completion (days or date): _____
Ready for Final Payment (days or date): _____

B. ☐ Increase ☐ Decrease ☐ No Change
from previously approved Change Order Nos. ___ to ___:

Substantial Completion (days or date): _____
Ready for Final Payment (days or date): _____

C. Project Schedule prior to this Change Order (Lines A+B):

Substantial Completion (days or date): _____
Ready for Final Payment (days or date): _____

D. ☐ Increase ☐ Decrease ☐ No Change
of this Change Order:

Substantial Completion (days or date): _____
Ready for Final Payment (days or date): _____

E. Project Schedule incorporating this Change Order (Lines C+D):

Substantial Completion (days or date): _____
Ready for Final Payment (days or date): _____

Recommended for Approval by Engineer:

Signature: _____ Date: _____

Accepted by the Owner:

Signature: _____ Date: _____

Accepted by Contractor:

Signature: _____ Date: _____

END OF CHANGE ORDER

SECTION 01 29 76

PROGRESS PAYMENT PROCEDURES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope:
   1. Contractor's requests for payment shall be in accordance with Engineer's Terms and Conditions and the Project Specifications.

B. Procedure:
   1. Review with Engineer quantities and the Work proposed for inclusion in each progress payment. Application for Payment shall cover only the Work and quantities recommended by the Engineer.
   2. Contractor will be required to review with Engineer the status of record documents in connection with Engineer's review of each Application for Payment.
   3. Contractor will follow the Engineer's direction for submitting a payment application only after approval from the Engineer to do so. Submittal requirements and payment terms are provided in Engineer's Terms and Conditions.

C. Each request for progress payment shall include:
   1. Completed Application for Payment form, including summary/signature page, progress estimate sheets, and stored materials summary. Progress estimate sheets shall have the same level of detail as the Schedule of Values.
      a. Documentation of work completed in accordance with the Contract Documents measurements and payments. Costs for which progress payment is requested and for which documentation acceptable to Engineer is not submitted will not be eligible for payment.
   2. Listing of Subcontractors and Suppliers:
      a. Submit not less than monthly updated listing of all Subcontractors and Suppliers known to Contractor, whether or not such entities have a contract directly with Contractor.
      b. Submit complete information using the form attached to this Section.
   3. Partial Release or Reduction of Retainage:
      a. For each Application for Payment where Contractor requests partial release or reduction of retainage in any amount (other than request for final payment), submit with associated progress payment request consent of surety to partial release or reduction of retainage, duly completed by Contractor and surety.

D. Final Payment:
   1. Requirements for request for final payment are in Section 01 77 19, Closeout Requirements.

1.02 PAYMENT FOR STORED MATERIALS AND EQUIPMENT

A. Observation of Stored Materials and Equipment Prior to Application for Payment:
   1. General:
      a. Prior to materials or equipment suitably stored but not yet incorporated into the Work can be eligible for payment, Engineer shall visit the storage location and verify the extent, condition, and storage environment of the stored items.
      b. When the same material or equipment item is stored for more than two months, such visits to storage location shall be not less than once every two months.
   2. Cost Responsibility for Observations:
      a. When storage location is less than 20 miles from the Site or less than 20 miles from Engineer's office, Contractor is not responsible for reimbursing Engineer for cost of Engineer's time and expenses for observing stored materials and equipment.
      b. When storage location is more than 20 miles from the Site and more than 20 miles from Engineer's office, Contractor shall reimburse Engineer, via a set-off under the Contract Documents, for cost of Engineer's time and expenses, including travel time, to visit the storage location and observe the stored materials and equipment.

1.03 SUBMITTALS

A. Informational Submittals: Submit the following:
   1. An example invoice for review by Engineer, to ensure that the invoice conforms with the Engineer's standards.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 ATTACHMENTS

A. The items listed below, which follow this Section's "End of Section" designation, are part of this Project Specifications Section:
   1. Attachment A: List of Subcontractors and Suppliers form (two pages).

END OF SECTION

LIST OF SUBCONTRACTORS AND SUPPLIERS

Engineer: _____
Project Name: _____

Contractor: _____Date: _____
Contract Designation: _____

Indicate below complete information for each Subcontractor and Supplier known to Contractor, regardless of whether the firm has a direct contract with Contractor. Include all lower-tier Subcontractors and associated Suppliers. Copy and paste the paragraphs below as required to indicate all Subcontractors and Suppliers.

SUBCONTRACTORS

1. **Subcontractor Name**:
   - *Address*:
   - *Contact Person*:
   - *Telephone No.*:
   - *E-mail Address*:
   - *Work Under Specifications Section Nos.*:
   - *Brief Description of Work*:
   - *Current Subcontract Price*:
   - *Approximate Subcontract Start Date*:
   - *Approximate Subcontract End Date*:

2. **Subcontractor Name**:
   - *Address*:
   - *Contact Person*:
   - *Telephone No.*:
   - *E-mail Address*:
   - *Work Under Specifications Section Nos.*:
   - *Brief Description of Work*:
   - *Current Subcontract Price*:
   - *Approximate Subcontract Start Date*:
   - *Approximate Subcontract End Date*:

3. **Subcontractor Name**:
   - *Address*:
   - *Contact Person*:
   - *Telephone No.*:
   - *E-mail Address*:
   - *Work Under Specifications Section Nos.*:
   - *Brief Description of Work*:
   - *Current Subcontract Price*:
   - *Approximate Subcontract Start Date*:
   - *Approximate Subcontract End Date*:

Total of Subcontract Prices for all subcontracts equals approximately ___ percent of the Contract Price *(Contractor to fill in blank monthly)*

SUPPLIERS

1. **Supplier Name**:
   - *Address*:
   - *Contact Person*:
   - *Telephone No.*:
   - *E-mail Address*:
   - *Furnishing Items Under Specifications Section Nos.*:
   - *Brief Description of Items*:
   - *Current Purchase Order Amount*:
   - *Approximate Purchase Order Date*:
   - *Approximate Purchase Order End Date*:

2. **Supplier Name**:
   - *Address*:
   - *Contact Person*:
   - *Telephone No.*:
   - *E-mail Address*:
   - *Furnishing Items Under Specifications Section Nos.*:
   - *Brief Description of Items*:
   - *Current Purchase Order Amount*:
   - *Approximate Purchase Order Date*:
   - *Approximate Purchase Order End Date*:

3. **Supplier Name**:
   - *Address*:
   - *Contact Person*:
   - *Telephone No.*:
   - *E-mail Address*:
   - *Furnishing Items Under Specifications Section Nos.*:
   - *Brief Description of Items*:
   - *Current Purchase Order Amount*:
   - *Approximate Purchase Order Date*:
   - *Approximate Purchase Order End Date*:

END OF LIST OF SUBCONTRACTORS AND SUPPLIERS

SECTION 01 31 13

PROJECT COORDINATION

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope:
   1. This Section includes general requirements for coordinating construction operations on the Project.

B. Related Sections:
   1. Section 01 11 00 – Summary of Work.

1.02 COORDINATION

A. Coordinate the Work with all necessary parties (whether hired by Contractor, Owner, or others) including testing agencies, subcontractors, suppliers, and others, in accordance with this Section, to complete the Work in accordance with the Contract Documents.

B. Cooperate with other contractors, utility service companies, and other entities working at the Site, in accordance with Section 01 11 00 – Summary of Work.

C. Coordinate construction operations included in different Sections of the Project Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations included in different Sections that depend on each other for proper installation, connection, and operation.
   1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
   2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
   3. Make adequate provisions to accommodate items scheduled for later installation.

D. Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
   1. Prepare Project Schedule.
   2. Install and remove temporary utilities, facilities, and controls.
   3. Deliver and process submittals.
   4. Progress Meetings.
   5. Startup and adjust systems.
   6. Project Closeout activities.

E. Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Coordinate use of Temporary Utilities to minimize waste.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 31 19.13

PRE-CONSTRUCTION CONFERENCE

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope:
   1. Engineer will host a pre-construction conference; distribute an agenda prior to the conference; preside at conference; and prepare and distribute minutes to all conference participants and others as requested.
   2. Attend the conference and be prepared to discuss all items on the agenda.

B. The purpose of the conference is to designate responsible personnel, establish working relationships, discuss preliminary schedules submitted by Contractor, and review administrative and procedural requirements for the Project. Matters requiring coordination will be discussed and procedures for handling such matters will be established.

C. Date, Time, and Location: Conference will be held prior to commencement of Work at the Site. The Owner will establish the date, time, and location of conference and will notify the interested and involved parties.

D. Prior to the conference, the Contractor shall submit the following preliminary schedules:
   1. Preliminary Project Schedule.
   2. Preliminary Schedule of Submittals.

E. Provide required information and contribute appropriate items for discussion. Bring to the conference the following, with sufficient number of copies for each attendee:
   1. Preliminary Project Schedule.
   2. Preliminary Schedule of Submittals.
   3. List of emergency contact information for Contractor’s project manager, Site superintendent, safety representative, and foreman.

1.02 ATTENDANCE

A. Representatives present for each entity shall be qualified and authorized to act on that entity’s behalf.

B. Attendance:
   1. Contractor:
      a. Project Manager.
      b. Site Superintendent.
      c. Safety Representative.
   2. The Owner.
   3. Engineer:
      a. Project Manager.
      b. Engineer of Record.
      c. Construction Manager.
   4. Air Monitoring Technician.
   5. Agencies, including New York State Department of Environmental Conservation, if available.
   6. Property Owner.
   7. Others as requested by the Owner, Contractor, or Engineer.

1.03 PRELIMINARY AGENDA

A. Safety Moment.

B. Procedural and Administrative:
   1. Personnel and Teams:
      a. Designation of roles and responsible personnel.
      b. Limitations of authority of personnel, including personnel who will sign Contract modifications and make binding decisions.
      c. List of proposed Subcontractors and Suppliers.
      d. Authorities having jurisdiction.
   2. Procedures for communication and correspondence.
   3. Copies of Contract Documents and availability.
   4. Work and Scheduling:
      a. Scope of Work.
      b. Project Schedule, including Milestones (if any).
      c. Phasing and Sequencing.
      d. Preliminary Project Schedule.
      e. Critical Path Activities.
      f. Working Hours.
   5. Safety:
      a. Responsibility for Safety.
      b. Designation of Contractor's Safety Representative.
      c. Emergency Procedures and Accident Reporting.
      d. Emergency Contact Information.
      e. Impact of Project on Public Safety.
   6. Permits.
   7. Coordination:
      a. Project Coordination.
      b. Progress Meetings.
   8. Products and Submittals:
      a. Preliminary Schedule of Submittals.
      b. Shop Drawings, Samples, and other submittals.
      c. Product options, "or equals", and Substitutions.
   9. Contract Modification Procedures.
   10. Requests for interpretation:
      a. Clarification notices.
      b. Field Orders.
      c. Proposal requests.
      d. Change Order proposals.
      e. Work Change Directives.
      f. Change Orders.
   11. Payment:
      a. Progress payment procedures.
      b. Taxes.
      c. Retainage.
   12. Testing And Inspections.
   13. Record Documents.
   14. Preliminary Discussion of Contract Closeout:
      a. Procedures For Substantial Completion.
      b. Contract Closeout Requirements.
      c. Correction Period.
      d. Duration Of Bonds and Insurance.

C. Site Mobilization:
   1. Field Offices and Staging Areas.
   2. Temporary Facilities and Utilities.
   3. Access To Site, Access Roads, And Parking.
   4. Maintenance And Protection of Traffic.
   5. Use of Premises.
   6. Protection of Existing Property.
   7. Security.
   8. Temporary Controls:
      a. Erosion And Sediment Control.
      b. Stormwater Management.
      c. Odor, Vapor, and Dust Control.
      d. Noise Control.
      e. Pollution Control.
   9. Temporary Fencing.
   10. Temporary Facilities (Office Trailer, Sanitary, Health and Safety)
   11. Storage Of Materials and Equipment.
   12. Reference Points and Benchmarks; Surveys And Layouts.
   13. Site Maintenance and Housekeeping During The Project, Including Cleaning and Removal of Trash And Debris.
   14. Restoration.

D. General Discussion And Questions.

E. Next Meeting.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

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SECTION 01 31 19.23

PROGRESS MEETINGS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope:
   1. Attend progress meetings to be held on a weekly basis throughout the Project and be prepared to discuss in detail all items on the agenda.
   2. Engineer will preside at progress meetings and will prepare and distribute minutes of progress meetings to all meeting participants and others as requested.

B. Date and Time:
   1. Regular Meetings: Every week on a day and time agreeable to the Owner, Engineer, and Contractor.
   2. Other Meetings: As required.

C. Location: Contractor's Field Office at the Site or other location (including virtually) mutually agreed upon by the Owner, Engineer, and Contractor.

D. Handouts: Provide electronic copies prior to each progress meeting of each of the following:
   1. List of Work accomplished since the previous progress meeting.
   2. Up-to-date Project Schedule. (In addition to electronic files the contractor to provide an appropriate number of hard copies each week based on the anticipated attendees.)
   3. Up-to-date Schedule of Submittals.
   4. Detailed "look-ahead" schedule of Work planned for the next two weeks, with specific starting and ending dates for each activity, including shutdowns, deliveries of important materials and equipment, Milestones (if any), and important activities affecting the Owner, the Project, and the site.

1.02 ATTENDANCE

A. Representatives present for each entity shall be qualified and authorized to act on that entity's behalf.

B. Attendance:
   1. Contractor:
      a. Project Manager.
      b. Site Superintendent.
      c. Safety Representative.
      d. Representatives of other subcontractors and suppliers when needed for the discussion of a particular agenda item.
   2. Owner.
   3. Engineer:
      a. Project Manager.
      b. Engineer of Record.
      c. Construction Manager.
      d. Air Monitoring Technician or designated representative.
   4. Agencies, if available.
   5. Property Owner.
   6. Others as appropriate.

1.03 PRELIMINARY AGENDA

A. Review, comment, and amendment (if required) of minutes of previous progress meeting.

B. Safety and Safe Work Practices.

C. Results of Community Air Monitoring performed since previous progress meeting.

D. Review of progress since previous progress meeting.

E. Planned progress through next progress meeting.

F. Review of Project Schedule:
   1. Project Schedule, including Milestones (if any).
   2. Critical Path.
   3. Schedules for fabrication and delivery of materials and equipment.
   4. Issues potentially affecting the Project Schedule, including Milestones (if any).
   5. Corrective measures, if required, to achieve Project Schedule, including Milestones (if any).

G. Submittals:
   1. Status of submittals critical to maintaining the project schedule.
   2. Review of Schedule of Submittals and Engineer's submittal log.

H. Field Observations, Problems, And Conflicts.

I. Quality Standards, Testing, and Inspections.

J. Coordination between parties.

K. Site Management Issues, including Access, Security, Temporary Controls, Maintenance and Protection Of Traffic, and Housekeeping.

L. Permits.

M. Punch List status, as applicable.

N. Other Business.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 32 16

CONSTRUCTION PROJECT SCHEDULE

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope:
   1. Preparing, submitting, maintaining, and updating Project Schedules in accordance with this Section, unless otherwise accepted by the Engineer.
   2. The Engineer's acceptance of the Project Schedule, and comments or opinions concerning the activities in the Project Schedule shall not control the Contractor's independent judgment relative to the means, methods, techniques, sequences, and procedures of construction. The Contractor is solely responsible for complying with the Project Schedule.
   3. If the revisions to Project Schedule reflect completion date(s) different than the most recently accepted version of the Project Schedule, the Project Schedule shall be thereby voided, nullified, or affected. The Engineer may accept such Project Schedule revisions granted the Contractor acknowledges that such revisions results in no Claim for additional Project Schedule or additions to the Contract Price be brought against the Engineer or Owner resulting from Contractor's failure to complete the work by the earlier date(s) indicated on the accepted Project Schedule.

B. Related Sections:
   1. Section 01 11 00 – Summary of Work.
   2. Section 01 31 19.23 – Progress Meetings.
   3. Section 01 33 00 – Submittal Procedures.

C. Factors Affecting the Project Schedule:
   1. In preparing the Project Schedule, take into consideration submittal requirements and submittal review times, time for fabricating and delivering materials and equipment, work by subcontractors, availability and abilities of workers, availability of construction equipment, weather conditions, restrictions in operations at the Site and coordination with the Property Owner's operations, if any, and other factors that have the potential to affect completion of the work within the Project Schedule.
   2. Comply with sequencing requirements, if any, indicated in the Contract Documents.

1.02 SUBMITTALS

A. Informational Submittals:
   1. Preliminary Project Schedule: Submit preliminary Project Schedule in accordance with this Section.
   2. Initial Project Schedule: After making revisions in accordance with the Owner's/Engineer's comments on the preliminary Project Schedule, submit initial Project Schedule in accordance with this Section.
   3. Project Schedule Updates:
      a. Submit updated Project Schedule at each progress meeting. Bring to meeting the minimum number of copies specified in Section 01 31 19.23 – Progress Meetings.
      b. Submit each updated Project Schedule with letter of transmittal complying with requirements of Section 01 33 00 – Submittal Procedures and specifically indicating the following:

1) Listing of activities and dates that have changed since the previous Project Schedule submittal.
2) Discussion of problems causing delays, anticipated duration of delays, and proposed countermeasures.
3) Completed activities, if any, and the anticipated and actual durations of each.

c. If the Project Schedule remains unchanged from one progress meeting to the next, submit a written statement to that effect.

4. Look-Ahead Schedules: Submit two-week look-ahead schedule at each progress meeting.
5. Recovery Schedules: Submit in accordance with this Section.

1.03 PROJECT SCHEDULE FORMAT AND CONTENT

A. Format:
1. Type: Gantt chart prepared using Microsoft Project 2013 or later edition.
2. Data Format: Submit as Microsoft Project and in Portable Document Format in accordance with Section 01 33 00 – Submittal Procedures.
3. Submit and maintain on site a hard copy of the schedule printed on a format of suitable size. The Portable Document Format version shall be formatted to print on 11 x 17.
4. Time Scale: Indicate first date of each work week.
5. Organization:
   a. Group deliveries of materials and equipment into a separate sub-schedule that is part of the Project Schedule.
   b. Group construction into a separate sub-schedule (that is part of the Project Schedule) by activity.
   c. Group Work by Subcontractors into a separate sub-schedule (that is part of the Project Schedule) by activity.
   d. Group critical activities that dictate the rate of progress (the “critical path”) into a separate sub-schedule that is part of the Project Schedule. Clearly indicate the critical path on the Project Schedule.
   e. Organize each sub-schedule by Project Specifications Section or payment item number.
6. Activity Designations: Indicate title and related Project Specifications Section or payment item number.

B. Content:
1. At a minimum, the following major work items and in the general sequence provided in Section 01 11 00 – Summary of Work should be included, with appropriate subtasks included as necessary, in the general sequence listed below.
2. Project Schedules shall also indicate the following:
   a. Dates for shop-testing.
   b. Delivery dates for materials and equipment to be incorporated into the Work.
   c. Dates for beginning and completing each phase of the Work by activity and by trade.
   d. Dates for start-up, check-out, and field-testing.
   e. Dates corresponding to the Project Schedule, and planned completion date associated with each Milestone (if any), Substantial Completion, and readiness for final payment.
   f. Manpower for each item and percent complete for each task.

C. Project Schedule Updates: Update Project Schedule on a bi-weekly basis (i.e., every two weeks) and to reflect changes to the previously accepted version of the Project Schedule, if any.

D. Coordinate the Project Schedule with the Schedule of Submittals.

1.04 RECOVERY SCHEDULES

A. General:
   1. When updated Project Schedule indicates that the ability to comply with the previously accepted version of the Project Schedule falls two or more weeks behind schedule, and there is no excusable delay, Change Order, or Work Change Directive to support an extension of the Project Schedule, Contractor shall prepare and submit a updated Project Schedule demonstrating Contractor's plan to accelerate the work to achieve compliance with the Project Schedule ("recovery schedule") for the Engineer's acceptance.
   2. Submit recovery schedule within three days after submittal of updated Project Schedule where need for recovery schedule is indicated.

B. Implementation of Recovery Schedule:
   1. At no additional cost to the Owner or Engineer, do one or more of the following: furnish additional labor, provide additional construction equipment, provide suitable materials, employ additional work shifts, expedite procurement of materials and equipment to be incorporated into the Work, and other measures necessary to complete the Work within the Project Schedule.
   2. Upon acceptance of recovery schedule by the Engineer, incorporate recovery schedule into the next Project Schedule update.

C. Lack of Action: Refusal, failure, or neglect to take appropriate recovery action, or to submit a recovery schedule, shall constitute reasonable evidence that Contractor is not prosecuting the work or separable part thereof with the diligence that will ensure completion within the Project Schedule.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

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SECTION 01 32 26

CONSTRUCTION PROGRESS REPORTING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope:
   1. Contractor shall prepare and submit construction progress reports in accordance with this Section.
   2. Construction progress reports include:
      a. Daily construction reports.
      b. Field condition reports.

B. Related sections:
   1. Section 01 35 29 – Contractor's Health and Safety Plan.
   2. Section 01 26 00 – Contract Modification Procedures.

1.02 SUBMITTALS

A. Informational Submittals:
   1. Daily Construction Reports: Submit in accordance with Part 1.03 of this Section.
   2. Field Condition Reports: Submit in accordance with Part 1.04 of this Section.

1.03 DAILY CONSTRUCTION REPORTS

A. Prepare daily construction reports throughout the Project. Include in each report, at a minimum, the following:
   1. Contractor's Name.
   2. Owner's Name.
   3. Project Name.
   4. Site Name and Location.
   5. Date and Day of The Week.
   6. High and Low Temperatures and General Weather Conditions.
   7. Number of Contractor Employees at The Site And Hours Worked.
   8. Number of Employees at The Site For Each Subcontractor.
   9. Breakdown of Employees by Trades.
   10. Major Construction Equipment Used.
   11. Material and Equipment Deliveries.
   12. Waste Shipments.
   13. Meter Readings and Similar Recordings.
   14. Work Performed, including:
      a. Excavation and Backfill Progress Documented on Maps/Figures.
      b. Field Quality Control Measures and Testing.
   15. Location of areas in which Construction was performed.
   16. Major Equipment and Materials installed as part of the Work.
   17. Services connected and disconnected.
   18. Equipment or System Tests and Startups.
   19. Stoppages, Delays, Shortages, and Losses.
   20. Health And Safety Information, including Health and Safety issues, incidents, concerns, and actions. Comply with accident reporting requirements of Section 01 35 29 – Contractor's Health and Safety Plan.

21. Environmental Protection Information, including environmental issues, incidents, concerns, and actions.
22. Emergency Procedures Implemented.
23. Field Meetings and significant decisions.
24. Orders and requests of authorities having jurisdiction.
25. Change Orders received and implemented.
26. Work Change Directives received and implemented.
27. Field Orders received and implemented.
28. Other instructions received from the Owner or Engineer.
29. Construction photographs with descriptions that represent activities and conditions covered in the report.

B. Submit daily construction reports to Engineer by 12:00 p.m. (local time) the next working day after the day covered in the associated report. Daily report shall be signed by responsible member of Contractor's staff, such as Contractor's project manager or superintendent, or foreman designated by Contractor as having authority to sign daily reports.

1.04 FIELD CONDITION REPORTS

A. Immediately upon discovery of a difference between field conditions and the Contract Documents, prepare and submit a detailed report. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

B. Submit field condition reports to Engineer with Request for Interpretation, prepared in accordance with Section 01 26 00 – Contract Modification Procedures.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope:
   1. This Section specifies the general methods and requirements of submissions applicable to Contractor submittals, including plans, shop drawings, product data, samples, mock-ups, and schedules. Detailed and specific submittal requirements are provided elsewhere in the Project Specifications and are summarized in the submittal log form included with this Section.
   2. Provide submittals well in advance (as indicated in this Section) of the need for the material, equipment, or procedure (as applicable) in the Work and with ample time required for delivery of material or equipment and to implement procedures following Engineer's review or acceptance of the associated submittal. Work covered by a submittal will not be included in progress payments until review or acceptance of related submittals has been obtained in accordance with the Contract Documents.
   3. Contractor is responsible for dimensions to be confirmed and corrected at the Site, for information pertaining solely to the fabrication processes and to techniques of construction, and for coordinating the work of all trades. Contractor's signature of submittal's stamp and letter of transmittal shall be Contractor's representation that Contractor has met its obligations under the Contract Documents relative to that submittal.

B. Related Sections:
   1. Section 01 78 39 – Project Record Documents.

C. Samples:
   1. Conform submittal of samples to the specification section in which the sample is specified.
   2. Furnish at the same time samples and submittals that are related to the same unit of Work or specification section. Engineer will not review submittals without associated Samples and will not review Samples without associated submittals.
   3. Samples shall clearly illustrate functional characteristics of product, all related parts and attachments, and full range of color, texture, pattern, and material.

D. Each submittal shall be prepared and transmitted to the Engineer a minimum of 10 working days in advance of the Contractor's intended performance of the related Work or other applicable activities, or within the time specified in the individual Work of other related sections, so that Work will not be delayed by processing times (including rejections and resubmittals, if required), coordination with other submittals, testing, purchasing, fabrication, delivery, and similar sequenced activities. The Owner/Engineer will not be liable for any expense and/or delay resulting from the Contractor's failure to provide submittals in a timely manner.

1.02 TYPES OF SUBMITTALS

A. Submittals are classified as Action Submittals, Informational Submittals, Closeout Submittals, and Maintenance Material Submittals. The type of each required submittal is designated in the respective Project Specifications Sections. When type of submittal is not specified in the associated Project Specifications Section, submittal will be classified as follows:

1. Action Submittals include:
    a. Shop Drawings.
    b. Product data.
    c. Delegated design submittals, which include documents prepared, sealed, and signed by a design professional retained by Contractor, Subcontractor, or Supplier for materials and equipment to be incorporated into the completed Work. Delegated design submittals do not include submittals related to temporary construction unless specified otherwise in the related Project Specifications Section. Delegated design submittals include design drawings, design data including calculations, specifications, certifications, and other submittals prepared by such design professional.
    d. Samples.
    e. Testing plans, procedures, and testing limitations.
2. Informational Submittals include:
    a. Certificates.
    b. Design data not sealed and signed by a design professional retained by Contractor, Subcontractor, or Supplier.
    c. Pre-construction test and evaluation reports, such as reports on pilot testing, subsurface investigations and similar reports.
    d. Supplier instructions, including installation data, and instructions for handling, starting-up, and troubleshooting.
    e. Source quality control submittals (other than testing plans, procedures, and testing limitations), including results of shop testing.
    f. Field quality control submittals (other than testing plans, procedures, and testing limitations), including results of operating and acceptability tests at the Site.
    g. Supplier reports.
    h. Sustainable design submittals (other than sustainable design closeout documentation).
    i. Special procedure submittals, including health and safety plans and other procedural submittals.
    j. Qualifications statements.
3. Closeout Submittals include:
    a. Maintenance contracts.
    b. Operations and maintenance data.
    c. Bonds, such as maintenance bonds and bonds for a specific product or system.
    d. Warranty documentation.
    e. Record documentation.
    f. Sustainable design closeout documentation.
    g. Software.
4. Maintenance Material Submittals include:
    a. Spare parts.
    b. Extra stock materials.
    c. Tools.
5. When type of submittal is not specified and is not included in the list above, Engineer will determine the type of submittal.

B. Not Included in this Section: Administrative and procedural requirements for the following are covered elsewhere in the Contract Documents:
    1. Requests for interpretations of the Contract Documents.
    2. Field Orders, Work Change Directives, and Change Orders.
    3. Applications for Payment.
    4. Project Schedules.
    5. Progress reports.
    6. Photographic documentation.
    7. Reports and documentation required in accordance with applicable permits.
    8. Site survey data.

1.03 SUBMITTALS REQUIRED IN THIS SECTION

A. Informational Submittals:
   1. Schedule of Submittals:
      a. Timing:
         1) Provide submittal within time frames specified in the Contract Documents.
         2) Provide updated Schedule of Submittals with each submittal of the updated Project Schedule.
      b. Content: Requirements for content of preliminary Schedule of Submittals and subsequent submittals of the Schedule of Submittals are identical. Identify on Schedule of Submittals all submittals required in the Contract Documents. Updates of Schedule of Submittals shall show scheduled dates and actual dates for completed tasks. Indicate submittals that are on the Project's critical path. Indicate the following for each submittal:
         1) Date by which submittal will be provided to Engineer.
         2) Whether submittal will be for a substitution or "equal".
         3) Date by which Engineer's response is required. At least 10 working days shall be allowed from Engineer's receipt of each submittal. Allow increased time, upwards of 20 working days, for large or complex submittals.
         4) For submittals for materials or equipment, date by which material or equipment must be at the Site to avoid delaying the Work and to avoid delaying the work of other Contractors.
      c. Coordinate Schedule of Submittals with the Project Schedule.
      d. Schedule of Submittals that is not compatible with the Project Schedule, or that does not indicate submittals on the Project's critical path, or that places extraordinary demands on Engineer for time and resources, is unacceptable. Do not include submittals not required by the Contract Documents.
      e. In preparing Schedule of Submittals:
         1) Considering the nature and complexity of each submittal, allow sufficient time for review and revision.
         2) Reasonable time shall be allowed for Engineer's review and processing of submittals, for submittals to be revised and resubmitted, and for returning submittals to Contractor.
         3) Identify and accordingly schedule submittals that are expected to have long anticipated review times and submittals that may be subject to review by USEPA or other authorities having jurisdiction.

1.04 PROCEDURE FOR SUBMITTALS

A. Submittal Identification System: Use the following submittal identification system, consisting of submittal number and review cycle number.
   1. Submittal Number: Shall be separate and unique number correlating to each individual submittal required. Assign submittal numbers as follows:
      a. First part of submittal number shall be the applicable Project Specifications Section number, followed by a hyphen.
      b. Second part of submittal number shall be a three-digit number (sequentially numbered from 001 through 999) assigned to each separate and unique submittal furnished under the associated Project Specifications Section.
      c. Typical submittal number for the third submittal provided for Section 31 23 00 (Excavation and Fill) would be "31 23 00-003".
   2. Review Cycle Number: Shall be a letter designation indicating the initial submittal or re-submittal associated with each submittal number:
      a. "A" = Initial (first) submittal.
      b. "B" = Second submittal (e.g., first re-submittal).
      c. "C" = Third submittal (e.g., second re-submittal).

3. Typical submittal identification for the second submission (first re-submission) of the third submittal provided for Section 31 23 00 (Excavation and Fill) would be “31 23 00-003-B”.

B. Letter of Transmittal for Submittals:
   1. Provide separate letter of transmittal with each submittal. Each submittal shall be for one Project Specifications Section.
   2. Each letter of transmittal shall contain the following:
      a. Contractor’s name.
      b. Owner’s name.
      c. Project name.
      d. Contract or Purchase Order number.
      e. Transmittal number.
      f. Submittal number and review cycle.
      g. Submittal date and dates of any previous submissions.
      h. Reference to appropriate Project Specifications Section number, page, and paragraph(s).
      i. Reference to appropriate Design Drawing sheet(s) and detail(s).
      j. Clear space at least 3 inches by 3 inches in size for affixing Engineer’s review stamp.
      k. Clear space suitably sized for affixing Contractor’s stamp.
   3. For submittals with proposed deviations from requirements of the Contract Documents, letter of transmittal shall specifically describe each proposed variation.

C. Contractor’s Review and Stamp:
   1. Contractor’s Review: Before transmitting submittals to Engineer, review submittals to:
      a. Ensure proper coordination of the Work.
      b. Determine that each submittal is in accordance with Contractor’s desires.
      c. Verify that submittal contains sufficient information for Engineer to determine compliance with the Contract Documents.
   2. Incomplete or inadequate submittals will be returned without review.
   3. Contractor’s Stamp and Signature:
      a. Each submittal furnished shall bear Contractor’s stamp of approval and signature, as evidence that submittal has been reviewed by Contractor and verified as complete and in accordance with the Contract Documents.
      b. Submittals without Contractor’s stamp and signature will be returned without review.
      c. Contractor’s stamp shall contain the following certification statement: “By this submittal, I hereby represent that I have determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers, and similar data, and I have checked and coordinated each item with other applicable Shop Drawings and all Project requirements.”

D. Submittal Marking and Organization:
   1. Mark on each page of submittal and each individual component submitted with submittal number and applicable Project Specifications paragraph.
   2. Arrange submittal information in same order as requirements are written in the associated Project Specifications Section.
   3. Each Shop Drawing sheet shall have title block with complete identifying information satisfactory to Engineer.
   4. Package together submittals for the same Project Specifications Section. Do not furnish required information piecemeal.

E. Format of Submittal and Recipients:
   1. Action Submittals and Informational Submittals: Provide Action Submittals and Informational Submittals as electronic files in PDF format; submittals of Samples shall be as specified in Paragraph 1.04.E.2 of this Section.

2. Samples:
    a. Securely label or tag Samples with submittal identification number. Label or tag shall include clear space at least 3 inches by 3 inches in size for affixing Engineer's review stamp. Label or tag shall not cover, conceal, or alter appearance or features of Sample. Label or tag shall not be separated from the Sample.
    b. Submit number of Samples required in Project Specifications. If number of Samples is not specified in the associated Project Specifications Section, provide at least three identical Samples of each item required for Engineer's review. Samples will not be returned to Contractor. If Contractor requires Sample(s) for Contractor's use, notify Engineer in writing and provide additional Sample(s). Contractor is responsible for furnishing, shipping, and transporting additional Samples.
    c. Deliver one Sample to Engineer's field office at the Site. Deliver balance of Samples to Engineer's office, unless otherwise directed by Engineer.
3. Closeout Submittals:
    a. Provide the following Closeout Submittals as electronic files in PDF format:
        1) Maintenance contracts.
        2) Operations and maintenance data.
        3) Bonds for specific products or systems.
        4) Warranty documentation.
        5) Sustainable design closeout documentation.
    b. Record Documentation: Submit in accordance with Section 01 78 39 – Project Record Documents.
    c. Software: Submit number of copies required in Project Specifications Section where the software is specified. If number of copies is not specified, provide two copies on compact disc in addition to software loaded on to the Owner's computer(s) or microprocessor(s).
4. Maintenance Material Submittals: For spare parts, extra stock materials, and tools, submit quantity of items specified in associated Project Specifications Section.

F. Distribution:
1. Engineer will distribute each reviewed submittal requiring Engineer's written response as electronic file in PDF format.
2. Contractor shall distribute hardcopy reproductions of reviewed submittals, where required, to the job site file and elsewhere, as directed by Engineer. Number of hardcopies shall be as directed by Engineer, but will not exceed six.

G. Resubmittals: Resubmittal requirements are provided in Part 1.04.D of this Section.

H. Engineer's Submittal Log:
1. Engineer will maintain a log of required submittals using the form included with this Section. Updated submittal log will be provided to Contractor upon request.
2. Review submittal log and status of each submittal with Engineer on a weekly or more frequent basis.
3. Coordinate updates to Schedule of Submittals with Engineer's updates to submittal log.

I. Engineer's Review
   1. Timing: Engineer's review will conform with timing indicated in the Schedule of Submittals accepted by Engineer.
   2. Submittals not required in the Contract Documents will not be reviewed by Engineer and will not be recorded in Engineer's submittal log. Hardcopies, if any, of such submittals will be returned to Contractor.
   3. Results of Engineer's Review:
   4. Action Submittals: Each submittal will be given one of the following dispositions:
      a. Reviewed: Upon return of submittal marked "Reviewed", order, ship, or fabricate materials and equipment included in the submittal (pending Engineer's review or acceptance, as applicable, of source quality control submittals) or otherwise proceed with the Work in accordance with the submittal and the Contract Documents.
      b. Reviewed and Noted: Upon return of submittal marked "Reviewed and Noted", order, ship, or fabricate materials and equipment included in the submittal (pending Engineer's review or acceptance, as applicable, of source quality control submittals) or otherwise proceed with the Work in accordance with the submittal and the Contract Documents, provided it is in accordance with corrections indicated.
      c. Revise and Resubmit: Upon return of submittal marked "Revise and Resubmit", make the corrections indicated and re-submit to Engineer for review in accordance with this Section.
      d. Rejected: This disposition indicates material or equipment that cannot be reviewed. Upon return of submittal marked "Rejected", repeat initial submittal procedure utilizing reviewable material or equipment.
   5. Informational Submittals:
      a. Each submittal will be given one of the following dispositions:
         1) Accepted: Information included in submittal conforms to the applicable requirements of the Contract Documents and is acceptable. No further action by Contractor is required relative to this submittal, and the Work covered by the submittal may proceed, and products with submittals with this disposition may be shipped or operated, as applicable.
         2) Not Accepted: Submittal does not conform to applicable requirements of the Contract Documents and is not acceptable. Revise submittal and re-submit to indicate acceptability and conformance with the Contract Documents.
      b. The following types of Informational Submittals, when acceptable to Engineer, will not receive a written response from Engineer. Disposition as "Accepted" will be recorded in Engineer's submittal log. When submittals of the following are not acceptable, Engineer will provide written response to Contractor:
         1) Safety data sheets.
         2) Manifests and other shipping documents.
         3) Delivery tickets.
         4) Compaction testing reports.
         5) Concrete testing reports.
         6) Manufacturer's instructions.
         7) Product and material Data.
   6. Closeout Submittals: Dispositions and meanings are the same as specified for Informational Submittals. When acceptable, Closeout Submittals will not receive a written response from Engineer. Disposition as "Accepted" will be recorded in Engineer's submittal log. When Closeout Submittal is not acceptable, Engineer will provide written response to Contractor.
   7. Maintenance Material Submittals: Dispositions and meanings are the same as specified for Informational Submittals. When acceptable, Maintenance Material Submittals will not receive a written response from Engineer. Disposition as "Accepted" will be recorded in Engineer's submittal log. When Maintenance Material Submittal is not acceptable, Engineer will provide written response to Contractor, and Contractor is responsible for costs associated with transporting and handling of maintenance materials until compliance with the Contract Documents is achieved.

J. Resubmittals:
   1. All changes made in the resubmittal must be documented and must also indicate any changes made other than those requested by Engineer.
   2. Revised submittals shall be submitted following the procedures specified for initial submittals.
   3. Resubmittals shall include the original tracking number with an updated alphabetic designation as required in Part 1.04A of this Section.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 ATTACHMENTS

A. The form listed below, which follows the “End of Section” designation, is part of this Project Specifications Section:
   1. Attachment A: Engineer’s submittal log form (4 pages).

END OF SECTION

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ENGINEER'S SUBMITTAL LOG

Section No.	Submittal Title	Submittal Type [1]	Submittal Number	New / Resub	Date Received	Reviewer	Review Status [2]	Date Returned	Notes
01 14 15	Shutdown Planning Submittal	I							
01 14 15	Shutdown Notification	I							
01 15 00	Contractor's Project Operations Plan, including: • Work Schedule • List of Major Construction Equipment • List of Major Subcontractors and Suppliers • Site Utilization Plan • Comprehensive Work Plan • Contractor's Construction Quality Assurance Plan	I							
01 29 76	Example Invoice	I							
01 32 16	Preliminary Project Schedule	I							
01 32 16	Initial Project Schedule	I							
01 32 16	Project Schedule Updates	I							
01 32 16	Look-Ahead Schedule	I							
01 32 16	Recovery Schedules	I							
01 32 26	Daily Construction Reports	I							
01 32 26	Field Condition Reports	I							
01 33 00	Schedule of Submittals	I							
01 35 23	Emergency Contact List	I							
01 35 23	Citations	I							
01 35 23	Hot Work Permit	I							
01 35 23	Digging/Excavation Permit	I							
01 35 23	Confined Space Entry Permit	I							
01 35 29	Contractor's HASP	I							
01 35 29	HASP Preparer Qualification Statements	I							
01 35 29	Safety Representative Qualification Statements	I							
01 35 29	Accident Reports	I							
01 35 29	Daily Health and Safety Field Reports	I							
01 35 29	Training Certificates	I							
01 35 43.13	Hazardous Materials Communication Plan	I							
01 35 43.13	Emergency Spill Response Plan	I							
01 35 43.13	Hazardous Materials Proposed for Use at the Site	I							
01 35 43.13	Hazardous Materials Generated at the Site	I							
01 35 43.13	Permits (for storing, handling, using, transporting, and disposing of Hazardous Materials)	I							
01 35 43.13	Other Documents required for the Hazardous Materials Management Plan	I							
01 35 43.13	Release Response and Notification Form	I							
01 35 43.13	Spill and Discharge Cleanup Report	I							
01 41 26	Erosion and Sedimentation Control Plan	I							

1. Submittal type is as follows: *A - Action* *I - Informational* *C- Closeout*

2. Review status is as follows: *R – Reviewed* *N - Reviewed and noted* *S – Resubmit* *J – Rejected* *A – Accepted* *M – Not Accepted*

Section No.	Submittal Title	Submittal Type [1]	Submittal Number	New / Resub	Date Received	Reviewer	Review Status [2]	Date Returned	Notes
01 41 26	Stormwater Permit Certification Statement	I							
01 41 26	SWPPP Revisions	I							
01 41 26	Qualifications Statements	I							
01 41 26	Stormwater Inspection Reports	I							
01 52 13	Field Office Submittal	A							
01 53 53	Construction Water Pretreatment Plan	A							
01 53 53	Pretreatment System Operation Records	I							
01 53 53	Corrective Action Reports	I							
01 55 26	Traffic Maintenance and Protection Plan	I							
01 57 05	Environmental Protection Plan	A							
01 57 05	Silt Fencing Product Data	A							
01 57 05	Erosion Control Product Data	A							
01 57 05	Follow-Up Report	I							
01 71 26	Surveying Plan	I							
01 71 26	Survey Field Book Example	I							
01 71 26	Project Field Book Originals	I							
01 71 26	Surveyor Qualification Statements	I							
01 71 26	Surveying Certificates	I							
01 71 26	Survey Results	I							
01 77 19	Work Completion Documentation - Actual excavated volumes	I							
01 77 19	Work Completion Documentation - Actual backfill volumes	I							
01 77 19	Work Completion Documentation - Construction Drawings	I							
01 77 19	Work Completion Documentation - Certified survey data	I							
01 77 19	Work Completion Documentation - Executed warranties	I							
01 77 19	Work Completion Documentation - Certified weigh slips from disposal facility	I							
01 77 19	Work Completion Documentation - Maintenance Agreements	I							
01 77 19	Work Completion Documentation - Inspection certificates	I							
01 77 19	Truck volume counts and measurement summary	I							
01 78 39	Record Documents	C							
02 41 19	Demolition and Removal Plan	I							
02 41 19	Notification of Intended Demolition Start	I							
02 60 05	Soil Drying Agent Product Data	A							
02 60 05	Material Handling and Dewatering Plan	A							
02 60 05	Waste Transportation and Disposal Plan	A							
02 60 05	Waste Transporter Permits	I							

1. Submittal type is as follows: *A - Action* *I - Informational* *C- Closeout*

2. Review status is as follows: *R – Reviewed* *N - Reviewed and noted* *S – Resubmit* *J – Rejected* *A – Accepted* *M – Not Accepted*

Section No.	Submittal Title	Submittal Type [1]	Submittal Number	New / Resub	Date Received	Reviewer	Review Status [2]	Date Returned	Notes
02 60 05	Bills of Lading	I							
02 60 05	Daily Transportation Reports/Logs	I							
02 60 05	Disposal records	I							
03 27 00	Fine Aggregate Concrete Submittals	A							
03 27 00	Fabric Manufacturer Certificates	A							
31 05 16	Borrow Source Characterization Reports	A							
31 05 16	Additional Material Testing Results	A							
31 05 16	Testing Laboratory Qualifications	I							
31 05 16	Fill Material Samples	I							
31 05 16	Delivery Tickets	I							
31 05 19	Geotextile Product Data	I							
31 05 19	Geomembrane Product Data	I							
31 11 00	Tree Removal Plan	A							
31 23 00	Excavation and Backfilling Plan	A							
31 23 00	Qualifications - Nuclear Density Testing firm	I							
31 23 00	Field Quality Control Submittals	I							
31 23 00	Excavation Support Plan(s)	I							
32 21 00	Restoration Plan	A							
32 21 00	Seed Certificates	A							
32 21 00	Topsoil Amendment Testing	I							
32 21 00	Data Certificates	I							

END OF ENGINEER'S SUBMITTAL LOG

1. Submittal type is as follows: *A - Action* *I - Informational* *C- Closeout*

2. Review status is as follows: *R – Reviewed* *N - Reviewed and noted* *S – Resubmit* *J – Rejected* *A – Accepted* *M – Not Accepted*

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1. Submittal type is as follows: *A - Action* *I - Informational* *C- Closeout*
2. Review status is as follows: *R – Reviewed* *N - Reviewed and noted* *S – Resubmit* *J – Rejected* *A – Accepted* *M – Not Accepted*

SECTION 01 35 23

SAFETY REQUIREMENTS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope:
   1. This Section augments the requirements elsewhere in the Contract Documents regarding Contractor's responsibilities for safety and protection and includes requirements for Contractor's safety representative and other safety requirements applicable to the Project.
   2. Contractor shall provide labor, materials, tools, equipment, training, certifications, protective measures, and incidentals shown, specified, and required to comply with Contractor's obligations under the Contract for safety and protection of personnel and property.

B. Coordination:
   1. When multiple contractors are working at the Site, Contractor shall communicate to each other contractor, the Owner, Engineer, and other entities working at the Site those elements of Contractor's safety program with which such other entities are to comply.

C. Related Sections: Provisions of this Section are coordinated with, but are not limited to, the following:
   1. Section 01 31 19.13 – Pre-Construction Conference.
   2. Section 01 31 19.23 – Progress Meetings.
   3. Section 01 35 29 – Contractor's Health and Safety Plan.
   4. Section 01 35 43.13 – Environmental Procedures for Hazardous Materials.
   5. Section 01 41 28 – Confined Space Entry Permit.
   6. Section 01 71 33 – Protection of Work and Property.
   7. Section 01 52 16 – First-Aid Facilities.

1.02 TERMINOLOGY

A. The following words or terms are not defined but, when used in this Section, have the following meaning:
   1. "Confined spaces" are areas on or about the Site as defined in 29 CFR 1910.146(b), 29 CFR 1926.21(b)(6), and other Laws and Regulations. Confined spaces include, but are not limited to: storage tanks, process vessels, bins, boilers and similar spaces; ventilation or exhaust ducts and stacks; manholes, underground utility vaults and chambers, sewers, pipelines, tunnels; and open-topped spaces greater than 4 feet deep, such as pits, tubs, vaults, and vessels.
   2. "Entry permit" means the written or printed document provided by the employer of personnel entering permit-required confined space, to allow and control entry into permit-required confined space and that contains the information specified in 29 CFR 1926.146(f), and other Laws and Regulations.
   3. "Permit-required confined space" means confined space as defined in 29 CFR 1926.146(b) and other Laws and Regulations, and that has one or more of the following characteristics:
      a. Contains or has potential to contain a hazardous atmosphere.
      b. Contains material that has potential for engulfing an entrant.

c. Has internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or floors, or by floor that slopes downward and tapers to a smaller cross-section.
d. Contains other recognized serious safety or health hazard.

4. "Hot work permit" means the written authorization of employer of personnel entering a confined space to perform operations, such as riveting, welding, cutting, burning, and heating, capable of providing a source of ignition.

1.03 COMPLIANCE REQUIREMENTS

A. Regulatory Requirements: Comply with Laws and Regulations related to protecting personnel working in or entering confined spaces, including:
1. Code of Federal Regulations (CFR), Title 29, Part 1910, Occupational Safety and Health Standards.
2. CFR, Title 29, Part 1926, Safety and Health Regulations for Construction.

B. Qualifications:
1. Contractor's Safety Representative shall meet the requirements in Section 01 35 29 – Contractor's Health and Safety Plan.

1.04 SUBMITTALS

A. Informational Submittals: Submit the following:
1. Emergency contact information, in accordance with Part 1.07 of this Section.
2. Citations:
a. Copies of safety citations from authorities having jurisdiction and from insurance companies, submitted within 24 hours of Contractor's receipt of such citations.
3. Work Permits: Submit in accordance with applicable requirements of Owner or Engineer (if any):
a. Digging/Excavation Permits.
b. Hot Work Permits (if needed).
c. Confined Space Entry Permits (if needed).

1.05 WORK REQUIREMENTS

A. Contractor shall implement a safe work policy on the Project and establish a goal of minimizing or eliminating hazards to personnel, process, equipment, environment, and the general public.

B. Contractor shall participate in a Project Environment, Health, and Safety Review (PEHSR) with the Owner and Engineer to review the Contractor's Health and Safety Plan (HASP) and provide sound environmental, health, and safety practices are incorporated into the Project in accordance with GTE Operations Support Incorporated's standards. Contractor shall be required to participate in the PEHSR process during the design and construction review phases of the Project. The PEHSR will be initiated by the Owner or Engineer prior to construction.

C. Hot work, if necessary, shall comply with the Laws and Regulation and the Contractor's HASP.

D. Digging and excavation activities shall comply with the Laws and Regulations.

E. Confined space entry, if necessary, shall comply with 29 CFR 1910.146, 29 CFR Subpart AA, and the Laws and Regulations.

1.06 SAFETY REPRESENTATIVE RESPONSIBILITIES

A. General:
   1. Contractor's safety representative shall be at the Site whenever Work is in progress. When Contractor employs multiple shifts, furnish more than one safety representative as necessary.
   2. Contractor's safety representative shall have no other duties on the Project except those directly related to safety. Safety representative shall not be Contractor's Project Manager, Field Engineer, Superintendent, or other supervisory personnel working on the Project.
   3. Contractor's safety representative shall have appropriate space at the Site to maintain and keep available safety records, up-to-date copies of pertinent safety Laws and Regulations, Material Data Sheets, Contractor's site-specific HASP, copies of the Owner's and Engineer's health and safety requirements with which Contractor shall comply, and the Site safety plan including information concerning foreseeable emergency conditions, and emergency contact information as required in Part 1.5 of this Section.

B. Contractor's safety representative's responsibilities include:
   1. Duties and responsibilities in accordance with the Contract Documents.
   2. Contractor's safety representative shall coordinate with Contractor's "competent person" required under Laws and Regulations.
   3. Contractor's safety representative shall attend pre-construction conference in accordance with Section 01 31 19.13 – Pre-Construction Conference and progress meetings in accordance with Section 01 31 19.23 – Progress Meetings.
   4. Schedule and conduct safety meetings and safety training programs as required by Laws and Regulations, Contractor's Health and Safety Plan (HASP), and good safety practices. Advise Engineer prior to the time and place of such meetings. Instruct Contractor's employees (and Subcontractors, Suppliers with personnel at the Site, and others for whom Contractor is responsible) on recognition of hazards; observance of precaution; contents of the Contractor's HASP and other safety programs with which employees shall comply; and use of personal protective equipment (PPE) and safety equipment.
   5. Verifythat operators of specific construction equipment are qualified by training and experience before such personnel are allowed to operate such equipment.
   6. Develop and implement emergency response procedures, including names, locations, and contact telephone numbers for emergency services and medical assistance as indicated in requirements for the Emergency Contact List in Part 1.5 of this Section.
   7. Post appropriate notices regarding health and safety Laws and Regulations at locations at the Site and Contractor's office that afford maximum exposure to personnel.
   8. Post appropriate instructions and warning signs in regard to all hazardous areas and hazardous conditions that cannot be eliminated. Identification of such areas shall be based on experience, site surveillance, and severity of the associated hazard. Signage shall not be used in place of appropriate workplace controls.
   9. Ascertain via personal inspection that safety Laws and Regulations and safety program requirements are enforced. Make inspections not less than once per work shift to ensure that machines, tools, and equipment are in a safe operating condition; and that all work areas are free of hazards to the extent practicable. Implement necessary and timely corrective actions to eliminate unsafe acts and unsafe conditions. Submit to Engineer daily copy of findings resulting from inspection using inspection checklist forms established in Contractor's HASP.
   10. Submit to Engineer copies of safety citations from authorities having jurisdiction and from insurance companies within 24 hours of Contractor's receipt of such citations.
   11. Provide appropriate orientation to employees, visitors, Subcontractors, and Supplier personnel at the Site.
   12. Perform all related tasks necessary to achieve the highest degree of safety that the nature of the Work allows.

1.07 EMERGENCY CONTACT INFORMATION

A. Contractor shall submit list of Emergency Contact Information for 24-hour use throughout the Project. Emergency contact information shall be updated and kept current throughout the Project. If personnel or contact information change, furnish updated Emergency Contact Information list at the next progress meeting.

B. Contractor's list of Emergency Contact Information shall include:
   1. Contractor's project manager's office, field office, and cellular telephone numbers.
   2. Contractor's Site superintendent's office, field office, and cellular telephone numbers.
   3. Contractor's foreman's field office and cellular telephone numbers.
   4. Contractor's safety representative's office and cellular telephone numbers.
   5. Major Subcontractors' and Suppliers' office and cellular telephone numbers of project manager and foreman (when applicable).

C. Additional Emergency Contact Information:
   1. Owner's Project Managers: office and cellular telephone numbers.
   2. Property Owner's Facility Manager: office and cellular telephone numbers.
   3. Engineer's Project Manager's office and cellular telephone numbers.
   4. Engineer's Project Engineer's office and cellular telephone numbers.
   5. Construction Manager's office, field office, and cellular telephone numbers.
   6. Utility companies' 24-hour contact telephone number(s), including gas, water, sewer, oil, telephone, cable television/telecommunications, and other companies or concerns having utilities in the vicinity of the Work.
   7. Highway and street owners' 24-hour telephone number(s).
   8. Emergency telephone numbers, including: "Emergency: Dial 911", and seven-digit telephone numbers for the hospital, ambulance, police, and fire department nearest to the Site. Furnish names of each of these institutions.
   9. Other involved entities as applicable.

D. Include with list of emergency contact information an 8.5-inch by 11-inch map showing route from the Site to the nearest hospital.

1.08 SAFETY EQUIPMENT

A. General:
   1. Contractor shall provide proper safety and rescue equipment, adequately maintained and readily available, for any foreseeable contingency.
   2. Such equipment shall include items such as safety ropes and harnesses, fall-prevention devices, stretchers, water safety devices, oxygen breathing apparatus, resuscitators, gas detectors, oxygen deficiency indicators, combustible gas detectors, fire extinguishers and first-aid equipment in accordance with the Division 01 Specifications, and similar equipment.
   3. Keep safety equipment in protected areas. Check safety equipment at scheduled intervals.
   4. Temporary First-Aid Facilities: Provide and maintain in accordance with Section 01 52 16, First-Aid Facilities.

B. Safety Equipment Log:
   1. Maintain a log indicating the person who checked the equipment, when equipment was checked, and that equipment was acceptable.
   2. Update equipment log not less-often than monthly.
   3. Include in safety representative's onsite records copies of equipment calibration records.

C. Provide replacement safety equipment when primary safety equipment is unavailable due to use or when undergoing maintenance.

D. Personal Protective Equipment (PPE):
   1. All persons entering the work areas shall wear appropriate PPE required for that particular area.
   2. Remove from the Site any person failing to comply with this or any other safety requirement.
   3. Engineer will furnish protective helmets (hard hats), safety eyewear, reflective vests, and hearing protection for Engineer's employees and consultants. Contractor shall furnish other equipment required.

1.09 EVACUATION DRILL

A. Conduct evacuation drills in accordance with Contractor's HASP not less-often than once per construction season, scheduled and conducted by Contractor under supervision of Contractor's safety representative.

B. Perform evacuation drill during regular working hours, scheduled to minimize disruption of the Work.

C. Upon evacuation, Contractor and all subcontractor's shall immediately advise Engineer's onsite personnel that all personnel have been evacuated.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

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SECTION 01 35 29

CONTRACTOR'S HEALTH AND SAFETY PLAN

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope:
   1. Prepare and maintain a written, Work-specific Contractor's Health and Safety Plan (HASP), and conduct all construction activities in a safe manner that avoids:
      a. Injuries to employees, subcontractors, and other persons with an interest at or near the Site.
      b. Employee exposures to health hazards above occupational limits established respectively by the Occupational Safety and Health Administration (OSHA), American Conference of Governmental Industrial Hygienists (ACGIH), and Nuclear Regulatory Commission (NRC), as applicable.
      c. Exposure of the public and the Property Owner's employees to air contaminants above levels established for public exposure by USEPA, NRC, NYSDEC, NYSDOH, and other authorities having jurisdiction at the Site.
      d. Significant increases in concentrations of contaminants in soil, water, or sediment near the Site.
      e. Violations of the Occupational Safety and Health Act, or other Laws or Regulations.

B. Related Sections:
   1. Section 01 35 23 – Safety Requirements.
   2. Section 01 35 43.13 – Environmental Procedures for Hazardous Materials.

1.02 QUALITY ASSURANCE

A. Qualifications:
   1. HASP Preparer:
      a. Engage a certified industrial hygienist accredited by the American Board of Industrial Hygiene, safety professional certified by the Board of Certified Safety Professionals, or other acceptable certified safety professional to prepare or supervise preparation of HASP.
   2. Safety Representative:
      a. Retain the services of a safety industry professional to manage, oversee, and enforce Contractor's health and safety program at the Site, and ensure compliance with the HASP and applicable Laws and Regulations during the Project. Contractor's safety representative shall have a minimum of five years of direct construction safety experience and appropriate training to supervise hazardous waste operations and emergency response (HAZWOPER) activities.
      b. The Safety Representative shall possess at least one of the following certifications: Certified Safety Professional, Certified Industrial Hygienist or Construction Health and Safety Technician.
      c. Engineer's acceptance of Contractor's safety representative's qualifications does not in any way mitigate or relieve Contractor of Contractor's safety obligations under the Contract Documents.
      d. Contractor's safety representative shall be present at the Site at all times when Work is being performed and shall be dedicated solely to the supervision of Contractor's health and safety program.

e. Responsibilities include, but are not necessarily limited to, the following:
   1) Supervising the implementation of HASP.
   2) Providing health and safety orientation training to Contractor's employees, Subcontractors, and Site visitors.
   3) Attending pre-construction conference, progress meetings, and other Project meetings, as required.
   4) Preparing and maintaining health and safety records and statistics.
   5) Leading and documenting daily job safety briefings.
   6) Preparing and submitting accident reports in accordance with Part 1.05 of this Section.
   7) Leading accident investigations on Contractor's behalf.
   8) Preparing and submitting daily health and safety field reports in accordance with Part 1.06 of this Section.

B. Regulatory Requirements:
   1. Laws and Regulations applying to the Work under this Section include, but are not limited to, the following:
      a. 29 CFR 1904, Recording and Reporting Occupational Injuries and Illnesses.
      b. 29 CFR 1910, Occupational Safety and Health Standards, with specific attention to activities involving handling of or exposure to contaminants.
      c. 29 CFR 1926, Safety and Health Regulations for Construction.
      d. 40 CFR 261.3, 264, and 265, Resource Conservation and Recovery Act (RCRA).
      e. 49 CFR 171.8, Transportation, Definitions and Abbreviations.
      f. 6 NYCRR 371, Identification and Listing of Hazardous Wastes.
      g. 6 NYCRR 375, Environmental Remediation Programs.
      h. 12 NYCRR 23, Protection in Construction, Demolition, and Excavation Operations.
      i. 12 NYCRR 57, High Voltage Proximity.
      j. 12 NYCRR 59, Workplace Safety and Loss Prevention Program.
      k. 12 NYCRR 61, Occupational Licensing and Certification.
      l. 16 NYCRR 753, Protection of Underground Facilities.
      m. 17 NYCRR 32, Oil Spill Prevention and Control – Actions to be Taken in Case of Discharge.

1.03 SUBMITTALS

A. Informational Submittals:
   1. HASP: Submit in accordance with Part 1.04 of this Section.
   2. Qualifications Statements:
      a. HASP Preparer: Submit name and qualifications of certified industrial hygienist or safety professional, including summary of experience and copy of valid certifications.
      b. Safety Representative: Submit name and qualifications of safety representative, including summary of experience, training received, and copy of valid certifications applicable to the Project.
   3. Reports:
      a. Accident Reports: Submit in accordance with Part 1.05 of this Section.
      b. Daily Health and Safety Field Reports: Submit in accordance with Part 1.06 of this Section.
   4. Submit in accordance with Part 1.07 of this Section, the following valid training certificates:
      a. Initial 40-hour HAZWOPER training.
      b. Initial 24-hour HAZWOPER training.
      c. Eight-hour HAZWOPER supervisor training.
      d. Annual eight-hour HAZWOPER refresher training.

1.04 HASP SUBMITTAL

A. General:
   1. Each employer working at the Site shall develop and implement a written HASP for its employees involved in Hazardous Waste Site operations to include procedures that will be used to ensure the safe handling of Hazardous Waste and Non-Hazardous Waste during excavating, loading, and transporting activities and other activities described herein.
      a. If any subcontractor elects to prepare their own work specific HASP, the subcontractor's plan shall comply with the requirements of this Project Specifications and the Contractor shall review all such subcontractor plans to ensure the requirements of this specification are met. The Contractor shall submit all subcontractor HASP's to the Engineer prior to the start of the Work by the subcontractor.
   2. Comply with regulatory requirements listed in Part 1.02.B and other Laws and Regulations.
   3. HASP shall be kept at the Site, shall address safety and health hazards of each phase of operations at the Site, and shall include requirements and procedures for employee protection.

B. HASP Contents: HASP shall address and include the following:
   1. Organizational Structure:
      a. Specific chain of command and overall responsibilities of supervisors and employees. Include the following:
         1) Designation of general supervisor who has responsibility and authority to direct all Hazardous Waste operations.
         2) Name of Site safety representative who has responsibility and authority to implement and modify the HASP and verify compliance.
         3) Other personnel required for Hazardous Waste operations at the Site and emergency response, and general functions and responsibilities of each.
         4) Lines of authority, responsibility, and communication.
      b. Review and update organizational structure as necessary to reflect current status of Site operations and personnel.
   2. Site description, background, and scope of Work.
   3. Safety and health risk or hazard analysis, and planned hazard controls, for each task and operation required to complete the Project.
   4. Site control measures, including:
      a. Preventing trespassing.
      b. Preventing unqualified or unprotected workers from entering restricted areas.
      c. Preventing the "tracking" of contaminants outside of exclusion and contamination reduction zones..
      d. Maintaining a log of employees at the Site and visitors to the Site.
      e. Delineating exclusion, contamination reduction, and support zones.
      f. Locating personnel and equipment decontamination zones.
      g. Communicating routes of escape and gathering points.
   5. Training Program:
      a. Initial training requirements for Site workers and supervisors.
      b. Exceptions to initial training requirements.
      c. Site briefings for visitors and workers.
      d. Refresher training requirements.

e. Specific Schedule (dates) and outline of materials to be covered in initial and refresher training programs and safety meetings.
f. Certification of training for all Contractor and Subcontractor employees assigned to the Project.

6. Medical Surveillance Program:
   a. Provisions of the Site medical surveillance program.
   b. Communication protocols between the Site, physicians, and workers.
   c. Medical recordkeeping procedures.
   d. Certification of medical clearance for all Contractor and Subcontractor employees assigned to the Project.
7. Personal Protective Equipment (PPE):
   a. PPE selection criteria.
   b. Site- and task-specific PPE ensembles.
   c. Training in the use of PPE.
   d. Respiratory protection.
   e. Hearing conservation.
   f. PPE maintenance and storage.
8. Exposure Monitoring Program:
   a. Monitoring procedures to detect the presence of hazardous substances.
   b. Monitoring procedures to determine worker exposures to hazardous substances and physical hazards.
   c. Action levels and required responses for known and expected hazardous substances and physical hazards.
   d. Calibration and maintenance procedures for monitoring equipment.
9. Heat stress prevention program.
10. Spill containment program. Comply with Section 01 35 43.13 – Environmental Procedures for Hazardous Materials.
11. Decontamination Program:
    a. Location and type of temporary decontamination facilities.
    b. General and specific decontamination procedures for personnel and PPE.
    c. General and specific decontamination procedures for equipment and vehicles.
    d. Disposal of residual waste from decontamination.
    e. Decontamination equipment and materials.
    f. Monitoring procedures used to evaluate the effectiveness of decontamination.
12. Emergency Response Plan:
    a. Potential emergencies that may occur at the Site.
    b. Pre-emergency planning.
    c. On-site emergency response equipment, materials, and PPE.
    d. Emergency Maps: Evacuation routes, gathering points, and route to nearest hospital.
    e. Emergency roles and responsibilities.
    f. Emergency alerting and evacuation procedures for Site personnel.
    g. Evacuation drill procedures, in accordance with Section 01 35 23 – Safety Requirements.
    h. Procedures for notifying, and list of emergency contact information for:
       1) Emergency responders, including fire officials, ambulance service, poison control, police, and local hospitals.
       2) Authorities having jurisdiction.
       3) the Owner and Engineer.
       4) Contractor’s project manager, Site superintendent, safety representative, and foreman.
       5) Other entities, as required.
    i. Emergency response procedures.
    j. Emergency decontamination, medical treatment, and first-aid.
    k. Emergency response training.
13. Other standard operating procedures applicable to the Work.

C. Submittal Procedure:
   1. Submit HASP to Engineer the sooner of: seven days prior to pre-construction conference, or 30 days prior to Contractor's scheduled mobilization to the Site.
   2. Engineer's review and acceptance of HASP will be only to determine if the topics covered in HASP comply with the Contract Documents. Engineer's review and acceptance will not extend to safety measures, means, methods, techniques, procedures of construction, or whether representations made in the HASP comply with Laws and Regulations, or standards of good practice.
   3. Do not perform Work at the Site until written HASP has been accepted by Engineer.
   4. Notwithstanding other provisions of the Contract Documents, changes in the Contract Price or Project Schedule will not be authorized due to delay by Contractor in developing, submitting, or revising the HASP.

1.05 ACCIDENT REPORTING AND INVESTIGATION

A. Immediately notify the Engineer of all accidents that:
   1. Result in bodily injury, illness, or property damage.
   2. Affect the environment.
   3. Involve the public.

B. Submit accident report to Engineer within 24 hours after accident occurs. Include in each report the following:
   1. Date, time, and location of accident.
   2. Names of all Site personnel involved in or affected by accident.
   3. Description of accident and activities being performed when accident occurred.
   4. Medical treatment administered, if any.
   5. Nature and seriousness of injury or damage.

C. Comply with 29 CFR 1904.29, including using OSHA 300, 300-A, and 301 forms (or equivalent) to document all accidents that result in bodily injury.

D. Based upon results of accident investigation, modify HASP as required by changing tasks or procedures to prevent reoccurrence of accident.

E. Post current copy of Contractor's OSHA 300-A report at conspicuous place at the Site from February 1 through April 30 of each year.

1.06 DAILY HEALTH AND SAFETY FIELD REPORTS

A. Prepare daily health and safety field reports throughout the Project. Include in each report, at a minimum, the following:
   1. Contractor's name.
   2. the Owner's name.
   3. Project name.
   4. Site name and location.
   5. Date and day of the week.
   6. Weather conditions.
   7. Delays encountered in construction.
   8. Acknowledgment of deficiencies noted along with corrective actions taken on current and previous deficiencies.
   9. Daily health and safety exposure monitoring results, documentation of instrument calibration, new hazards encountered, and PPE utilized.

10. Problems, real or anticipated, encountered during the Work should be brought to the attention of Engineer.
11. Deviations from planned Work described in previously-submitted daily health and safety field report(s).

B. Submit daily health and safety field reports to Engineer by 9:00 a.m. the next working day after the day covered in the associated report. Daily reports shall be signed by the Contractor's safety representative.

1.07 RECORDS

A. Retain at the Site complete and accurate health and safety records for all Contractor and Subcontractor employees assigned to the Project. Records shall include, at a minimum, the following:
   1. Valid Training Certificates:
      a. Initial 40-hour HAZWOPER training.
      b. Initial 24-hour HAZWOPER training.
      c. Eight-hour HAZWOPER supervisor training.
      d. Annual eight-hour HAZWOPER refresher training.
      e. 10-hour construction safety training.
      f. First-aid/cardiopulmonary resuscitation training.
      g. Other training required by HASP.
   2. Valid medical clearance certificates.
   3. Valid respirator fit test certificates.
   4. Accident reports, prepared in accordance with Part 1.05 of this Section.
   5. Daily health and safety field reports, prepared in accordance with Part 1.06 of this Section.
   6. Other records required by Laws and Regulations.

B. Keep records up-to-date throughout the Project.

C. Contractor's safety representative shall meet at least monthly with Engineer to review Contractor's health and safety records and verify compliance with this Section.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 35 43.13

ENVIRONMENTAL PROCEDURES FOR HAZARDOUS MATERIALS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope:
   1. Develop, implement, and maintain a Hazardous Materials Management Program (HMMP) throughout the Project, in accordance with Laws and Regulations.
      a. Hazardous Materials brought to Site by Contractor: Transport, handle, store, label, use, and dispose of in accordance with this Section, and Laws and Regulations.
      b. Hazardous Material Generated by Contractor:
         1) Properly handle, store, label, transport, and dispose of Hazardous Material in accordance with Laws and Regulations, and this Section.
         2) Obtain the Owner's USEPA identification number listing the Owner's name and address of the Site as generator of the Hazardous Material in the event that Contractor generates Hazardous Material at the Site.
         3) Identify, characterize, profile, transport, and dispose of Hazardous Material generated by Contractor.
      c. Fines or civil penalties levied against the Owner or Engineer for violations committed at the Site by Contractor, and costs to the Owner or Engineer (if any) associated with cleanup of Hazardous Materials shall be paid by Contractor.

B. Enforcement of Laws and Regulations:
   1. Accidental spills and emissions, Site contamination, and injury of personnel at the Site must be avoided.
   2. When the Engineer is aware of suspected violations, the Engineer will notify Contractor, and authorities having jurisdiction if the Engineer reasonably concludes that doing so is required by Laws or Regulations.

1.02 DEFINITIONS

A. The following terms are defined for this Section:
   1. Hazardous Material: Material, whether solid, semi-solid, liquid, or gas, that, if not stored or used properly, may cause harm or injury to persons through inhalation, ingestion, absorption or injection, or that may negatively impact the environment through use or discharge of the material on the ground, in water (including groundwater), or to the air. Hazardous Material includes, but is not limited to, chemicals, Cadmium, Asbestos, Hazardous Waste, PCBs, Petroleum, Radioactive Material, and which is or becomes listed, regulated, or addressed pursuant to the following:
      a. Comprehensive Environmental Response, Compensation, and Liability Act, 42 United States Code (USC) §§9601 et seq. ("CERCLA").
      b. Hazardous Materials Transportation Act, 49 USC §§1801 et seq.
      c. Resource Conservation and Recovery Act, 42 USC §§6901 et seq. ("RCRA").
      d. Toxic Substances Control Act, 15 USC §§2601 et seq.
      e. Clean Water Act, 33 USC §§1251 et seq.
      f. Clean Air Act, 42 USC §§7401 et seq.
      g. Any other Law or Regulation relating to or imposing liability or standards of conduct concerning any hazardous, toxic, or dangerous waste, substance, or material.

1.03 QUALITY ASSURANCE

A. Regulatory Requirements:
   1. Laws and Regulations applying to the Work under this Section include, but are not limited to, the following:
      a. 29 CFR 1910, Occupational Safety and Health Standards.
      b. 29 CFR 1926, Safety and Health Regulations for Construction.
      c. 40 CFR 261.3, 264, and 265, Resource Conservation and Recovery Act (RCRA).
      d. 49 CFR 171.8, Transportation, Definitions and Abbreviations.
      e. 6 NYCRR 364, Waste Transporter Permits.
      f. 6 NYCRR 371, Identification and Listing of Hazardous Wastes.
      g. 6 NYCRR 372, Hazardous Waste Manifest System and Related Standards for Generators, Transporters, and Facilities.
      h. 6 NYCRR 375, Environmental Remediation Programs.
      i. 17 NYCRR 32, Oil Spill Prevention and Control – Actions to be Taken in Case of Discharge.

1.04 SUBMITTALS

A. Informational Submittals:
   1. Hazardous Materials (including Chemicals) proposed for use at the Site: Submit current (dated within the past two years) safety data sheets (SDSs) in accordance with 29 CFR 1910.1200 (OSHA Hazard Communication Standard), manufacturer, Supplier (if different than manufacturer), container size(s) and number of containers proposed to be at the Site, minimum and maximum volume of material intended to be stored at the Site, and description of process or procedures in which Hazardous Material will be used. Furnish information in sufficient time to obtain the Engineer's acceptance no later than at least three days before bringing Hazardous Material to the Site.
   2. Hazardous Material Generated at the Site: Submit for each Hazardous Material generated at the Site an identification number, analysis results, and number and size of storage containers at the Site. Furnish information not less than three days after Contractor's receipt of analytical results.
   3. Permits: Submit copies of permits for storing, handling, using, transporting, and disposing of Hazardous Materials, obtained from authorities having jurisdiction.
   4. Other Documents required for the HMMP: Submit requested documents within three days of Contractor's receipt of request. HMMP documents includes Hazardous Materials Communications Plan (described in Part 1.05 B), Emergency/Spill Response Plan (described in Part 1.05 C), and other documents.
   5. Release Response and Notification Form. Submit in accordance with Part 1.06.
   6. Spill and Discharge Cleanup Report. Submit in accordance with Part 1.06.

1.05 HAZARDOUS MATERIALS MANAGEMENT

A. Obtain the Engineer's acceptance before bringing each Hazardous Material to the Site.

B. Hazardous Materials Communication Plan: Develop and submit a Hazardous Materials Communication Plan. At a minimum, maintain hard copy records containing the following:
   1. Inventory of Hazardous Materials, including all chemicals.
   2. Current (dated within the past two years) SDSs for all materials being used to accomplish the Work, whether or not defined as Hazardous Material in this Section. Keep one notebook in Contractor's field office at the Site; keep second notebook at location acceptable to the Engineer. Keep notebooks up-to-date as materials are brought to and removed from the Site.

C. Emergency/Spill Response Plan: Develop, implement, and maintain an Emergency/Spill Response Plan. Response plan shall include, at a minimum, the following:
   1. Spill and discharge control procedures, responses, and contingency actions to be taken to prevent accidental introduction of hazardous products, materials, and impacted soils/sediments and liquids into any waterway, the air, or the ground.
   2. Description of equipment and materials available at the Site to contain a spill of, or respond to an emergency related to, the material.
   3. Procedures for notifying, and list of emergency contact information for:
      a. Authorities having jurisdiction.
      b. Emergency Responders.
      c. Contractor's Project Manager, Site Superintendent, Safety Representative, And Foreman.
      d. the Owner and Engineer.
      e. Other entities as required.
   4. Response coordination procedures between Contractor, Engineer, and others as appropriate.
   5. Site plan showing proposed location of materials storage area, location of spill containment/response equipment and materials, and location of Stormwater drainage inlets and drainage routes.
   6. Description of material handling and spill response training provided to Contractor's and Subcontractors' employees, in accordance with 29 CFR 1926.21(b) and other Laws and Regulations.
   7. A description of where the plan will be kept so it is easily accessible at all times and visible to all project personnel.

D. Storage of Hazardous Materials and Non-Hazardous Materials:
   1. Hazardous Materials containers shall bear applicable hazard diamond(s).
   2. Container Labeling:
      a. Properly label each container of consumable materials, whether or not classified as Hazardous Materials under this Section.
      b. Stencil Contractor's name and, as applicable, subcontractor's name, on each vessel containing Hazardous Material and, for non-Hazardous Materials, on each container over five-gallon capacity. Containers shall bear securely attached label clearly identifying contents. Label containers that are filled from larger containers.
      c. If Engineer becomes aware of unlabeled containers at the Site, Engineer will notify Contractor. Properly label container(s) within one hour of receipt of notification or remove container from the Site.
   3. To greatest extent possible, store Hazardous Materials off-site until required for use in the Work.

E. Hazardous Materials Storage Area:
   1. Maintain designated storage area for Hazardous Materials that includes secondary containment. Storage area shall include barriers to prevent vehicles from colliding with storage containers and shall include protection from environmental factors such as weather.
   2. Provide signage in accordance with Laws and Regulations, clearly identifying the Hazardous Materials storage area.

F. Contractor's safety representative shall meet at least monthly with Engineer to review Contractor's HMMP documents and procedures, and inspect storage areas and the Site in general, to verify compliance with this Section.

1.06 SPILL/RELEASE RESPONSE

A. In the event of a spill or release, the Contractor shall immediately notify the Engineer. The Contractor shall also be responsible for contacting and procuring a licensed cleanup contractor (as necessary) and coordinating with the Engineer for release notification requirements in accordance with the approved Emergency/Spill Response Plan and local, state, and federal requirements and regulations.

B. In the event that a release to surface water occurs, the Contractor must coordinate with the Engineer to provide applicable notifications to the National Response Center, USCG, NYSDEC, and all other appropriate agencies. The Contractor shall assist the Engineer in preparing a Release Response and Notification Form in accordance with the applicable procedures. Applicable documentation shall be provided to the Engineer for review prior to submittal to the agencies.

C. Within 48 hours of the completion of spill or discharge cleanup, the Contractor shall document the cleanup in a Spill and Discharge Cleanup Report. This report shall include the following, at a minimum:
   1. Identification of the source of the spill.
   2. Nature and amount of material spilled.
   3. Estimated or actual date and time of the spill occurrence.
   4. Names of regulatory agencies contacted, including the date and time of such notifications.
   5. Spill reference numbers assigned by regulatory agencies.
   6. A description of the spill location.
   7. The date and time cleanup was completed or terminated (or, if cleanup was delayed by emergency or adverse weather, the nature and duration of the delay).
   8. Sampling data taken prior to the cleanup and a description of the sampling methodology used to establish the spill boundaries.
   9. Sampling data taken subsequent to the cleanup to confirm the removal of the spilled material.
   10. If release was to a solid surface, a description of the solid surface cleaned, and the wash and rinse method used.
   11. If release was to surface water, approximate extent or transport and impact (including size of sheen, if generated).
   12. A certification statement signed by the Contractor stating that cleanup requirements have been met and the information contained in the record is true to the best of their knowledge.
   13. A description of corrective actions taken to prevent future releases.
   14. Copies of the documents and certifications submitted to the Engineer for review and acceptance.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 OIL AND FUEL SPILL PREVENTION

A. Contractor shall take all necessary measures to prevent and control any leaks, spills, or release of oil or fuel.

B. Contractor shall maintain emergency response kits at the Project Site in the event of an emergency or spill. The kits shall be permanent and easily accessible to Project Site workers at all times and shall include a sufficient provision of floating phase capture device containment, sorbent materials, and related equipment (e.g., personal protective equipment,

shovels, and hose bandages) to mitigate any situation, as well as clearly identified tight receptacles designed to receive spilled residues and other hazardous residual materials. Secondary emergency kits shall also be maintained at key locations on the Project Site (e.g., shoreline). Each piece of equipment and machine shall also contain a sufficient quantity of sorbent materials to be able to intervene rapidly in the event of a spill or release.

C. Fuel dispensers shall comply with all federal, state, and local requirements and, at a minimum, have adequate containment. Containment areas shall be cleaned by an approved method immediately after every dispensing of fuel, and wastes shall be disposed of off-site in an approved location. The Contractor shall select and implement controls and procedures to prevent and minimize leaking or spilling of fuels during fueling of vehicles or equipment.

D. Contractor shall perform all fueling activities under constant surveillance.

E. Should any spilling of fuel occur, Contractor shall immediately contain the spill to practical extent and immediately notify the Engineer to assure proper notifications and response to contain and recover the contaminated materials for disposal.

F. If, during the course of remedy implementation, equipment failure occurs resulting in the discharge of fuel, oil, or other contaminants, the Contractor shall have equipment available to control the discharge and is solely responsible for management and cleanup of any spill.

G. Contractor shall prevent oil or other hazardous substances from entering the ground, drainage, or local waterbodies. Contractor shall provide containment, diversionary structures, or equipment to prevent discharged oil from reaching a watercourse. Immediate action must be taken to contain and clean up any spill of oily substances, petroleum products, or hazardous substances. Contractor shall immediately report such spills to the Engineer and provide one or more of the following preventive systems at each oil storage site (the provision of such preventive systems shall be approved by the Engineer prior to tank installation and use):
    1. Dikes, berms, retaining walls, culverts, curbs, gutters, or other similar structures shall be capable of containing the contents of the largest single tank.
    2. Spill diversion ponds shall be capable of containing the contents of the largest single tank.
    3. Absorbent materials shall be capable of absorbing the contents of the largest single tank.

H. If Contractor elects to install oil or fuel storage tanks, the details shall be provided as a component of Contractor's Hazardous Materials Communication Plan. If Contractor's fuel storage triggers the requirements for an SPCC, the Contractor shall prepare, submit for review, and implement an appropriate SPCC Plan.

I. Oil or fuel storage tank installation. Storage tank installation shall be constructed so that a secondary means of containment is provided for the entire contents of the tanks installed. Dikes and other structures shall be positioned or located so as to provide a secondary containment identical to that required for non-mobile storage tanks. Storage tanks shall be located where they will not be subject to flooding or washout. When it is determined the installation of containment structures or equipment to prevent discharged oil from reaching a watercourse is not practicable, a clear demonstration of such impracticability shall be submitted to the Engineer for approval, prior to installation or use of the storage tank. The following shall also be provided to the Engineer for approval prior to installation use of the storage tank:
    1. An Oil Spill Contingency Plan, either contained within or separate from the Contractor's Emergency/Spill Response Plan.
    2. A written certification of commitment of manpower, equipment, and materials required to expeditiously control and remove the discharge oil.

J. Liabilities. Contractor shall be liable for the damage resulting from oil or fuel spills caused by the Contractor or its subcontractors. The penalty for failure to report the discharge of oil or fuel shall be in accordance with federal, state, and local laws.

END OF SECTION

SECTION 01 41 26

STORMWATER POLLUTION PREVENTION PLAN AND PERMIT

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope:
   1. Contractor shall comply with the Project's Stormwater Pollution Prevention Plan (SWPPP) and the substantive requirements of the most current version of NYSDEC's SPDES General Permit for Stormwater Discharges from Construction Activity (hereinafter, the "SPDES General Permit"). Providing necessary materials and taking appropriate measures to comply with requirements of the SPDES General Permit and minimize pollutants in Stormwater run-off from the Site.
   2. The following documents are part of the Work included under this Section:
      a. SWPPP: Prepared by Engineer, on behalf of the Owner, and filed with NYSDEC. The SWPPP is included in the 100% Remedial Design Report and is part of the Contract Documents.
      b. SWPPP Revisions: Prepared by Contractor, on behalf of the Owner, in accordance with Part 1.04 of this Section. SWPPP Revisions, if any, will become part of the Contract Documents.
      c. Stormwater Permit Certification Statement: To be submitted by Contractor to Engineer on the form included with this Section. Do not perform Work at the Site until the Stormwater permit certification statement has been submitted to Engineer.
      d. Stormwater Inspection Reports: Prepared by Contractor's qualified inspector and submitted to Engineer in accordance with Part 1.05 of this Section. A Stormwater inspection report shall be prepared for each Site inspection and assessment required by the SPDES General Permit and this Section.
   3. Prevent discharge of sediment to and erosion from the Site to surface waters, drainage routes, public streets and rights-of-way, and private property, including during dewatering operations. Prevent trash and construction and demolition debris from leaving the Site via Stormwater run-off. Providing berms, dikes, and other acceptable methods of directing Stormwater around work areas to drainage routes.
   4. Do not cause or contribute to a violation of water quality standards, Laws, or Regulations. Provide and implement measures to control pollutants in Stormwater run-off from the Site to prevent:
      a. Turbidity increases that will cause a substantial visible contrast to natural conditions.
      b. Increase in suspended, colloidal, and settleable solids that would cause sediment deposition, or impair receiving water quality and use.
      c. Presence of residue from oil and floating substances, visible oil, and globules of grease.
   5. Contractor shall pay civil penalties and other costs incurred by the Owner or Engineer, including additional engineering, construction management, and inspection services, associated with Contractor's non-compliance with the SPDES General Permit and erosion and sediment controls associated with the Work.
   6. Contract Price includes all material, labor, and other permits and incidental costs related to:
      a. Installing and maintaining structural and non-structural items used in complying with the SWPPP and its revisions, if any.
      b. Clean-up, disposal, and repairs following wet weather events or spills caused by Contractor.
      c. Implementing and maintaining "best management practices," as defined in applicable permits and Laws or Regulations, to comply with requirements that govern Stormwater discharges at the Site.

d. Inspecting erosion, sediment, and Stormwater controls as specified.
7. Coordinating requirements of this Section with requirements for earthwork, erosion control, and landscaping in the Contract Documents, applicable permit requirements, and Laws and Regulations.
8. Implementing SWPPP controls and practices prior to starting other Work at the Site.

1.02 QUALITY ASSURANCE

A. Qualifications:
1. Qualified Inspector:
a. Contractor's qualified inspector shall be knowledgeable in the principles and practices of erosion and sediment control and shall be responsible for performing Site inspections and assessments, and preparing and certifying Stormwater inspection reports, in accordance with this Section.
b. Contractor's qualified inspector shall be one of the following:
1) Professional engineer licensed and registered in the State of New York.
2) Landscape architect licensed and registered in the State of New York.
3) Certified Professional in Erosion and Sediment Control.
4) NYSDEC-endorsed individual.
5) An individual working under the direct supervision of, and employed by, a professional engineer or landscape architect licensed and registered in New York State, provided that said individual has received four hours of NYSDEC-endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other NYSDEC-endorsed entity. Following the initial training, the individual shall have completed four hours of training every three years.

B. Regulatory Requirements:
1. Comply with Laws and Regulations related to environmental protection and restoration, including:
a. NYSDEC's current SPDES General Permit for Stormwater Discharges from Construction Activity (SPDES General Permit) available online at: https://www.dec.ny.gov/docs/water_pdf/constrgp020001.pdf.
b. New York State Standards and Specifications for Erosion and Sediment Control.

1.03 SUBMITTALS

A. Informational Submittals:
1. Erosion and Sedimentation Control Plan. The Contractor shall prepare and submit a specific Erosion and Sedimentation Control Plan to address floodplain removal activities and other upland soil disturbance activities. The Erosion and Sedimentation Control Plan shall include material specifications and installation details for all erosion and sediment control measures, an implementation schedule, inspection and maintenance requirements, and product data and material specifications for all proposed erosion and sedimentation control materials. This Erosion and Sedimentation Control Plan may be included in the Contractor's SWPPP Revisions or submitted separately.
2. Stormwater Permit Certification Statement: Submit in accordance with this Section.
3. SWPPP Revisions. Submit in accordance with Part 1.04 of this Section.
4. Qualifications Statements: Submit name and qualifications of qualified inspector, including summary of experience, training received, and copy of valid certifications applicable to the Project.
5. Stormwater Inspection Reports: Submit in accordance with Part 1.05 of this Section.

1.04 SWPPP REVISIONS

A. Contractor shall prepare a SWPPP Revision in accordance with the SPDES General Permit:
   1. When there is a significant change in design, construction, operation, or maintenance of the Project that has or could have an effect on the discharge of pollutants from the Site.
   2. When the provisions of the SWPPP prove to be ineffective in minimizing pollutants in Stormwater discharges from the Site.
   3. To address issues or deficiencies identified during an inspection by Contractor's qualified inspector, NYSDEC, or other regulatory authority having jurisdiction.

1.05 STORMWATER INSPECTION REPORTS

A. Prepare a Stormwater inspection report for each Site inspection and assessment required by the SPDES General Permit and this Section. Each report shall be prepared using the form included with this Section.

B. Include in each Stormwater inspection report, at a minimum, the following:
   1. Date and time of inspection.
   2. Name, title, and affiliation of Contractor's qualified inspector.
   3. Weather and soil conditions (e.g., dry, wet, saturated, etc.) at the time of the inspection.
   4. Description of and site plan showing areas that are disturbed at the time of the inspection and any areas that have been stabilized (either temporary or final) since the previous inspection.
   5. A description of the condition of all natural surface waterbodies located within, or immediately adjacent to, the property boundaries of the construction site which receive runoff from disturbed areas. This shall include identification of any discharges of sediment to the surface waterbody.
   6. Repairs, maintenance, or corrective actions implemented since the previous inspection. Include digital photographs, with date stamp, that clearly show the areas or items installed, repaired, or replaced.
   7. Condition of Stormwater run-off at all points of discharge from the Site.
   8. Identification of any erosion, sediment, and Stormwater controls that require repair or maintenance.
   9. Identification of any erosion, sediment, and Stormwater controls that were not installed properly or are not functioning as designed.
   10. Repairs, maintenance, or corrective actions required to correct any deficiencies observed during the inspection. Include digital photographs, with date stamp, that clearly show the deficient areas or items.

C. Submit Stormwater inspection reports to Engineer within three days after each inspection. Inspection reports shall be signed by Contractor's qualified inspector.

D. Retain copies of Stormwater inspection reports at the Site. Keep with the SWPPP and any SWPPP revisions.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 INSPECTIONS AND REPAIRS

A. Perform Site inspections and assessments as required by the SPDES General Permit and this Section to ensure the continued effectiveness and integrity of all SWPPP controls and practices, including erosion and sediment controls. Inspections and assessments shall be done by Contractor's qualified inspector, together with Engineer.

B. Inspections:
   1. Site inspections shall be performed:
      a. After installation of SWPPP controls, including erosion and sediment controls, and temporary field offices and other temporary facilities, prior to starting other Work at the Site.
      b. Every seven days during the Work, and within 24 hours after wet weather events (0.5 inches or greater of rainfall), until all disturbed areas have achieved final stabilization in accordance with the SPDES General Permit and the SWPPP. For temporary Work stoppages and seasonal shut-downs greater than two weeks in duration, inspection frequency may be reduced to once every 30 days if temporary stabilization measures have been applied to all disturbed surfaces, and if approved by Engineer and Agencies.
   2. During each inspection, verify sediment control practices and record approximate degree of sediment accumulation as percentage of acceptable sediment storage volume. Inspect erosion and sediment control practices and record repairs and maintenance performed, if any. Observe and record deficiencies relative to implementation of the SWPPP.
   3. Prepare Stormwater inspection report for each inspection in accordance with Part 1.05 of this Section.

C. Notify Engineer within one day after each inspection of any deficiencies observed, and any repairs, maintenance, or corrective actions required to correct such deficiencies.

D. Complete repairs or maintenance to SWPPP controls in accordance with applicable requirements and to satisfaction of Engineer within two days after each inspection. If site conditions prevent repairs or maintenance from being completed, document such conditions in the subsequent Stormwater inspection report and complete repairs or maintenance as soon as site conditions permit.

E. Cooperate with representatives of authorities having jurisdiction during periodic visits to Site, and promptly provide information requested by authorities having jurisdiction.

3.02 ATTACHMENTS

A. The attachments listed below, which follow the "End of Section" designation, are part of this Section:
   1. Attachment A: Stormwater permit certification statement form (one page).
   2. Attachment B: Stormwater inspection report form (three pages).

END OF SECTION

GTE OPERATIONS SUPPORT INCORPORATED
FORMER PHILIPS DISPLAY COMPONENTS FACILITY
SENECA FALLS, NEW YORK

STORMWATER PERMIT CERTIFICATION STATEMENT

Each Contractor and Subcontractor identified in the Stormwater Pollution Prevention Plan (SWPPP) shall certify that they understand the permit conditions and their responsibilities. Every Contractor and Subcontractor performing an activity that involves soil disturbance shall sign and submit this certification statement to Engineer prior to performing the Work. This certification statement shall be signed by an owner, principal, president, secretary, or treasurer of the firm.

I hereby certify that I understand and agree to comply with the terms and conditions of the SWPPP and agree to implement any corrective actions identified by the qualified inspector during a site inspection. I also understand that the Owner must comply with the terms and conditions of the most current version of NYSDEC's SPDES General Permit for Stormwater Discharges from Construction Activity (SPDES General Permit), and that it is unlawful for any person to cause or contribute to a violation of water quality standards. Furthermore, I understand that certifying false, incorrect, or inaccurate information is a violation of the referenced permit and the laws of the State of New York, and could subject me to criminal, civil, and/or administrative proceedings.

Firm: _____

Address: _____

_____

Name (Print): _____ Title: _____

Signature: _____ Date: _____

END OF STORMWATER PERMIT CERTIFICATION STATEMENT

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GTE OPERATIONS SUPPORT INCORPORATED
FORMER PHILIPS DISPLAY COMPONENTS FACILITY
SENECA FALLS, NEW YORK

STORMWATER INSPECTION REPORT

Date and Time of Inspection: _____

Qualified Inspector (Name, Title, and Affiliation): _____

Weather Conditions: _____

Soil Conditions: _____

Describe disturbed areas at time of inspection: _____

_____

_____

_____

_____

Describe areas stabilized (temporary or final) since previous inspection: _____

_____

_____

_____

_____

ATTACH SITE PLAN SHOWING APPROXIMATE LIMITS OF DISTURBED AND NEWLY-STABILIZED AREAS

Describe repairs, maintenance, or corrective actions implemented since previous inspection: _____

_____

_____

_____

_____

ATTACH PHOTOGRAPHS OF AREAS OR ITEMS INSTALLED, REPAIRED, OR REPLACED

Maintaining Water Quality

Yes	No	NA	
☐	☐	☐	Is there an increase in turbidity causing a substantial visible contrast to natural conditions?
☐	☐	☐	Is there residue from oil and floating substances, visible oil film, or globules or grease?
☐	☐	☐	All disturbance is within the limits of the approved plans?
☐	☐	☐	Have receiving lake/bay, stream, and/or wetland been impacted by silt from project?

Housekeeping

Yes	No	NA	
1. General Site Conditions:			
☐	☐	☐	Is construction site litter and debris appropriately managed?
☐	☐	☐	Are facilities and equipment necessary for implementation of erosion and sediment control in working order and/or properly maintained?
☐	☐	☐	Is construction impacting the adjacent property?
☐	☐	☐	Is dust adequately controlled?

Run-Off Control Practices

Yes	No	NA	
1. Excavation Dewatering:			
☐	☐	☐	Upstream and downstream controls are installed per plan?
☐	☐	☐	Clean water from upstream is being pumped around excavation?
☐	☐	☐	Sumps installed within excavation and operated/maintained per plan?
☐	☐	☐	Sediment laden water from work area is being discharged to treatment system?
2. Rock Outlet Protection:			
☐	☐	☐	Installed per plan?
☐	☐	☐	Installed concurrently with pipe installation?

Soil Stabilization

Yes	No	NA	
1. Topsoil and Spoil Stockpiles:			
☐	☐	☐	Stockpiles are stabilized with vegetation and/or mulch?
☐	☐	☐	Sediment control is installed at the toe of the slope?
2. Revegetation:			
☐	☐	☐	Temporary seed and mulch have been applied to idle areas?
☐	☐	☐	Six inches minimum of topsoil has been applied under permanent seeding?

Sediment Control Practices

Yes	No	NA	
1. Stabilized Construction Entrance:			
☐	☐	☐	Stone is clean enough to effectively remove mud from vehicles?
☐	☐	☐	Installed per standards and specifications?
☐	☐	☐	Does all traffic use the stabilized entrance to enter and leave construction site?
☐	☐	☐	Is adequate drainage provided to prevent ponding at entrance?
2. Silt Fence:			
Sediment accumulation is ___% of design capacity.			
☐	☐	☐	Installed on contour, 10 feet from toe of slope (not across conveyance channels)?
☐	☐	☐	Joints constructed by wrapping the two ends together for continuous support?
☐	☐	☐	Fabric buried 6 inches minimum below grade?
☐	☐	☐	Posts are stable, fabric is tight and without rips or frayed areas?

Describe any repairs, maintenance, or corrective actions required to correct observed deficiencies: _____

ATTACH PHOTOGRAPHS OF DEFICIENT AREAS OR ITEMS OBSERVED DURING THE INSPECTION

Qualified Inspector's Certification:

I certify under penalty of Law that this document and all attachments were prepared under my direction or supervision in accordance with a system to ensure that qualified personnel property gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that false statements made herein may be punishable by Law.

Signature: _____ Date: _____

END OF STORMWATER INSPECTION REPORT

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SECTION 01 51 05

TEMPORARY UTILITIES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope:
   1. Provide all temporary utilities required for the Project:
      a. Make all arrangements with utility service companies for temporary services and obtain required permits and approvals for temporary utilities.
      b. Pay all utility service costs, including cost of electricity, water, fuel, and other utility services required for the Work.
      c. Continuously maintain adequate utilities for all purposes during the Project, until removal of temporary utilities and temporary facilities. At a minimum, providing and maintaining temporary utilities through Substantial Completion and removal of temporary field offices and sheds.
      d. Maintain and clear temporary utilities and continuously provide consumables as required.
      e. Temporary utilities shall be adequate for personnel using the Site and requirements of the Project.
      f. Provide temporary utilities in compliance with Laws and Regulations and, when applicable, requirements of utility owners.

B. Provide the following temporary utilities as needed to perform the Work:
   1. Electricity.
   2. Lighting.
   3. Telephone and communications.
   4. Heating, ventilating, and temporary enclosures.
   5. Water.
   6. Fire protection.

1.02 REFERENCES

A. The following standards are referenced in this Section:
   1. ANSI C2, National Electrical Safety Code.
   2. NFPA 10, Standard for Portable Fire Extinguishers.
   3. NFPA 241, Standard for Safeguarding Construction, Alteration, and Demolition Operations.
   4. NFPA 70, National Electrical Code.

1.03 REQUIREMENTS FOR TEMPORARY UTILITIES

A. Electrical:
   1. Provide temporary electrical service required for the Work, including continuous power for temporary field offices and sheds.
   2. Comply with applicable local electrical safety standards, National Electrical Safety Code (ANSI C2), and the National Electrical Code (NFPA 70).
   3. All temporary electrical power must have a ground-fault circuit interrupter as part of its circuit. All equipment must be suitable and approved for the class of hazard present.

B. Lighting:
   1. Minimum lighting shall be 5-foot candles for open areas and 10-foot candles for stairs and shops. Provide minimum of one, 300-watt lamp every 15 feet in indoor Work areas.

C. Telephone and Communications:
   1. Provide temporary telephone and communications required for Contractor's operations at the Site and for summoning emergency medical assistance.

D. Heating, Ventilating, and Enclosures:
   1. Provide sufficient temporary heating, ventilating, and enclosures to ensure safe working conditions and prevent damage to existing facilities and the Work.
   2. Except where otherwise specified, temporary heating shall maintain temperature of the area served between 50 degrees F and maximum design temperature of building or facility and its contents.
   3. Maintain temperature of areas occupied by Engineer's personnel or electronic equipment, including offices and rooms containing computers between 65 degrees F and 80 degrees F with relative humidity less than 75 percent.
   4. Required temperature range for storage areas and certain elements of the Work, including preparation of materials and surfaces, installation or application, and curing as applicable, shall be in accordance with the Contract Documents for the associated Work and the Supplier's recommended temperature range for storage, application, or installation, as appropriate.
   5. Provide temporary ventilation sufficient to prevent accumulation in construction areas and areas occupied by Engineer of hazardous and nuisance levels or concentrations of dust and particulates, mist, fumes or vapors, odors, and gases associated with construction.
   6. Provide temporary enclosures and partitions required to maintain required temperature and humidity.

E. Water:
   1. Provide temporary water facilities including piping, valves, meters (if not provided by owner of existing waterline), backflow preventers, pressure regulators, and other appurtenances. Provide freeze-protection as required.
   2. Provide water for temporary sanitary facilities, field offices, Site maintenance and cleaning and, when applicable, disinfecting and testing of systems.
   3. Continuously maintain adequate water flow and pressure for all purposes during the Project, until removal of temporary water system.

F. Fire Protection:
   1. Provide temporary fire protection, including portable fire extinguishers rated not less than 2A or 5B in accordance with NFPA 10, Portable Fire Extinguishers.

PART 2 - PRODUCTS

2.01 MATERIALS AND EQUIPMENT

A. Materials and equipment for temporary systems may be new or used, but shall be adequate for purposes intended and shall not create unsafe conditions, and shall comply with Laws and Regulations.

B. Provide required materials, equipment, and facilities, including piping, wiring, and controls.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install temporary utilities in neat, orderly, manner, and make structurally, mechanically, and electrically sound throughout.

B. Location of Temporary Utilities:
   1. Locate temporary systems for proper function and service.
   2. Do not allow temporary systems to interfere with or provide hazards or nuisances to the Work under this and other contracts, movement of personnel, traffic areas, materials handling, hoisting systems, storage areas, finishes, and work of utility companies.
   3. Do not install temporary utilities on the ground, with the exception of temporary extension cords, hoses, and similar systems in place for short durations.

C. Modify and extend temporary systems as required by progress of the Work.

3.02 USE

A. Maintain temporary systems to provide safe, continuous service as required.

B. Properly supervise operation of temporary systems:
   1. Enforce compliance with Laws and Regulations.
   2. Enforce safe practices.
   3. Prevent abuse of services.
   4. Prevent nuisances and hazards caused by temporary systems and their use.
   5. Prevent damage to finishes.
   6. Ensure that temporary systems and equipment do not interrupt continuous progress of construction.

C. At end of each work day, check temporary systems and verify that sufficient consumables are available to maintain operation until work is resumed at the Site. Provide additional consumables if the supply on hand is insufficient.

3.03 REMOVAL

A. Completely remove temporary utilities, facilities, equipment, and materials when no longer required. Repair damage caused by temporary systems and their removal, and restore the Site to condition required by the Contract Documents. If restoration of damaged areas is not specified, restore to pre-construction condition.

B. Where temporary utilities are disconnected from existing utility, provide suitable, water-tight or gas-tight (as applicable) cap or blind flange, as applicable, on service line, in accordance with requirements of utility owner.

END OF SECTION

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SECTION 01 52 13

FIELD OFFICE AND SHEDS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope:
   1. Provide and maintain field offices with at least the minimum facilities specified for Project use.
   2. Provide required temporary storage and work sheds.
   3. Provide complete and fully functional field offices within 14 days after date on which the Project Schedule commence running.
   4. Obtain and pay for required permits and utilities. Field offices and sheds shall comply with Laws and Regulations.
   5. Provide and maintain, in accordance with all applicable codes and regulations, the fire protection system (e.g., fire extinguishers, sprinklers, etc.) and electric, heating, and cooling services for the office trailer(s).

B. Coordination:
   1. Coordinate with the Engineer, Property Owner, and others using the Site the location of field offices and sheds, including contracts indicated in Section 01 11 00, Summary of Work.

C. Location:
   1. Locate field offices and sheds in accordance with the Contract Documents and in accordance with the Site mobilization discussions at the preconstruction conference.

D. Furnish in Contractor's field office one complete set of the Contract Documents for ready reference by interested persons. In addition to the reference set, comply with Section 01 78 39, Project Record Documents.

1.02 SUBMITTALS

A. Action Submittals:
   1. Field Office Submittal: Submit, as a single submittal, the following:
      a. Site plan indicating proposed location of field offices, parking for field offices, facilities related to the field offices, and material of both field office's parking and sidewalk or walkway to field offices.
      b. Information on proposed field office size, construction, exterior appearance, interior finishes, and field office security measures.
      c. Proposed layout of field office interior, showing location of offices, common areas, restroom, closet, other areas specified (if any), with dimensions indicated for each.
      d. Proposed type of Internet service; name of proposed Internet service provider; and product data and technical information on equipment (if any) required for Internet service.
      e. Office Equipment: Product data and technical information for copier, fax (if any), telephones, and other office equipment.

PART 2 - PRODUCTS

2.01 FIELD OFFICES– FURNISHINGS AND EQUIPMENT

A. Field Offices:
   1. Provide one office trailer. Field office trailer shall:
      a. Consist of a weather-tight, insulated Mobile Office manufactured by ModSpace (or equivalent) and provide a minimum of 440 square feet of floor space (with a 10-foot minimum width) and shall be partitioned to provide three separate spaces (one office for the Owner/Engineer use, one office for Contractor's use, and a shared common area between offices. A minimum of two outside doors will be required.
      b. Be equipped with windows with insect screen and operable sash. Provide each window with lock and exterior security bars approved by the Engineer.
      c. Be equipped with two doors for ingress and egress, each with landing, stairs, and railing conforming to building codes at the site.
         1) Landing and stairs shall be metal, pressure-treated wood, fiberglass, or concrete, and have slip-resistant walking surfaces.
         2) Railing shall be metal, wood, or fiberglass.
         3) Doors shall be secure and lockable, and each furnished with suitable, lockable security bar by MasterLock or equal.
   2. Furnish to Engineer two identical sets each of keys suitable for operating all keyed locks, including ingress/egress door locks, security bars for doors, window locks, closets, and office furnishings for their respective field offices.
   3. A sign reading "All Site Visitors Must Sign-In Here" shall be affixed to the trailer exterior near entrance to shared space.

B. Utilities and Services:
   1. Comply with Section 01 51 00 – Temporary Utilities.
   2. Provide the following for each field office:
      a. Electrical System and Lighting:
         1) Electric service as required, including paying all costs. Provide electrical submeter if electrical service is obtained from the Property Owner's system.
         2) Interior lighting of 50-foot candles at desktop height.
         3) Minimum of eight 120-volt, wall-mounted, duplex convenience electrical receptacles.
         4) Exterior, wall-mounted, 250-watt lighting at each entrance.
      b. Heating, Ventilating, and Air Conditioning:
         1) Automatic heating to maintain indoor temperature of at least 65 degrees F in cold weather.
         2) Automatic cooling to maintain indoor temperature no warmer than 75 degrees F in warm weather.
         3) Furnish all fuel and pay all utility costs.
      c. Internet Service:
         1) Obtain and pay for Internet service, with unlimited (untimed) Internet access, until removal of field office trailer.
         2) Provide fiber-optic or cable connection with appropriate modem and appurtenances, and dual-band Wireless-N router.
         3) Minimum Speed: Up to 15 megabits per second download, up to 1 megabit per second upload.
         4) Set up system and appurtenances required and verify functionality in each field office space.
   3. Should actions of utility companies delay the complete set up of field offices, Contractor shall provide temporary electricity, heat, telephone, and internet service as required at no additional cost to the Owner or Engineer.

C. Furnishings and Equipment:
   1. Provide the following furnishings and equipment for each field office:
      a. Tables:
         1) Two new or used (in good condition) portable folding tables, each 8 feet long by 2.5 feet wide.
         2) Two new or used (in good condition) portable folding tables, each 6 feet long by 2.5 feet wide.
      b. Folding Chairs: Ten metal folding chairs without arm rests.
      c. Plan rack(s) to hold a minimum of eight sets of the Design Drawings.
      d. Four polyethylene waste baskets, each with minimum capacity of seven gallons.
      e. Suitable doormat at each exterior ingress/egress door.
      f. One tack board, approximately 3 feet long by 2.5 feet wide, with thumbtacks.
      g. One white board for use with dry markers, approximately 6 feet long by 4 feet wide, with marker holding tray, installed by Contractor at location selected by Engineer in the field. Furnish supply of colored markers and eraser for the white board.
      h. Fire extinguisher with associated signage, and smoke detector, in accordance with Laws and Regulations. At a minimum, provide two wall-mounted fire extinguishers and one battery-operated, ceiling-mounted smoke detector. Comply with fire protection requirements of Section 01 51 00 – Temporary Utilities.
      i. One first-aid station. Comply with Section 01 52 16 – First Aid Facilities.
      j. Bottled water with electric cooler dispenser for five-gallon bottles, with cup dispenser.
      k. Teleconference System:
         1) Provide necessary equipment and services to support teleconferences. System shall include a hands-free speaker capable of supporting internet phone calls or other acceptable methods.
      l. Provide two-way portable radios and charging units for Engineer, and key Contractor personnel (e.g., superintendent, foreman, etc.).
   2. Provide the following furnishings and equipment in designated office space for use by the Owner/Engineer:
      a. Desks: Two five-drawer desks, each 5 feet long by 2.5 feet wide with at least one file drawer per desk suitable for storing 8.5-inch by 11-inch documents.
      b. Desk Chairs: Two new or used (in good condition) five-point, high backed, cushioned swivel chairs.
      c. Two four-drawer, legal size, fire-proof file cabinets with locks.
      d. Multifunction Printer:
         1) One new or used (in good condition) machines with the following functions:
            a) Photocopying.
            b) Network printing.
            c) Scanning to produce PDF and JPG files.
            d) E-mail.
            e) Fax via telephone line.
         2) Provide necessary cables and appurtenances to enable all functions specified in this Section, including scan-and-email and printing from field office computers.
   3. Personal Protective Equipment for Visitors: Furnish the following:
      a. Protective Helmets (Hard Hats): Four, each with full brim, of fiberglass or thermoplastic; each with ratchet suspension; white in color.
      b. Safety Glasses: Four, each with clear lenses, polycarbonate, anti-fog and anti-scratch coating, suitable to fit over personal eyewear.
      c. Reflective Safety Vest: Four, each of polyester mesh or other material acceptable to Engineer, color to be high-visibility orange, with 1-inch-wide reflective tape, one-size-fits-all design.
      d. Earplugs: Supply of foam, disposable earplugs. Promptly resupply when stock is depleted.
   4. Other furnishings required by Contractor.

D. Contractor's Storage and Work Sheds:
   1. Provide storage and work sheds sized, furnished, and equipped to accommodate personnel, materials, and equipment involved in the Work, including temporary utility services and facilities required for environmental controls sufficient for personnel, materials, and equipment.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Installation:
   1. Install temporary field offices, sheds, and related facilities in accordance with Laws and Regulations.
   2. Install materials and equipment, including prefabricated structures, in accordance with manufacturer's instructions.

3.02 CLEANING, MAINTENANCE, AND SUPPLIES

A. Furnish the following maintenance services:
   1. Immediately repair malfunctioning, damaged, leaking, or defective field offices, sheds, site improvements, systems, and equipment.
   2. Provide all supplies and pay for maintenance on copiers.
   3. Promptly provide snow removal for field offices, including parking areas, walkways, and stairs and landings.
   4. Provide continuous maintenance and janitorial service of field offices and sanitary facilities. Clean field offices at least once per week.
   5. Properly dispose of trash as needed, at least twice per week. Dispose of other waste, if any, as required, to avoid creation of nuisances.

B. Provide the following consumables as needed:
   1. Light bulbs for interior and exterior lights.
   2. Toner or ink cartridges for multifunction printers, as required.
   3. Paper supplies for multifunction printers.
   4. Dry markers in six colors and white board eraser set.
   5. Bottled water suitable for water dispensers and disposable cups.
   6. Hand soap, paper towels, cleansers, sanitary supplies, and janitorial implements, including broom.
   7. Batteries for smoke detector and other battery-powered items furnished by Contractor.
   8. Replace fire extinguishers upon expiration.
   9. Not less-often than monthly, inspect first-aid kit and inventory items consumed or used and remove items that are at or near their expiration date. Promptly replace and restock consumed and expired items.

3.03 REMOVAL

A. Do not remove temporary field offices and sheds until after Substantial Completion of the entire Work, unless otherwise approved by Engineer.

B. Remove field offices and sheds and restore areas upon removal and prior to final inspection.

END OF SECTION

SECTION 01 52 16

FIRST-AID FACILITIES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope:
   1. Providing first-aid facilities during the Project, including.
      a. Paying all costs for first-aid facilities, including installation, maintenance, and removal.
      b. Maintaining first-aid facilities, including cleaning. Keeping first-aid facilities continuously supplied with consumables.
      c. Facilities shall be adequate for personnel using the Site and requirements of the Project.
      d. Provide facilities in compliance with Laws and Regulations.

B. Related Sections
   1. Section 01 35 23 – Safety Requirements.
   2. Section 01 35 29 – Contractor's Health and Safety Plan.

1.02 REFERENCES

A. Standards: The following standards are referenced in this Section:
   1. ANSI Z308.1, Minimum Requirements for Workplace First Aid Kits and Supplies.
   2. ANSI Z358.1, Emergency Eye Wash and Shower Equipment.

1.03 REQUIREMENTS FOR FIRST-AID FACILITIES

A. Provide temporary first-aid stations at or immediately adjacent to the Site's major work areas, and inside the temporary field office. Locations of first-aid stations shall be determined by Contractor's safety representative. At a minimum, first-aid stations provided shall include:
   1. One first-aid kit complying with ANSI Z308.1.
   2. One eyewash station complying with ANSI Z358.1.

B. Provide list of emergency telephone numbers at each hardwired telephone at the Site. List shall be in accordance with the list of emergency contact information required in Section 01 35 23 Safety Requirements and Section 01 35 29 – Contractor's Health and Safety Plan.

C. When Work is in progress, provide at the Site at least one person trained in first-aid and cardiopulmonary resuscitation (CPR). First-aid- and CPR-trained personnel shall possess valid certificate indicating that they have successfully completed a first-aid and CPR training course by the American Red Cross or similar entity.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 INSTALLATION

A. Locate temporary first-aid facilities as specified in Part 1.03 of this Section.

3.02 USE

A. Properly supervise temporary first-aid facilities.

B. Properly dispose of wastes.

C. Check temporary first-aid stations not less than weekly and verify that sufficient consumables are available. Provide additional consumables if the supply on hand is insufficient.

3.03 REMOVAL

A. Completely remove temporary first-aid facilities and materials when no longer required. Repair damage caused by temporary first-aid facilities and their removal, and restore the Site to condition required by the Contract Documents. If restoration of damaged areas is not specified, restore to pre-construction condition.

END OF SECTION

SECTION 01 52 19

SANITARY FACILITIES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope:
   1. Providing all temporary sanitary facilities required for the Project:
      a. Making all arrangements with temporary sanitary facility companies for temporary sanitary services and obtain required permits and approvals for temporary sanitary services.
      b. Paying all temporary sanitary facility service costs, including cost of electricity, water, fuel, and other utility services required for the Work.
      c. Continuously maintaining, including cleaning, adequate temporary sanitary facilities for all purposes during the Project, until removal of temporary sanitary facilities. At minimum, provide and maintain temporary sanitary facilities through Substantial Completion and removal of temporary field offices and sheds. Provide consumables as required.
      d. Providing temporary sanitary facilities in compliance with Laws and Regulations and, when applicable, requirements of utility owners.

1.02 REQUIREMENTS FOR TEMPORARY SANITARY FACILITIES

A. Provide suitably-enclosed chemical or self-contained toilets and suitable temporary washing facilities for employees and visitors to the Site.

B. Location of temporary toilets shall be acceptable to the Property Owner. At a minimum, provide two portable toilets (male and female) and handwash station at the field office and each construction area.

C. Provide supply of potable drinking water and related facilities and consumables for all personnel using the Site.

PART 2 - PRODUCTS

2.01 MATERIALS AND EQUIPMENT

A. Materials and equipment for temporary sanitary facilities may be new or used, but shall be adequate for purposes intended and shall not create unsafe conditions, and shall comply with Laws and Regulations.

B. Provide required materials, equipment, and facilities, including piping, wiring, and controls.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install temporary sanitary facilities in neat, orderly, manner, and make structurally, mechanically, and electrically sound throughout.

B. Location of Temporary Sanitary Facilities:
   1. Locate temporary sanitary facilities for proper function and service.
   2. Temporary sanitary facilities shall not interfere with or provide hazards or nuisances to: the Work under this and other contracts, movement of personnel, traffic areas, materials handling, hoisting systems, storage areas, finishes, or work of utility companies.

C. Modify and extend temporary sanitary facilities as required by progress of the Work.

3.02 USE

A. Maintain sanitary facilities to provide safe, continuous service as required.

B. Properly supervise operation of sanitary facilities:
   1. Enforce compliance with Laws and Regulations.
   2. Enforce safe practices.
   3. Prevent abuse of services.
   4. Prevent nuisances and hazards caused by temporary sanitary facilities and their use.
   5. Prevent damage to finishes.
   6. Ensure that temporary sanitary facilities do not interrupt continuous progress of construction.

C. At the end of each work day, check sanitary facilities and verify that sufficient consumables are available to maintain operation until work is resumed at the Site. Provide additional consumables if the supply on hand is insufficient.

3.03 REMOVAL

A. Completely remove temporary sanitary facilities and materials when no longer required. Repair damage caused by temporary sanitary facilities and their removal and restore the Site to condition required by the Contract Documents; if restoration of damaged areas is not specified, restore to preconstruction condition.

END OF SECTION

SECTION 01 55 13

TEMPORARY ACCESS ROADS AND PARKING AREAS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope:
   1. Provide temporary construction roads (as needed), walks, parking areas, and appurtenances required during the Project for use by Contractor, other contractors employed on the Project, the Owner, Engineer and emergency vehicles.
   2. Maintain temporary roads and parking areas to be fully passable to vehicles in all weather conditions.
   3. Install temporary traffic control as needed.

B. Related Sections:
   1. Section 01 57 05 – Temporary Controls.

C. Use of Existing Access Roads:
   1. Prevent interference with traffic on existing roads and parking areas. Contractor shall, at all times, keep access roads and entrances serving the Site clear and available to the Property Owner, Engineer, Emergency Vehicles, and other Contractors. Do not use access roads or Site entrances for parking or storage of materials or equipment.
   2. Indemnify and hold harmless the Owner, Engineer, and Property Owner from expenses caused by Contractor's operations over existing roads and parking areas including damage and required restoration.
   3. Schedule deliveries and site exports to minimize use of driveways and Site entrances.

1.02 QUALITY ASSURANCE

A. Regulatory Requirements:
   1. Comply with applicable provisions and recommendations of the following:
      a. NYSDOT Standard Specifications and Standard Sheets.

1.03 SITE ACCESS

A. Site Access:
   1. Comply with public roadway requirements for weight and height.

1.04 CONTRACTOR PARKING

A. Park in area(s) proposed by the Contractor, as shown on Design drawings, and as approved by the Engineer.

B. Park construction vehicles and equipment in work areas off of permanent roads and parking areas, in areas of the Site designated (and approved by the Engineer) for Contractor staging.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Materials for temporary roads and parking areas shall comply with the Contract Documents.

B. Traffic controls shall comply with requirements of authorities having jurisdiction.

PART 3 - EXECUTION

3.01 TEMPORARY ROADS AND PARKING AREAS

A. Temporary Roads and Parking in Areas Different from Permanent Pavement:
   1. Provide temporary roads (as necessary) and parking areas adequate to support and withstand traffic loads during the Project. Locate temporary roads and parking areas in areas conducive to facilitate the construction activities, to be approved by the Engineer.
   2. Provide reasonably level, graded, well-drained subgrade of satisfactory soil material, and compacted to a non-yielding surface.
   3. Provide geotextile or geogrid underlayment where required to support loads and provide separation between subgrade and subbase materials.
   4. Provide a minimum 6-inch layer crushed stone or gravel subbase material, roller-compacted or tracked to relatively level, smooth, dense and non-yielding surface. Subbase for temporary roads and areas traveled by construction vehicles shall be adequate for loads and traffic served.
   5. Install Stabilized Construction Entrance at transition from temporary roads to existing roadways and paved roads as shown in the Design Drawings.
   6. Temporary road installation or enhancement within floodplain limits shall be avoided if possible and shall require Engineer approval prior to conducting. Where temporary roads are required to be installed or enhanced within floodplain areas, contractor shall remove and temporarily stockpile existing materials such that improved roadway grades do not exceed pre-construction grades.

3.02 TRAFFIC CONTROLS

A. Traffic Controls:
   1. Provide temporary traffic controls at intersections of temporary roads, including intersections with other temporary roads, intersections with public roads, and intersections with permanent access roads at the Site.
   2. Comply with requirements of authorities having jurisdiction:
      a. Comply with Contract Specifications and Section 619 of the NYSDOT Standard Construction Details and Specifications.
      b. Traffic control on Lamb Road and Route 20 shall conform to Sections 619 and 685 of the NYSDOT Standard Construction Details and Specifications.
      c. Construction traffic on Johnson Street west of Outfall 2 is not permitted.

3.03 MAINTENANCE OF ROADS

A. General:
   1. Maintain temporary roads and parking areas to continuously provide access for construction vehicles and trucks, the Property Owner vehicles, deliveries for the Property Owner, emergency vehicles, and parking areas for the Property Owner's personnel.
   2. Public roads shall be passable at all times unless a road closure is allowed in writing by authority having jurisdiction.
   3. When granular material of temporary roads and parking without hard surfacing become intermixed with soil, or when temporary roads otherwise create a nuisance, remove intermixed granular-and-soil material and replace with clean aggregate.
   4. Remove snow and ice from temporary roads and parking areas as necessary.

B. Cleaning and Dust Control:
   1. Cleaning: Clean paved surfaces over which construction vehicles travel. Perform cleaning by mechanical sweeping and/or vacuuming a minimum of once per week or more frequently, as directed by Engineer. Contractor shall dispose of materials collected

as part of cleaning activities as Construction Waste in accordance Section 01 74 19 – Construction Waste Management and Disposal, unless otherwise indicated by Engineer. Clean the following surfaces:
   a. Roads within limits of the Project.
   b. Permanent roads at the Site, between the Site entrance and the work areas, between the Site entrance and construction parking and staging areas.
   c. Public roads that require sweeping and cleaning due to construction operations.

2. Dust Control:
   a. Control dust resulting from construction activities to prevent nuisances at the Site and in nearby areas.
   b. Apply water or use other methods subject to Engineer's acceptance that will minimize airborne dust. Do not use water when water will cause hazardous or objectionable conditions such as ice, mud, ponds, erosion and pollution.
   c. Provide dust control that is non-polluting and does not contribute to tracking-out of dirt and dust onto pavement. Re-apply dust control treatment as required.
   d. Comply with Section 01 57 05 – Temporary Controls.

C. Protection of Underground Facilities: Provide temporary, heavy-duty steel roadway plates to protect existing manholes, hand holes, valve boxes, vaults, and other underground facilities or piping near to or visible at the ground surface. Contractor is responsible for coordinating with applicable utility owners to ensure proper protections are implemented prior to commencement of the Work.

3.04 REMOVALS AND RESTORATION

A. Removals:
   1. Remove temporary roads, walks, and parking areas unless otherwise indicated in the Contract Documents. Return areas of temporary roads, walks, and parking to pre-construction grades and conditions unless otherwise required by the Contract Documents. Remove temporary gates, fencing, and traffic controls associated with temporary roads and parking areas. Contractor to coordinate with existing utility providers regarding roadway enhancements within their Right-of-Way.

B. Restoration:
   1. Repair or replace paving, curbs, gutters, and sidewalks affected by temporary roads and parking, and restore to required conditions in accordance with authorities having jurisdiction.
   2. Restore to pre-construction grades and conditions existing roads, walks, and parking areas damaged by Contractor, subject to approval of the owner of affected roads, walks, and parking areas.

END OF SECTION

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SECTION 01 55 26

MAINTENANCE AND PROTECTION OF TRAFFIC

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope:
   1. Contractor shall keep all roads, streets, and traffic ways open for passage of traffic and pedestrians during the Work, unless otherwise approved by owner of the street, traffic way, or right-of-way, as applicable.
   2. Construction traffic shall access the Site only via entrance(s) indicated on the Design Drawings.
   3. Maintenance and protection of traffic shall be in accordance with all Laws and Regulations, including the New York State Department of Transportation Manual of Uniform Traffic Control Devices.

B. Coordination:
   1. Coordinate with the Owner, Engineer, and owner of the highway or street right-of-way, as applicable, for maintenance and protection of traffic requirements.
   2. Give required advance notice to fire departments, police departments, and other emergency services as applicable of proposed construction operations.
   3. Give reasonable notice to owners or tenants of private property who may be affected by construction operations. Give such notice not less than 7 days prior to when such property will or may be affected by construction operations.
   4. Coordinate with requirements of the following:
      a. Section 01 55 13, Access Roads and Parking Areas.
      b. Section 01 71 33, Protection of Work and Property, regarding temporary barriers.
      c. Section 31 23 00, Excavation and Fill, for temporary barriers at excavations.

1.02 SUBMITTALS

A. Informational Submittals: Submit the following:
   1. Traffic Maintenance and Protection Plan: Detailed plan, procedures, and sequencing for maintaining and protecting traffic in accordance with the Contract Documents and requirements of authorities having jurisdiction. Include in the submittal the following:
      a. Traffic staging plan, and construction sequencing as applicable to maintain and protect traffic.
      b. Product data, including manufacturer's catalog information and specifications, for temporary signage, temporary signals, temporary illumination devices, and other products to be utilized in maintaining and protecting traffic.
      c. Indication of number and types of personnel dedicated to maintaining and protecting traffic during construction.
      d. Location of traffic controls to be installed.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 GENERAL PROVISIONS

A. When required to cross, obstruct, or temporarily close a street or traffic way, provide and maintain suitable bridges, detours, or other acceptable temporary expedient for the accommodation of traffic. Closings shall be for shortest duration practical, and passage shall be restored immediately after completion of filling and temporary paving or bridging.

B. Temporary Control Devices:
   1. Provide temporary signs, signals, barricades, flares, lights and other equipment, services, and personnel required to regulate and protect traffic and warn of hazards.
   2. Such Work shall comply with requirements of authorities having jurisdiction at the Site.
   3. Remove temporary equipment and facilities when no longer required, and restore grounds to condition indicated in the Contract Documents; if not indicated, restore to pre-construction conditions.

C. Keep accessible for use permanent facilities such as hydrants, valves, fire alarm boxes, postal boxes, delivery service boxes, and other facilities that may require access during construction.

3.02 TRAFFIC SIGNALS AND SIGNS

A. Provide and operate temporary traffic controls and directional signals required to direct and maintain an orderly flow of traffic in areas under Contractor's control, and areas affected by construction operations.

B. Provide temporary traffic controls and directional signs, mounted on temporary barriers or standard posts, at the following locations:
   1. Each change of direction of a roadway and at each crossroad.
   2. Detours and areas of hazard.
   3. Parking areas.
   4. Traffic entrance to and exit from each construction area.

3.03 TRAFFIC CONTROL PERSONNEL

A. General:
   1. When construction operations encroach on traffic lanes, furnish qualified and suitably-equipped traffic control personnel as required for regulating traffic and in accordance with requirements of authorities having jurisdiction.
   2. Traffic control personnel shall use appropriate flags or mobile signs.
   3. Equip traffic control personnel with appropriate personal protection equipment and suitable attire.
   4. Attire and conduct of traffic control personnel shall be appropriate and shall not create nuisances or distractions for traffic.

3.04 FLARES AND LIGHTS

A. During periods of low visibility provide temporary flares and lights for the following:
   1. To clearly delineate traffic lanes, to guide traffic, and to warn of hazardous areas.
   2. For use by traffic control personnel directing traffic.

B. Provide adequate illumination of critical traffic and parking areas.

3.05 PARKING CONTROLS

A. Control Contractor-related vehicular parking at the Site to preclude interfering with traffic and parking, access by emergency vehicles, the Property Owner's operations, and construction operations. Provide temporary parking facilities for the public, as required because of construction operations.

B. Control parking of construction and private vehicles at the Site as follows:
   1. Maintain free vehicular access to and through parking areas.
   2. Prohibit parking on or adjacent to access roads, and in non-designated areas.
   3. Construction vehicles shall possess current vehicle registration.
   4. Private vehicles shall park only in designated areas.

3.06 HAUL ROUTES

A. Submit proposed haul routes to Engineer and obtain approval of authorities having jurisdiction.

B. Confine construction traffic to designated haul routes.

C. Provide temporary traffic controls at critical areas of haul routes to expedite traffic flow, and to minimize interference with normal traffic.

3.07 REMOVAL

A. Maintain and protect traffic until the Work is completed and at all times thereafter when Contractor is working at the Site. Provide maintenance and protection of traffic measures at the Site until no longer required due to the progress of the Work. When no longer required, completely remove maintenance and protection of traffic measures and restore the Site to condition required by the Contract Documents or, when not indicated in the Contract Documents, to pre-construction conditions.

END OF SECTION

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SECTION 01 57 05

TEMPORARY CONTROLS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope:
   1. Provide and maintain methods, equipment, materials, and temporary construction as required to control environmental conditions at the Site and adjacent areas.
   2. Maintain temporary controls until no longer required.
   3. Temporary controls include, but are not limited to, the following:
      a. Erosion and sediment controls.
      b. Control of surface water, including Stormwater run-off.
      c. Odor, dust, and vapor controls.
      d. Pollution controls.
      e. Noise controls.
      f. Light emission controls.

B. Related Sections:
   1. Section 01 32 26 – Construction Project Reporting.
   2. Section 01 35 43.13 – Environmental Procedures for Hazardous Materials.
   3. Section 01 41 26 – Stormwater Pollution Prevention Plan and Permit.
   4. Section 01 74 19 – Construction Waste Management.
   5. Section 07 73 00 – Construction Water Management and Disposal
   6. Section 31 05 19.13 – Geotextiles for Earthwork.
   7. Section 31 23 00 – Excavation and Fill.

1.02 TERMINOLOGY

A. The following words or terms are not defined but, when used in this Section, have the following meaning:
   1. “Dust-generating Work” means any Work with the potential to generate dust. Examples of dust-generating Work include, but are not limited to, the following:
      a. Crushing and processing demolition debris.
      b. Handling excavated material and fill material.
      c. Ground-intrusive Work.
   2. “Ground-intrusive Work” means any Work performed below the existing level of the ground, or that involves the disturbance of existing earth, regardless of quantity. Examples of ground-intrusive Work include, but are not limited to, the following:
      a. Grubbing.
      b. Demolitions and removals of below-grade construction and Underground Facilities.
      c. Excavation.
      d. Backfilling and grading.
   3. “Perimeter of work area” means the limits of Work, or half the distance to the nearest potential receptor or occupied residential/commercial structure, whichever is less, but in no case less than 20 feet.
   4. “Work area” means any area where ground-intrusive Work or dust-generating Work is being performed.

1.03 QUALITY ASSURANCE

A. Regulatory Requirements:
   1. Comply with applicable provisions and recommendations of the following:
      a. NYSDEC New York State Standards and Specifications for Erosion and Sediment Control (Blue Book).
      b. NYSDOT Standard Specifications and Standard Sheets.
      c. 40 CFR 112 (Oil Pollution Prevention).
      d. New York State Division of Environmental Remediation – Generic Community Air Monitoring Plan (Appendix 1A of DER-10).
      e. 42 U.S. Code 4901 et seq. (1972).
      f. Title 6 of the New York Codes, Rules, and Regulations (NYCRR) Subpart 217-3 (Idling Prohibition for Heavy Duty Vehicles).
      g. Town of Seneca Falls Code, Part 300-26, Section A (Noise).

1.04 SUBMITTALS

A. Action Submittals:
   1. Environmental Protection Plan. Submit a written Environmental Protection Plan that addresses protection of sediment, soil, and water and air resources; water quality control; odor control; dust control; noise control; light emission control; and compliance with the requirements of this Project Specifications, applicable permits, and permit equivalency requirements. Contractor shall not proceed with physical Work at the Site until the Engineer has approved the Contractor's Environmental Protection Plan. Acceptance of the Environmental Protection Plan by the Engineer is conditional and predicated on satisfactory performance during construction. The Engineer reserves the right to require the Contractor to make changes to the Environmental Protection Plan or operations if the Engineer determines that environmental protection requirements are not being met. The Environmental Protection Plan shall include, but not be limited to, the following information:
      a. A list of applicable federal, state, and local laws, regulations, and permits concerning environmental protection, pollution control, and abatement that are applicable to the Contractor's proposed operations and the requirements imposed by those laws, regulations, and permits in addition to any required by the Contract.
      b. A description of the methods for continuously monitoring the work areas to ensure soil/sediment is not spilled or misplaced, including during excavation and material handling.
      c. A description of daily housekeeping activities.
      d. A description of response actions and procedures to be implemented in the event that oil sheens are observed during excavation or backfill operations; the equipment, materials, and procedures that will be used; and procedures for the management, storage, and disposal of materials used for sheen containment and control.
      e. A description of any dust, particulate, and airborne organic vapor monitoring that the Contractor intends to perform.
      f. A detailed description of the methods, equipment, and materials to be used to prevent and control dust and particulate generation and migration. Include material specifications and product data for proposed control products.
      g. A detailed description of the methods, equipment, and materials to be used to prevent and control odors, including material specifications and product data for proposed odor control products.
      h. A detailed description of the methods, equipment, and materials to be used to control noise during the implementation of the Work.
      i. A contingency plan in the event spills or action levels are exceeded for dust or noise.
      j. Example logs, reports, and recordkeeping.

2. Product Data: Submit manufacturer's product data, specifications, and installation instructions for the following:
    a. Silt fencing.
    b. Erosion control mats or netting, and staples or anchoring stakes.

B. Informational Submittals:
1. Follow-Up Reports:
    a. Submit follow-up reports within 24 hours for any spills or exceedances of the dust or noise requirements. Include a description of the incident, causes of the exceedance, and actions taken to mitigate the exceedance and prevent the incident from recurring.

PART 2 - PRODUCTS

2.01 EROSION AND SEDIMENT CONTROLS

A. General:
1. Materials used for erosion and sediment controls shall be in accordance with the applicable regulatory requirements indicated in Part 1.03 of this Section, unless otherwise shown or indicated in the Contract Documents.

B. Silt Fencing:
1. Filter Fabric:
    a. Material: Geotextile shall comply with NYSDEC New York State Standards and Specifications for Erosion and Sediment Control standard and specifications for super silt fence.
    b. Height: 36 inches, minimum.
2. Fence Support Posts:
    a. Material: Hardwood or steel posts may be used.
        1) Hardwood posts shall be at least 1.25 inches by 1.25 inches in cross section.
        2) Steel posts shall be "T" or "U" shape in cross section with a minimum weight of 1.0 pound per linear foot.
    b. Length: 40 inches, minimum.
3. Fabric fasteners shall be heavy-duty staples, wire ties, or other fastener compatible with support post material.

C. Stabilized Construction Access:
1. Crushed stone shall be a clean, durable, matrix of sharp-angled fragments ranging in size from 1 to 4 inches.
2. Geotextile shall comply with NYSDEC New York State Standards and Specifications for Erosion and Sediment Control standard and specifications for stabilized construction access use.

2.02 ODOR, DUST, AND VAPOR CONTROLS

A. Emission Control Agents: Products shall be biodegradable, non-hazardous, non-combustible, and non-reactive and shall have the capability of controlling emissions for the duration of the Project as needed.

B. Water: Clean, potable.

C. Provide pressure washers, pneumatic foam unit, portable tanks, hoses, and other equipment required for the storage and application of vapor mitigation agents and water.

2.03 POLLUTION CONTROLS

A. Provide spill kits and oil-absorbent pads, rolls, and booms as required to contain spills, should they occur, and prevent the potential migration of pollutants in accordance with all applicable Laws and Regulations. Spill kits shall be located within active work areas and dispersed around the site near equipment and petroleum storage areas.

2.04 CONTACT WATER MANAGEMENT

A. Provide means for collecting and containerizing construction and/or Stormwater that comes in contact potentially contaminated soils and/or construction equipment.

B. Refer to Section 07 73 00 – Construction Water Management and Disposal.

PART 3 - EXECUTION

3.01 GENERAL

A. Comply with all applicable federal, state, and local laws and regulations. The environmental resources within the Project boundaries and those affected outside the work area under this Contract shall be protected during the entire period of this Contract. Contractor shall confine its activities to areas defined by the Design Drawings and Project Specifications. Failure to meet the requirements of the Project Specifications for environmental protection may result in Work stoppages or termination for default. No part of the time lost due to any such Work stoppages shall be made the subject of claims for extensions of time or for excess costs or damages by the Contractor. If Contractor fails or refuses to promptly repair any damage caused by violation of provisions of these Project Specifications, the Owner or Engineer may have the necessary Work performed and charge the cost thereof to the Contractor.

B. Contractor, their personnel, and subcontractors shall review and comply with the requirements of this Project Specifications; permits and permit equivalency requirements for the Project; and all federal, state, and local environmental protection laws and regulations.
   1. Contractor shall train their personnel in all phases of environmental protection. The training shall include methods of detecting and avoiding pollution, familiarization with pollution standards, both statutory and contractual, and installation and care of facilities to ensure adequate and continuous environmental pollution control. Quality control and supervisory personnel shall be thoroughly trained in the proper use of monitoring devices and abatement equipment, and shall be thoroughly knowledgeable of federal, state, and local laws, regulations, permits, and permit equivalencies.

C. Contractor shall be responsible for any fines resulting from violations of construction related to environmental protection. The Contractor shall be responsible for any delays and costs resulting from failure to comply.

3.02 EROSION AND SEDIMENT CONTROLS

A. Installation and Maintenance – General:
   1. General:
      a. Erosion and sedimentation controls shall be installed prior to any ground disturbance (including clearing, excavation, or other disturbances) and shall be maintained in an effective condition at all locations until construction is completed and disturbed areas are stabilized.

b. Provide erosion and sediment controls as shown and indicated on the Design Drawings and elsewhere in the Contract Documents. Provide erosion and sediment controls as the Work progresses into previously undisturbed areas.
c. Install erosion and sediment controls in accordance with the applicable regulatory requirements indicated in Part 1.02 of this Section, unless otherwise shown or indicated in the Contract Documents.
d. Use necessary methods to successfully control erosion and sedimentation, including ecology-oriented construction practices, vegetative measures, and mechanical controls. Use best management practices in accordance with Laws and Regulations, and regulatory requirements indicated in Part 1.02 of this Section, to control erosion and sedimentation during the Project.
e. Plan and execute construction, disturbances of soils and soil cover, and earthwork by methods to control surface drainage from cuts and fills, and from borrow and waste disposal areas, to prevent erosion and sedimentation. Provide temporary measures for controlling erosion and sedimentation, as indicated in the Contract Documents and as required for the Project.
f. Regulate drainage and control erosion and sedimentation in areas that are cleared for storage of materials or equipment, or for temporary facilities.
g. Provide erosion and sediment controls, including stabilization of soils, at the end of each work day.

2. Coordination:
   a. Coordinate erosion and sediment controls with this Section's requirements on water control and with Section 01 41 26 – Stormwater Pollution Prevention Plan and Permit.
   b. Coordinate temporary erosion and sediment controls with construction of permanent drainage facilities and other Work to the extent necessary for economical, effective, and continuous erosion and sediment control.
3. Provide all erosion and sediment control measures required by the Contract Documents for the areas where soil will be disturbed before commencing activities that will disturb soil or soil cover at the Site.
4. Implement construction procedures associated with, or that may affect, erosion and sediment control to ensure minimum damage to the environment during construction.
5. Vegetation Removal:
   a. Remove only those trees, shrubs, grasses, and other vegetation that must be removed for construction. Protect remaining vegetation.
6. Access Roads and Parking Areas: When possible, locate and construct access roads and temporary roads to avoid adverse effects on the environment. Provisions shall be made to regulate drainage, avoid erosion and sedimentation, and minimize damage to vegetation.
7. Earthwork and Temporary Controls:
   a. Perform excavation, fill, and related operations in accordance with Section 31 23 00 – Excavation and Fill.
   b. Control erosion to minimize transport of silt from the Site into existing waterways and surface waters. Such measures shall include, but are not limited to, using berms, silt fencing, gravel or crushed stone, slope drains, and other methods. Apply such temporary measures to erodible materials exposed by activities associated with the construction.
   c. Hold to a minimum the areas of bare soil exposed at one time.
   d. In performing earthwork, eliminate depressions that could serve as mosquito pools.
   e. Provide special care in areas with steep slopes. Minimize vegetation disturbance to maintain soil stability.
8. Inspection and Maintenance:
   a. Inspect areas of earthwork and areas where soil or soil cover are disturbed, in accordance with the SWPPP to identify evidence of the start of erosion and sedimentation; apply corrective measures as required to control erosion and sedimentation. Continue inspections and corrective measures until soils are permanently stabilized and permanent vegetation has been established.

b. Inspect erosion and sediment controls prior to conducting any intrusive activities. During Work, erosion and sediment controls shall be inspected at least once every seven days until restoration is complete.
c. Repair or replace damaged erosion and sediment controls within one day of becoming aware of such damage.
d. Periodically remove silt and sediment that has accumulated in or behind sediment and erosion controls. Properly dispose of silt and sediment.

9. Duration of Erosion and Sediment Controls:
   a. Maintain erosion and sediment controls in effective working condition until the associated drainage area has been permanently stabilized.
   b. Maintain erosion and sediment controls until the Site is restored and site improvements including landscaping, if any, are complete with underlying soils permanently stabilized.
10. Work Stoppage: Provide additional temporary controls necessary to prevent environmental damage to the Site and adjacent areas if the Work is temporarily stopped or suspended for any reason.
11. Failure to Provide Adequate Controls: In the event Contractor repeatedly fails to satisfactorily control erosion and siltation, the Owner or Engineer reserves the right to employ outside assistance or to use the Owner's or Engineer's own forces for erosion and sediment control. Cost of such work, plus engineering and inspection costs, will be deducted from monies due to Contractor.

B. Silt Fencing:
1. Install and maintain silt fencing in a vertical plane, at the location(s) shown or indicated on the Design Drawings.
2. Locations of Silt Fencing:
   a. Where possible, install silt fencing along contour lines so that each given run of fencing is at the same elevation.
   b. On slopes, install silt fencing at intervals that do not exceed the maximum lengths indicated in Table 01 57 05-A.

TABLE 01 57 05-A
MAXIMUM LENGTH OF UPGRADIENT SLOPE BETWEEN RUNS

Slope	Upgradient Slope Length (feet)
< 2%	N/A
2 – 10%	300
10 – 20%	200
20 – 33%	100
33 – 50%	100
> 50%	50

   c. Provide silt fencing around the perimeter of each stockpile of topsoil, general fill material, and excavated material. Install silt fencing before expected precipitation and maintain until stockpile is removed.
   d. Do not install silt fencing at the following types of locations:
      1) Area of concentrated Stormwater flows such as ditches, swales, or channels.
      2) Where rock or rocky soils prevent full and uniform anchoring of silt fencing.
      3) Across upstream or discharge ends of Stormwater piping or culverts.
3. Installation:
   a. Securely fasten filter fabric to each support post in no less than four locations. Spacing between support posts shall not exceed 10 feet (center to center).
   b. When two sections of filter fabric abut each other, fold over edges and overlap by minimum of 6 inches and securely fasten to wire mesh.
   c. Embed posts in the ground to the depth necessary for proper controls, but not less than 16 inches below ground surface.
   d. Extend filter fabric a minimum of 6 inches below ground and a minimum of 16 inches above ground.

e. Bury filter fabric at bottom of silt fence in a trench, in a “J” configuration, to a depth of 6 inches below grade.
f. Remove sediment accumulated at silt fencing as required. Repair and reinstall silt fencing as required.

4. Maintenance:
   a. Conduct routine inspection at least once every seven days until final restoration.
   b. Remove accumulated sediment when depth reaches one-half the effective height of the sediment control.
   c. Repair and reinstall silt fencing as required.
   d. Do not allow formation of concentrated Stormwater flows on slopes above silt fencing unless so shown or indicated in the Contract Documents. If unauthorized concentrated Stormwater flows occur, stabilize the slope via earthmoving and other stabilization measures as required to prevent flow of concentrated Stormwater flows toward silt fencing.

C. Protection of Stormwater Drainage Inlets and Catch Basins:
1. Protect each drainage inlet and catch basin that has the potential to receive Stormwater run-off from exposed soils.
2. Install inlet filter bags inside of drainage inlet or catch basin in accordance with manufacturer’s instructions and the NYS erosion and sediment control manual. Secure inlet filter bag with the structure’s grate or by other acceptable means.
3. Inlet filter bags shall not pose any obstruction above the elevation of the drainage inlet or catch basin grate requiring barricades or flashers.
4. When removing silt and sediment from inlet filter bag, do not dump filter bag’s contents into the drainage inlet or catch basin.
5. Remove silt and sediment from inlet filter bag, or replace inlet filter bag, when inlet filter bag is not more than half full.

D. Stabilized Construction Access and Construction Entrance and Exit Pads:
1. Where shown on the Design Drawings, and where construction vehicles will regularly transit to paved surfaces from unstabilized surfaces or temporary access roads, provide a temporary construction entrance/construction entrance/exit pad.
2. Contractor vehicles shall use temporary construction entrances.
3. Provide temporary construction accesses of the width, length, and thickness shown or indicated on the Design Drawings. When not shown or indicated on the Design Drawings, temporary construction entrance shall be not less than 50 feet long, by 12 feet wide, by 6 inches thick. Slope of entrance shall not exceed 12 percent.
4. Place Construction Entrance/Exit Pads at transitions to/from temporary access roads from/to paved areas.
5. Construction Entrance/Exit Pads shall be no less than 50 feet long, by 15 feet wide, by 6 inches thick. See Design Drawings for additional details.
6. Installation:
   a. Ensure that subgrade under temporary construction entrance is suitably dense for the intended purpose. Suitably prepare subgrade as required for temporary construction entrance.
   b. Place a layer of geotextile fabric on the subgrade, installed in accordance with geotextile manufacturer's recommendations and in accordance with Section 31 05 19.13 - Geotextiles for Earthwork.
   c. Provide crushed stone on installed geotextile. Grade crushed stone for passage of vehicles.
7. Maintenance:
   a. Maintain temporary construction entrance at not less than the minimum required thickness. Add crushed stone as required to maintain thickness.
   b. When upper layer of temporary construction entrance becomes impacted with soil, remove the contaminated material and replace with clean crushed stone.
   c. Using water to wash down temporary construction entrance or paved areas onto which soil material has been tracked is prohibited.

3.03 SURFACE WATER CONTROL

A. General:
   1. Provide methods to control surface water to prevent damage to the Work, the Site, and adjoining properties.
   2. Control fill, grading, and ditching to direct surface water away from disturbed areas, excavations, pits, tunnels, and other construction areas, and to direct drainage to proper run-off courses to prevent erosion, damage, or nuisance.
   3. Surface water in contact with remedial excavation areas shall be containerized and disposed of in accordance with the Contract Documents.

B. Equipment and Facilities for Surface Water Control:
   1. Provide, operate, and maintain equipment and facilities of adequate size to control surface water.

C. Discharge and Disposal:
   1. Dispose of surface water in a manner to prevent flooding, erosion, and other damage to any and all parts of the Site and adjoining areas, and that complies with Laws and Regulations.

3.04 WATER QUALITY CONTROLS

A. General:
   1. Implement BMPs, engineering controls, operational controls, and other mitigation measures necessary to minimize visual impacts to the onsite drainage features, Van Cleef Lake, and the Seneca River-NYS Barge Canal and maintain compliance with any requirements specified in the permits and permit equivalency requirements for the Project.
   2. The Engineer reserves the right to suspend Work at any time as necessary if there is a water quality concern that may cause contamination of adjacent areas. Contractor shall not be entitled to any additional compensation for suspension of Work under such conditions.

B. Sheen Response and Control:
   1. At all times, Contractor shall have sufficient sheen response personnel, booms, sorbents, vessels, and all other necessary equipment and materials on site to respond to oil sheens in accordance with this Project Specifications. When oil sheens are present, the response crews shall be actively engaged in sheen control actions. Sheen response personnel may perform other activities when sheen response activities are not required but shall be available at the Project Site to respond quickly if sheens are observed, and they shall be dedicated to sheen response activities while sheens are present.
   2. Contractor shall monitor the water surface for the presence of oil sheens using available vantage points from ongoing Work to inspect for the presence of oil sheens and identify their development, location, appearance, drift direction, and rate of movement.
   3. If the Contractor observes one or more oil sheens on the water surface, the Contractor shall immediately notify the Engineer. The Engineer will also monitor for the presence of oil sheens and will notify the Contractor if any oil sheen is observed.
   4. If one or more oil sheens are observed on the water surface by the Contractor or the Engineer, the Contractor shall, within 30 minutes of the sheen observation, deploy and maintain oil containment booms, oil sorbent booms, and oil sorbent materials to intercept and control the sheen. When using machinery or are excavating within 15 feet of a surface water body or within a floodplain, oil containment and sorbent booms shall be deployed.

5. All used sorbents, booms, and other materials generated during the collection, control, and containment of sheens shall be removed for disposal by the Contractor in accordance with Section 01 74 19 – Construction Waste Management and Disposal.

3.05 AIR QUALITY CONTROLS

A. General:
   1. Contractor shall keep construction activities under surveillance, management, and control to minimize pollution of air resources. All activities, equipment, processes, and Work operated or performed by the Contractor shall be in strict accordance with the applicable air pollution standards of the State of New York, as well as all federal emission and performance laws and standards.
   2. Maintaining operations within the specified criteria is the sole responsibility of the Contractor.
   3. Burning of waste materials, rubbish, or other debris will not be permitted on or adjacent to the Project Site.
   4. Tanks and containers of fuels and related products shall be controlled to minimize the emission of VOCs.
   5. Heavy duty construction vehicles (diesel equipment) shall abide by NYSDEC Title 6 NYCRR, Subpart 217-3 Idling Restrictions.

B. Compliance Air Monitoring:
   1. Monitoring for compliance with the criteria listed in this Section will be conducted by others under direction of Engineer. Air monitoring data will be provided to the Contractor.
   2. Air monitoring will be conducted by others during soil/sediment removal, contaminated soil/sediment dewatering and processing, and backfill operations.
   3. Contractor may conduct air monitoring at their discretion, but compliance will be based on monitoring performed by others under direction of Engineer.
   4. In the event it becomes necessary in the opinion of the Engineer or Contractor's Safety Representative, to provide additional measures to control air emissions, the Contractor shall implement such measures immediately and at no additional cost to the Owner or Engineer.
   5. Engineer reserves the right to suspend Work at any time necessary if air emissions cause a safety or air quality concern or may cause contamination of adjacent areas. Contractor shall not be entitled to any additional compensation for suspension of Work under such conditions.

C. Dust and Particulate Control:
   1. Contractor shall comply with the following criteria:
      a. Particulate (PM_{10}) – 0.150 milligrams per cubic meter (mg/m^3) above upwind location for a 15-minute period:
         1) If the downwind PM_{10} level is 0.100 mg/m^3 above the upwind location for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques shall be employed. Work may continue with dust suppression techniques provided that downwind PM_{10} particulate levels do not exceed 0.150 mg/m^3 above the upwind level and no visible dust is migrating from the work area.
         2) If, after implementation of dust suppression techniques, the downwind PM_{10} levels are greater than 0.150 mg/m^3 above the upwind location, Work shall be stopped, and Project Site activities shall be evaluated. Work may resume only if dust suppression measures and other controls are successful in reducing PM_{10} levels to less than 0.150 mg/m^3 above background and if no visible dust is observed leaving the Project Site.
         3) An initial level of 0.100 mg/m^3 (15-minute average) at any of the monitoring stations will be established as a conservative assessment level. Readings

greater than this conservative assessment level will result in on-site personnel performing a review of the background (upwind perimeter) site level. If the downwind level is determined to be greater than 0.100 mg/m^3 above the background (upwind perimeter) level, dust-suppression techniques will be employed to avoid an exceedance of the corrective action level.

2. Maintaining operations within the specified PM requirements is the sole responsibility of the Contractor.
3. Contractor shall strictly adhere to applicable environmental regulations for dust prevention.
4. Contractor shall implement dust and particulate control measures throughout the duration of the Project to maintain compliance with the specified particulate criteria and to adequately protect the public and Project Site personnel so as not to create hazardous or nuisance conditions.
5. Contractor shall keep dust down at all times, including during nonworking periods.
6. Contractor shall wet haul routes, material stockpiles, and loading and unloading areas as needed or if requested by the Engineer during Work activities, and as needed or if requested by the Engineer during nonworking time periods, to minimize dust generation.
7. Contractor's dust and particulate control measures shall be detailed in the Contractor's Environmental Protection Plan.

D. Not Used

E. Odors:
1. No objectionable odors resulting from the Work shall be allowed at the Site's perimeter.
2. Contractor shall implement odor-control measures to adequately protect the public and employees of Contractor, Subcontractors, Property Owner, and the construction management team so as to not create hazardous or nuisance conditions. Contractor shall implement the measures identified in the Contractor's Environmental Protection Plan.
3. Acceptable measures include covering stockpiles, backfilling open excavations, and applying odor/organic vapor-suppression foam. Contractor shall be prepared and equipped to apply odor-suppressing foam during soil excavation, handling, and management activities. Once foam has been applied, disturbed surfaces, temporary stockpiles, and other odor sources shall remain foamed at all times until otherwise directed by Engineer.
4. The Property Owner and/or Engineer reserve the right to suspend Work at any time in the event the Contractor's operations result in objectionable odors that are deemed to cause a potential safety and/or air quality issue. Contractor shall not be entitled to any additional compensation for suspension of Work under such conditions.
5. Contractor shall be prepared to provide odor-control products and equipment required for application of the products within 2 hours of request from the Engineer.

F. Air Monitoring Exceedances and Corrective Action:
1. In the event of an exceedance of the air quality criteria listed in this Section, Contractor will be notified by the Engineer. Contractor shall:
    a. Include the name of the notifying party, date, and time of the notification in the Daily Activities Report prepared in accordance with Section 01 32 26 – Construction Project Reporting.
    b. Coordinate with the Engineer to immediately investigate the cause of the exceedance and implement procedures, engineering controls, operational controls, and other corrective measures to address the source, modify practices, or implement additional engineering controls to address the exceedance and prevent recurrence as applicable.
    c. Submit a follow-up report documenting the actions taken to the Engineer in accordance with this Section.

2. In the event it becomes necessary in the opinion of the Engineer or the Contractor's Safety Representative, to provide additional measures to control air emissions, the Contractor shall implement such measures immediately and at no additional cost to the Owner or Engineer.
3. Engineer reserves the right to suspend Work at any time necessary if air emissions cause a safety or air quality concern or may cause contamination of adjacent areas. Contractor shall not be entitled to any additional compensation for suspension of Work under such conditions.

3.06 NOISE CONTROLS

A. General:
   1. Minimize noise emissions from Contractor vehicles, equipment, and operations to the greatest degree practicable. Provide mufflers, silencers, and sound barriers when necessary, or as directed by the Owner or Engineer.
   2. Contractor also comply with the following:
      a. Federal: 42 U.S. Code 4901 et seq. (1972).
      b. Local: Town of Seneca Falls Code, Part 300-26, Section A.
   3. Do not allow noise emissions to interfere with the Work of the Engineer, Property Owner or others.

B. Compliance Monitoring:
   1. Noise levels shall comply with the following noise level criteria at the perimeter of the Site.
      a. Residential receptors – 80 dBA in the daytime (maximum hourly average 7 a.m. to 10 p.m.) and 65 dBA in the evening (maximum hourly average; 10 p.m. to 7 a.m.).

C. Controls:
   1. Implement BMPs to minimize noise generation, reduce noise impacts, and comply with the specified noise levels. BMPs may include, but are not limited to, use of mufflers and silencers on equipment where possible; use of critically silenced or hospital-grade generators and pumps; use of hardwired power where possible to reduce the need for generators and engines; reduction of certain activities during evening hours to lessen generated noise; locating equipment and noise sources away from potential receptors; or sheltering equipment and noise sources to reduce impacts.
   2. The use of horns, bells, or whistle signals shall be held to the minimum necessary in order to ensure an operation that is as safe and as quiet as possible.

D. Exceedance and Corrective Action:
   1. In the event of a noise-level exceedance, Contractor will be notified by the Engineer. Contractor shall include the name of the notifying party, date, and time of the notification in the Daily Activities Report. Contractor shall immediately investigate the cause of the exceedance and implement procedures, engineering controls, operational controls, and other corrective measures to address the source, modify practices, or implement additional engineering controls to address the exceedance. Contractor shall submit a follow-up report documenting these response actions to the Engineer.
   2. In the event it becomes necessary in the opinion of the Engineer or the Safety Representative to provide additional measures to control noise, the Contractor shall implement such measures immediately at no additional cost to the Owner or Engineer.
   3. The Engineer reserves the right to suspend Work at any time necessary if sound levels may impact Project Site workers or the community. The Contractor shall not be entitled to any additional compensation for suspension of Work under such conditions.

3.07 LIGHT EMISSION CONTROLS

A. Supply sufficient lighting to work areas to provide safe conditions during low-light and night-time operations (if applicable).

B. All lighting shall comply with all applicable Laws and Regulations, including OSHA requirements and local ordinances.

C. Controls and mitigation measures shall be implemented to minimize disturbance to adjacent properties.

D. Lighting shall be directed toward work areas and away from neighboring properties. Measures to minimize impacts from light shall be considered to include proper positioning of lights, beam direction, height of light masts, and shielding.

E. Contractor shall provide engineering controls (e.g., light shrouds, temporary light barriers, or other light-control devices) for use, as necessary, to minimize impacts from lights to neighboring properties.

3.08 POLLUTION CONTROLS

A. General:
   1. Provide means, methods, and facilities required to prevent contamination of soil, water, and atmosphere caused by discharge of noxious substances from construction operations.
   2. Utilize construction equipment that complies with Laws and Regulations.
   3. Comply with Section 01 35 43.13 – Environmental Procedures for Hazardous Materials.

B. Spills and Contamination:
   1. Provide equipment, materials, and personnel to perform emergency measures required to contain and clean up spills, and to remove soils and liquids contaminated by spills.
   2. Provide spill kits, including oil-absorbent pads, socks, and booms, at or immediately adjacent to the Site's major work areas and equipment storage and fueling areas.
   3. Immediately notify Engineer of all spills, regardless of material, volume, or circumstances involved.
   4. Excavate contaminated material and properly dispose of off-site, and replace with suitable compacted fill and topsoil or other suitable materials to restore pre-spill condition or better.

C. Protection of Water Resources:
   1. Contractor shall keep construction activities under surveillance, management, and control to avoid pollution of surface water and groundwater. Contractor shall conduct its operations in a manner that prevents and minimizes erosion and conforms to all water quality standards as required by the permits or permit equivalency and all other relevant federal, state, and local regulatory criteria.
   2. Prevent disposal of wastes, effluents, chemicals, and other such substances in or adjacent to surface waters and open drainage routes, in sanitary sewers, or in storm sewers. Contractor shall comply with all applicable federal, state, and local laws concerning pollution of surface water and groundwater. The Contractor is responsible for proper management of any water that may be encountered during execution of the Work.
   3. Contractor shall take sufficient precautions to prevent discharge of fuels, oils, bitumen, calcium chloride, and other harmful materials to the surface water and groundwater.

D. Protection of Wetlands:
   1. Protect all wetland areas adjacent to the Project Site from erosion, siltation, scouring, and dewatering resulting from Contractor's operations except those areas noted for disturbance on the Design Drawings. There shall be no storage of tools or materials (e.g.,

clearing debris, lumber, and fill dirt) within wetlands, along the shoreline in the littoral zone, or elsewhere within waters of the state, except as specified in the Project Specifications or on the Design Drawings.
2. Appropriate erosion control barriers shall be placed at the edge of slopes adjacent to wetlands to prevent turbid runoff and erosion from entering the wetlands.

E. Protection of Fish and Wildlife Resources:
1. Contractor shall keep construction activities under surveillance, management, and control to minimize interference with, disturbance to, and damage of fish and wildlife. Species that require specific attention, along with measures for their protection, shall be listed in the Contractor's Environmental Protection Plan prior to the beginning of construction operations.
2. Threatened and endangered species may exist within the Limits of Work and adjacent vicinities. Contractor shall follow all federal and state requirements for operations to reduce potential impacts to habitat and use of habitat by listed species.
3. Upland and shoreline tree trimming, tree removal, or brush clearing shall consider impacts to potential bat habitat. In accordance with Section 31 11 00 - Clearing and Grubbing, Contractor will be required to prepare a Tree Removal Plan for review and approval prior to performing clearing activities.
4. In the event that a threatened or endangered species is harmed because of construction activities, the Contractor shall cease all Work and notify the Engineer.

F. Solid Waste:
1. Provide systems for controlling and managing solid waste related to the Work.
2. Prevent solid waste from becoming airborne, and from discharging to surface waters and drainage routes.
3. Properly handle and dispose of solid waste.

3.09 PROHIBITED CONSTRUCTION PROCEDURES

A. Prohibited construction procedures include, but are not limited to, the following:
1. Dumping or disposing of spoil material, cleared vegetation, debris, or other waste material in any surface waters, drainage ways, or other unauthorized locations.
2. Indiscriminate, arbitrary, or capricious operation of equipment in any surface waters, drainage ways, or other unauthorized locations.
3. Pumping of silt-laden water from trenches or other excavations to any surface waters, drainage ways, sewers, or other unauthorized locations.
4. Damaging vegetation beyond the extent necessary for construction.

3.10 REMOVAL OF TEMPORARY CONTROLS

A. Remove temporary controls only when directed by Engineer.

END OF SECTION

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SECTION 01 61 00

COMMON PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope:
   1. This Section includes:
      a. Common requirements for materials and equipment.
      b. Compatibility of materials and equipment.

1.02 REQUIREMENTS FOR MATERIALS AND EQUIPMENT

A. Unless otherwise indicated in the Contract Documents, furnish materials and equipment that:
   1. Have not been previously incorporated into another project or facility.
   2. Have not changed ownership after initial shipment from the manufacturer's factory or facility.
   3. If stored since their manufacture or fabrication, have, while in storage, been properly maintained and serviced in accordance with the manufacturer's recommendations for long-term storage; submit documentation as required by Engineer that such maintenance and service has been performed.
   4. That the item(s) have not been subject to degradation or deterioration since manufacture.
   5. Are the current model(s) or type(s) furnished by the Supplier.

B. To the extent possible, furnish from a single source those materials and equipment that are of the same generic kind.

C. Furnish materials and equipment complete with accessories, trim, finish, fasteners, and other items shown, indicated, or required for a complete installation for the indicated use and performance.

D. Standard Items: When available, and unless custom or nonstandard options are specified or indicated, furnish standard materials and equipment of types that have been produced and used successfully in similar situations on other projects.

E. Visual Matching: Where required in the Contract Documents, furnish materials and equipment that match (as determined by Engineer) referenced existing construction, and mock-ups and Sample(s) approved by Engineer.

1.03 COMPATIBILITY

A. Similar materials and equipment by the same Supplier shall be compatible with each other, unless otherwise indicated in the Contract Documents or approved by Engineer.

B. Provide materials and equipment compatible with items previously selected or installed on the Project.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 62 00

PRODUCT OPTIONS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope:
   1. This Section includes:
      a. Contractor's options for selecting products.
      b. Requirements for consideration of "or-equal" products.

1.02 TERMINOLOGY

A. The following words or terms are not defined but, when used in this Section, have the following meaning:
   1. "Products" includes materials, equipment, machinery, components, fixtures, systems, and other goods incorporated in the Work. Products do not include machinery and equipment used for preparing, fabricating, conveying, erecting, or installing the Work. Products include the Owner-furnished goods incorporated in the Work where use of such goods is specifically required in the Contract Documents.

1.03 PRODUCT OPTIONS

A. For products specified only by reference standard or description, without reference to Supplier, provide products meeting that standard, by a Supplier or from a source that complies with the Contract Documents.

B. For products specified by naming one or more products or Suppliers, provide the named products that comply with the Contract Documents, unless an "or-equal" or substitute product is approved by Engineer.

C. For products specified by naming one or more products or Suppliers and the term, "or equal", when Contractor proposes a product or Supplier as an "or equal", submit to Engineer a request for approval of an "or-equal" product or Supplier.

D. For products specified by naming only one product or manufacturer and followed by words indicating that no substitution is allowed, there is no option, and no substitution will be allowed.

1.04 "OR-EQUAL" PRODUCTS

A. For proposed products not named in the Contract Documents and considered as an "or equal", Contractor shall request in writing Engineer's approval of the "or equal". The Shop Drawing or product data submittal for the proposed product and shall include:
   1. Contractor's request that the proposed product be considered as an "or equal", accompanied by Contractor's certifications.
   2. Documentation adequate to show that proposed product:
      a. Does not require extensive revisions to the Contract Documents.
      b. Is consistent with the Contract Documents.
      c. Will produce results and performance required in the Contract Documents.
      d. Is compatible with other portions of the Work.

3. Detailed comparison of significant qualities of proposed product with the products and manufacturers named in the Contract Documents. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements shown or indicated.
4. Evidence that proposed product manufacturer will furnish warranty equal to or better than specified, if any.
5. List of similar installations for completed projects with project names and addresses, and names and address of design professionals and owners, if requested.
6. Samples, if requested.
7. Other information requested by Engineer.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 65 00

PRODUCT DELIVERY REQUIREMENTS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope:
   1. General requirements for preparing for shipping, delivering, and handling materials and equipment.
   2. Make all arrangements for transporting, delivering, and handling of materials and equipment required for prosecution and completion of the Work.
   3. Move stored materials and equipment when required without additional compensation and without changes to the Project Schedule.

B. Related Sections:
   1. Section 01 35 43.13 – Environmental Procedures for Hazardous Materials.

1.02 PREPARING FOR SHIPMENT

A. When practical, factory-assemble materials and equipment. Match mark or tag separate parts and assemblies to facilitate field assembly. Cover machined and unpainted parts that may be damaged by the elements with strippable, protective coating.

B. Package materials and equipment to facilitate handling, and protect materials and equipment from damage during shipping, handling, and storage. Mark or tag outside of each package or crate to indicate the associated purchase order number, bill of lading number, contents by name, the Engineer's contract name and number, Contractor name, equipment number, and approximate weight. Include complete packing lists and bills of materials with each shipment.

C. Protect materials and equipment from exposure to the elements and keep thoroughly dry and dust-free at all times. Protect painted surfaces against impact, abrasion, discoloration, and other damage. Lubricate bearings and other items requiring lubrication in accordance with manufacturer's instructions.

D. Keep Engineer informed of delivery of all materials and equipment to be incorporated in the Work.

E. Do not ship materials and equipment until:
   1. Related Shop Drawings, Samples, and other submittals have been reviewed or accepted (as applicable) by Engineer, including, but not necessarily limited to, all Action Submittals associated with the materials and equipment being delivered.
   2. Manufacturer's instructions for handling, storing, and installing the associated materials and equipment have been submitted to and accepted by Engineer in accordance with the Project Specifications.
   3. Results of source quality control testing (factory testing), when required by the Contract Documents for the associated materials or equipment, have been reviewed and accepted by the Engineer.
   4. Facilities required for handling materials and equipment in accordance with manufacturer's instructions are in place and available.
   5. Required storage facilities have been provided.

1.03 DELIVERY

A. Scheduling and Timing of Deliveries:
   1. Arrange deliveries of materials and equipment in accordance with the accepted Project Schedule and in ample time to facilitate inspection prior to installation.
   2. Schedule deliveries to minimize space required for and duration of storage of materials and equipment at the Site or delivery location, as applicable.
   3. Coordinate deliveries to avoid conflicting with the Work and conditions at the Site, and to accommodate the following:
      a. Work of other Contractors and the Property Owner.
      b. Storage space limitations.
      c. Availability of equipment and personnel for handling materials and equipment.
      d. the Property Owner's use of premises.
   4. Deliver materials and equipment to the Site during regular working hours.
   5. Deliver materials and equipment to avoid delaying the Work and the Project, including work of other Contractors, as applicable.

B. Deliveries:
   1. Shipments shall be delivered with Contractor's name, Subcontractor's name (if applicable), Site name, Project name, and contract designation clearly marked.
   2. Site may be listed as the "ship to" or "delivery" address; but the Property Owner shall not be listed as recipient of shipment unless otherwise directed in writing by Engineer.
   3. Provide Contractor's telephone number to shipper; do not provide the Property Owner's telephone number.
   4. Arrange for deliveries while Contractor's personnel are at the Site. Contractor shall receive and coordinate shipments upon delivery. Shipments delivered to the Site when Contractor is not present will be refused by the Property Owner, and Contractor shall be responsible for the associated delays and additional costs, if incurred.
   5. Comply with Section 01 35 43.13 – Environmental Procedures for Hazardous Materials.

C. Containers and Marking:
   1. Have materials and equipment delivered in manufacturer's original, unopened, labeled containers.
   2. Clearly mark partial deliveries of component parts of materials and equipment to identify materials and equipment, to allow easy accumulation of parts, and to facilitate assembly.

D. Inspection of Deliveries:
   1. Immediately upon delivery, inspect shipment to verify that:
      a. Materials and equipment comply with the Contract Documents and reviewed or accepted (as applicable) submittals.
      b. Quantities are correct.
      c. Materials and equipment are undamaged.
      d. Containers and packages are intact, and labels are legible.
      e. Materials and equipment are properly protected.
   2. Promptly remove damaged materials and equipment from the Site and expedite delivery of new, undamaged materials and equipment, and remedy incomplete or lost materials and equipment to furnish materials and equipment in accordance with the Contract Documents, to avoid delaying progress of the Work.
   3. Advise Engineer in writing when damaged, incomplete, or defective materials and equipment are delivered, and advise Engineer of the associated impact on the Project Schedule.

1.04 HANDLING OF MATERIALS AND EQUIPMENT

A. Provide equipment and personnel necessary to handle materials and equipment, including those furnished by the Owner or Engineer, by methods that prevent soiling or damaging materials, equipment, and packaging.

B. Provide additional protection during handling as necessary to prevent scraping, marring, and otherwise damaging materials, equipment, and surrounding surfaces.

C. Handle materials and equipment by methods that prevent bending and overstressing.

D. Lift heavy components only at designated lifting points.

E. Handle materials and equipment in safe manner and as recommended by the manufacturer to prevent damage. Do not drop, roll, or skid materials and equipment off delivery vehicles or at other times during handling. Hand-carry or use suitable handling equipment.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

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SECTION 01 66 00

PRODUCT STORAGE AND HANDLING REQUIREMENTS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope:
   1. Storing and protecting materials and equipment.

B. Related Sections:
   1. Section 01 35 43.13 – Environmental Procedures for Hazardous Materials.
   2. Section 01 65 00 – Product Delivery Requirements.

1.02 STORAGE

A. Store and protect materials and equipment in accordance with manufacturer's recommendations and the Contract Documents.

B. Make all arrangements and provisions necessary for, and pay all costs for, storing materials and equipment. Place excavated materials, construction equipment, and materials and equipment to be incorporated into the Work in a manner that avoids injuring the Work and existing facilities and property, and so that free access is maintained at all times to all parts of the Work and to public utility installations in vicinity of the Work. Store materials and equipment neatly and compactly in locations that cause minimum inconvenience to the Property Owner, other Contractors, public travel, and owners, tenants, and occupants of adjoining property. Arrange storage in manner to allow easy access for inspection.

C. Store materials and equipment in areas shown or indicated in the Contract Documents, or as approved by the Property Owner or Engineer.

D. Store materials and equipment that will become the Owner's property to facilitate their inspection and preserve the quality of the Work, including proper protection against damage by freezing, moisture, and high temperatures with ambient temperatures as high as 90 degrees F. Store in indoor, climate-controlled storage areas all materials and equipment subject to damage by moisture, humidity, heat, cold, and other elements, unless otherwise acceptable to the Owner.

E. Contractor shall be fully responsible for loss or damage (including theft) to stored materials and equipment.

F. Do not open manufacturer's containers until time of installation, unless recommended by the manufacturer or otherwise specified in the Contract Documents.

G. Do not store materials or equipment in structures being constructed unless approved by Engineer in writing.

H. Do not use lawns or other private property for storage without written permission of the Property Owner or other person in possession or control of such premises.

1.03 PROTECTION

A. Equipment to be incorporated into the Work shall be boxed, crated, or otherwise completely enclosed and protected during shipping, handling, and storage, in accordance with Section 01 65 00 – Product Delivery Requirements.

B. Store all materials and equipment off the ground (or floor) on raised supports such as skids or pallets where possible.

C. Protect painted surfaces against impact, abrasion, discoloration, and other damage. Painted equipment surfaces that are damaged or marred shall be repainted in their entirety in accordance with equipment manufacturer and paint manufacturer requirements, to the satisfaction of Engineer.

D. Protect electrical equipment, controls, and instrumentation against moisture, water damage, heat, cold, and dust. Space heaters provided in equipment shall be connected and operating at all times until equipment is placed in operation and permanently connected.

1.04 HAZARDOUS PRODUCTS

A. Prevent contamination of personnel, storage area, and the Site. Comply with Laws and Regulations, manufacturer's instructions, and Section 01 35 43.13 – Environmental Procedures for Hazardous Materials.

1.05 MAINTENANCE OF STORAGE

A. Periodically inspect stored materials and equipment to on a scheduled basis to ensure that:
   1. Condition and status of storage facilities is adequate to provide required storage conditions.
   2. Required environmental conditions are maintained on a continuing basis.
   3. Materials and equipment exposed to elements are not adversely affected.

1.06 RECORDS

A. Keep up-to-date account of materials and equipment in storage to facilitate preparation of Applications for Payment, if the Contract Documents provide for payment for materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 71 26

CONSTRUCTION SURVEYING AND LAYOUT

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope:
   1. Furnish surveying services specified or required to execute Contractor's construction methods.
   2. Develop and make all detail surveys and measurements required for construction, including slope stakes, batter boards, and all other working lines, elevations, and cut sheets.
   3. Provide materials required for benchmarks, control points, batter boards, grade stakes, and other items.
   4. Keep a transit, theodolite, or total station (theodolite with electronic distance measurement device), leveling instrument, and related implements such as survey rods and other measurement devices, at the Site at all times, and have a skilled instrument person available when necessary for laying out the Work.
   5. Be solely responsible for all locations, dimensions, and levels. No data other than Change Order, Work Change Directive, or Field Order shall justify departure from dimensions and levels required by the Contract Documents.
   6. Rectify all Work improperly installed due to unauthorized modification or removal of established survey reference points, stakes, marks, and monuments.
   7. Provide such facilities and assistance necessary for the Engineer to check lines and grade points placed by Contractor. Do not perform excavation or backfilling Work until all cross-sectioning necessary for determining payment quantities for Unit Price Work have been completed and accepted by Engineer.

B. Related Sections:
   1. Section 01 78 39 – Project Record Documents.

1.02 QUALITY ASSURANCE

A. Qualifications:
   1. Surveyor:
      a. Employ or retain the services of a surveyor with experience and capability of performing surveying and layout tasks required in the Contract Documents and as required for the Work. Surveyor shall be a professional land surveyor licensed and registered in the State of New York.
      b. Responsibilities include, but are not necessarily limited to, the following:
         1) Providing required surveying equipment, capable of achieving required accuracies as specified in Part 3.01.G of this Section.
         2) Establishing required lines and grades for performing all excavating, filling, compacting, and grading.
         3) Preparing and maintaining professional-quality, accurate, well organized, legible notes of all measurements and calculations made while surveying and laying out the Work.
         4) Performing a pre-construction topographic survey for verification of remedial excavation limits. Survey shall adhere to the accuracy and reporting requirements noted in this Specification Section.
         5) Performing such surveys and computations necessary to determine quantities of Work performed, placed, or installed.

6) Performing such surveys necessary to record actual construction, including demolition, excavation, backfilling, and restoration operations.
7) Prior to backfilling operations, surveying, locating, and recording on a copy of the Contract Documents accurate representation of buried Work and Underground Facilities encountered.
8) Preparing certified survey drawings in accordance with Section 01 78 39 – Project Record Documents.
9) Complying with requirements of the Contract Documents relative to surveying and related Work.

1.03 SUBMITTALS

A. Informational Submittals:
1. Survey Plan: Submit surveying plan for conducting all survey Work not less than 10 days prior to starting survey Work.
2. Survey Field Books:
a. Submit example of proposed survey field books to be maintained by Contractor's surveyor. Example shall have sufficient information and detail, including example calculations and notes, to demonstrate that field books will be organized and maintained in a professional manner, complying with the Contract Documents.
b. Submit original field books within two days after completing survey Work.
3. Qualifications Statements:
a. Surveyor: Submit name and address of firm, and resumes of each professional land surveyor and crew chief conducting the survey Work. Submit at least 10 days prior to beginning survey Work. During the Project, submit resume for each new registered land surveyor and crew chief employed or retained by Contractor at least 10 days prior to starting on the survey Work.
4. Certificates:
a. Surveying: When requested by Engineer, submit certificate signed by professional surveyor certifying that elevations and locations of the Work comply with the Contract Documents. Explain all deviations, if any.
5. Survey Results: Provide electronic copy of results (in format acceptable to Engineer) for results of surveys required in Part 3.02, including:
a. Pre-Construction.
b. Post-Excavation.
c. Post-Backfill.
d. Post-Construction Surveys.

1.04 RECORDS

A. Maintain at the Site a complete and accurate log of control and survey Work as it progresses.
1. Survey data shall be in accordance with recognized professional surveying standards, Laws and Regulations, and prevailing standards of practice in the locality where the Site is located. Original field notes, computations, and other surveying data shall be recorded by Contractor's surveyor in Contractor-furnished hard-bound field books, and shall be signed and sealed by Contractor's surveyor. Completeness and accuracy of survey Work, and completeness and accuracy of survey records, including field books, shall be responsibility of Contractor. Failure to organize and maintain survey records in an appropriate manner that allows reasonable and independent verification of calculations, and to allow identification of elevations, dimensions, and grades of the Work, shall be cause for rejecting the survey records, including field books.
2. Illegible notes or data, and erasures on any page of field books, are unacceptable. Do not submit copied notes or data. Corrections by ruling or lining out errors will be

unacceptable unless initialed by the surveyor. Violation of these requirements may require re-surveying the data questioned by Engineer.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 SURVEYING

A. Verification of Conditions: Verify Site conditions before starting Work including proposed remedial excavation limits. Promptly notify Engineer of any discrepancies with the potential to affect the Work.

B. Reference Points:

1. Contractor shall establish necessary reference points, establish lines, grades, and elevations necessary to control the Work. Obtain measurements required for executing the Work to tolerances specified in the Contract Documents.
2. Establish, place, and replace as required, such additional stakes, markers, and other reference points necessary for control, intermediate checks, and guidance of construction operations.

C. Coordinate System and Reference Datums: Comply with the following:
1. Coordinate System: New York State Plane Coordinate System of 1983, Central Zone. (USFT)
2. Vertical Datum: North American Datum 1988. (USFT)

D. Surveys to Determine Quantities for Payment:
1. For each Application for Payment, perform such surveys and computations necessary to determine quantities of Work performed, placed, or installed. Perform surveys necessary for Engineer to determine final quantities of Work performed or in place. Surveys for payment shall be based on topographic survey performed by a licensed surveyor in accordance with this Section.
2. Notify Engineer at least 24 hours before performing survey services for determining quantities. Unless waived in writing by Engineer, perform quantity surveys in presence of Engineer.

E. Surveys to Record Actual Construction: Perform such surveys necessary to record actual construction including, but not limited to, the following:
1. Horizontal and vertical limits of excavation.
2. Horizontal and vertical location of existing Underground Facilities and surface structures demolished, realigned, or abandoned in-place.
3. Horizontal and vertical limits of fill for each material classification.
4. Final grade topography.
5. Horizontal and vertical location of buildings, foundations, and walls adjacent to work areas.
6. Horizontal location of exposed piping and utilities, poles, exposed wires, posts, signs, markers, curbs, fencing, gates, guard rails, guard cables, and other facilities visible at or above ground surface in the vicinity of work areas.
7. Horizontal limits of lawns, pavements, roads, walks, drives, and other surface improvements in the vicinity of work areas.

F. Construction Surveying: Comply with the following:
   1. Topography: Collect elevation data on maximum 10-foot grid and at significant grade breaks (elevation changes of 1 foot or more).
   2. Alignment Staking: Provide alignment stakes at 50-foot intervals on tangent, and at 25-foot intervals on curves.
   3. Slope Staking: Provide slope staking at 50-foot intervals on tangent, and at 25-foot intervals on curves. Re-stake at every 10-foot difference in elevation.
   4. Structures: Stake out structures, including elevations, and check prior to and during construction.
   5. Road: Stake out roadway elevations at 50-foot intervals on tangent, and at 25-foot intervals on curves.
   6. Cross-Sections: Provide original, intermediate, and final staking as required for site work, and other locations as necessary for quantity surveys.
   7. Easement Staking: Provide easement staking at 50-foot intervals on tangent, and at 25-foot intervals on curves. Also provide wooden laths with flagging at 100-foot maximum intervals.
   8. Record Staking: Provide permanent stake at each blind flange and each utility cap is provided for future connections. Stakes for record staking shall be material acceptable to Engineer.

G. Accuracy:
   1. Establish Contractor's temporary survey reference points for Contractor's use to at least second-order accuracy (i.e., 1:10,000). Construction staking used as a guide for the Work shall be set at least third-order accuracy (i.e., 1:5000). Basis on which such orders are established shall provide the absolute margin for error specified below.
   2. Horizontal accuracy of easement staking shall be plus or minus 0.1 foot. Accuracy of other staking shall be plus or minus 0.1 foot horizontally and plus or minus 0.1 foot vertically, except in cases of achieving specified excavation elevations where vertical accuracy may only be at or 0.1 foot below target elevation.
   3. Survey calculations shall include an error analysis sufficient to demonstrate required accuracy.

3.02 REQUIRED SURVEYS

A. Pre-Construction Surveys:
   1. Perform Pre-Construction Surveys in each removal area (including all existing site features) prior to start of removal activities. Pre-Construction Surveys shall cover the full extent of the areas that will be excavated, provide enough points to define actual limits of removal areas, and also include any nearby areas that will be disturbed (e.g., support areas, excavation sloping areas). Pre-Construction Survey will include establishing an appropriately-spaced grid to document pre- and post-excavation elevations and verify specified removal depths have been achieved,
   2. Provide pre-construction conditions prior to start of work. Documentation of pre-construction conditions shall consist of digital photographs. Photographs shall be numbered. A key plan shall be provided to show the location and general direction of each photograph.
   3. Pre-Excavation Surveys must be accepted by Engineer before commencing soil removal in the area.

B. Post-Excavation Surveys:
   1. Perform Post-Excavation Surveys in each removal area within 2 work days following completion of excavation. Contractor shall submit this survey comparison to the Engineer for review and approval. Post-Excavation survey shots shall be taken at the same locations established during the pre-construction survey event and shall include any additional areas disturbed during excavation (e.g., excavation sloping areas)

a. Post-Excavation Surveys shall include survey of the bottom and horizontal extent of documentation sample locations.

2. Post-Excavation Surveys must be accepted by the Engineer before commencing backfill placement in each area.

C. Post-Backfill Placement Surveys:
1. Perform Post-Backfill Placement Surveys within 5 workdays following completion of backfill placement in upland removal areas. Post-backfill survey shots shall be taken at the same locations established during the pre-construction survey event and shall include any additional areas disturbed during backfilling operations.
2. Contractor shall submit survey comparison to the Engineer for approval.

D. Post-Construction Surveys
1. Perform Post-Construction Survey within 5 workdays following completion of restoration activities. Post-Construction Surveys shall cover the full extent of the areas disturbed by the work including excavation areas, support areas, and restoration areas (including all replaced/restored site features). Post-Construction Surveys shall include location or extents of all installed products including erosion control mat, riprap, etc.
2. Provide post-construction conditions following site restoration. Documentation of post-construction conditions shall consist of digital photographs and videos. The post-construction conditions documentation shall consist of the same elements as the pre-construction conditions documentation and shall also note any discrepancies from the pre-construction conditions.

E. Contractor's surveyor shall calculate the actual in-place thickness and in-place quantities (to the nearest cubic yard) of soil excavated and backfill material placed for each removal area. The quantity calculations shall be submitted to the Engineer for approval.

F. Engineer will verify the soil excavation and backfill placement elevations achieve the specified requirements. If required excavation or backfill placement has not been achieved as determined by the Engineer, Contractor shall implement corrective action and re-survey the area at no additional expenses to the Owner.

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SECTION 01 71 33

PROTECTION OF WORK AND PROPERTY

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope:
   1. Take all precautions, provide all programs, and take all actions necessary to protect the Work and all public and private property and facilities from damage as specified in this Section.
   2. Prevent damage, injury, or loss, by:
      a. Storing materials, supplies, and equipment in an orderly, safe manner that does not unduly interfere with the progress of the Work or work of other Contractors or utility companies.
      b. Providing suitable storage facilities for materials and equipment subject to damage or degradation by exposure to weather, theft, breakage, or other cause.
      c. Placing upon the Work or any part thereof only loads consistent with the safety and integrity of that portion of the Work and existing construction.
      d. Frequently removing and disposing of refuse, rubbish, scrap materials, and debris caused by Contractor's operations so that, at all times, the Site is safe, orderly, and workmanlike in appearance.
      e. Providing temporary barricades and guard rails around openings, scaffolding, temporary stairs and ramps, excavations, elevated walkways, and other hazardous areas.
   3. Do not, except after written consent from proper parties, enter or occupy privately-owned land with personnel, tools, materials, or equipment, except on lands and easements provided by the Owner. Contractor shall not seek out such written consent unless specifically authorized by the Owner or Engineer to do so.
   4. Preserve public and private property and facilities on and adjacent to the Site. Direct or indirect damage done by, or on account of, any act, omission, neglect, or misconduct by Contractor in executing the Work, shall be restored by Contractor, at its expense to condition equal to that existing before damage was done.

B. Related Sections:
   1. Section 02 41 19 – Selective Demolition.
   2. Section 31 11 00 – Clearing and Grubbing.
   3. Section 31 23 00 – Excavation and Fill.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 SITE ACCESS AND SECURITY PROCEDURES

A. Contractor Security Requirements:
   1. Contractor shall provide site fencing as shown on the Design Drawings and in accordance with requirements for temporary barriers specified in Section 31 23 00 – Excavation and Fill. Contractor shall determine the need for security fencing and provide as appropriate. Security fencing shall be minimum 6-foot-tall galvanized steel chain-link fencing. Contractor to submit product details to the Engineer for approval prior to construction.
   2. Contractor shall be responsible for all costs associated with providing access restriction features, maintaining all features during construction, and removing and disposing of temporary features after the Work is completed. This includes physical restrictions (e.g., fences, gates, or other barriers), signage, and warning devices as necessary to deter trespassers and restrict unauthorized entry. Any proposed signage shall be submitted to the Engineer for approval.
   3. Contractor shall be solely responsible for the security and protection of the Contractor's and subcontractors' equipment, tools, supplies, and materials at all times, including within areas that are accessible by water. Contractor shall provide appropriate locking mechanisms necessary to properly secure equipment and vehicles throughout the duration of the Work. Any vandalism, damage, or theft shall be the sole responsibility of the Contractor. Contractor shall make no claim against the Property Owner, Owner or Engineer for damages for any reason.
   4. Contractor shall immediately report any trespassers, theft, or vandalism to the Engineer.
   5. Contractor shall restrict entrance to work areas only to authorized persons with proper identification. Authorized persons include only personnel who have proper training for the specific work area and/or who are employed by the Owner, the Engineer, the Contractor and its subcontractors, monitoring personnel representing the Owner, or agency oversight personnel. No other personnel are allowed on the Project Site without written approval of the Owner or Engineer.
   6. For each area being accessed for performing the Work, Contractor shall maintain a daily registry (log) of personnel entering and exiting the work area. The daily logs shall be submitted to the Engineer as part of the Daily Activities Reports as defined in Section 01 31 26 – Construction Progress Reporting.
   7. All Contractor and subcontractor personnel shall sign in upon entry to the Project Site and sign out upon exit.
   8. Visitors are not allowed within the work area without the prior approval of the Engineer or the Owner. Visitors shall be escorted at all times.
   9. Contractor vehicles are only permitted within the work area for delivery of materials or when actively engaged to support the Work. Personnel vehicles shall be parked in designated parking areas.
   10. Any access cards granted to Contractor and subcontractor personnel shall be used only for the period of the Contract and shall be returned to the Engineer at the end of the Work under the Contract.
   11. The use of cameras, video equipment, and phones with built-in cameras is not permitted on the Project Site without prior approval by the Engineer and, if approved, shall only be used to document the progress of the Work, and the images shall be made available to the Engineer upon request.
   12. Guard dogs and weapons are not permitted on the Project Site.
   13. All vehicles and equipment must be identified with the Contractor's or subcontractors' Company logo(s).

3.02 BARRICADES AND WARNING SIGNALS

A. General:
   1. Where the Work is performed on or adjacent to roadway, access road, right-of-way, or public place:
      a. Provide barricades, fences, lights, warning signs, danger signals, watchmen, and take other precautionary measures for protecting persons, property, and the Work.
      b. Paint barricades to be visible at night.
      c. From sunset to sunrise, furnish and maintain at least one light at each barricade.
      d. Erect sufficient barricades to keep vehicles from being driven on or into Work under construction.
   2. Provide temporary barricades to protect personnel and property for Work not in or adjacent to vehicular travel areas, including indoor work, in accordance with Laws and Regulations.
   3. Maintain temporary barricades, signs, lights, and provide watchmen until the Work is accepted in accordance with the Contract Documents.

3.03 TREE AND PLANT PROTECTION

A. General:
   1. Protect existing trees, shrubs, and plants on or adjacent to the Site, shown or designated to remain in place, against unnecessary cutting, breaking, or skinning of trunk, branches, bark, and roots.
   2. Do not store materials or equipment, or park construction equipment and vehicles, within the foliage drip line.
   3. In areas subject to traffic, provide temporary fencing or barricades to protect trees and plants.
   4. Where excavation is conducted within the drip line of protected trees with breast height diameter of 6 inches or greater, protect exposed root systems. Cover exposed roots with burlap, which shall be kept continuously wet. Cover exposed roots with earth as soon as possible. Protect root systems from mechanical damage and damage by erosion, flooding, run-off, and noxious materials in solution.
   5. If branches or trunks are damaged, prune branches immediately and protect cut or damaged areas with emulsified asphalt compounded specifically for horticultural use, in manner acceptable to Engineer.
   6. When directed by Engineer, remove and dispose of damaged trees and plants that die or suffer permanent injury, and replace at Contractor's expense damaged trees or plants with specimens of equal or better quality.

B. Coordinate Work in this Part with Section 31 11 00 – Clearing and Grubbing.

3.04 PROTECTION OF EXISTING STRUCTURES

A. Underground Facilities:
   1. Contractor shall strictly comply with all applicable requirements of 16 NYCRR Part 753.
   2. Underground Facilities known to the Owner and Engineer, except water, gas, sewer, electric, and communications services to individual buildings and properties, are shown on the Design Drawings. Information shown for Underground Facilities is the best available to the Owner and Engineer but is not guaranteed to be correct or complete. It is the responsibility of the Contractor to take all necessary precautions to investigate, locate, and document utilities.
   3. Utility Mark-Out:
      a. Clearly delineate areas of trenching, excavation, or other subsurface Work at the Site.

b. Provide required notification to local one-call notification system (Dig Safely New York) at least two working days, but not more than 10 working days, before planned start of demolition, trenching, excavation, or other subsurface Work.
c. Walk the Site and review utility markings before proceeding with trenching, excavation, or other subsurface Work.
d. Protect and preserve staking, markings, or other designations until no longer required for proper and safe Work at or near Underground Facilities.

4. Explore ahead of trenching, excavation, or other subsurface Work, and uncover obstructing Underground Facilities sufficiently to determine their location, to prevent damage to Underground Facilities, and to prevent service interruption to building or parcels served by Underground Facilities. Immediately notify the Owner and Engineer if Contractor damages an Underground Facility, or the material surrounding or supporting the same. Restore damaged facility and restore it to original condition, in accordance with requirements of the owner of the damaged facility. Such repair or restoration Work shall be performed at no additional cost to the Owner.
   a. Undertake such emergency response actions as may be required.
   b. Collect, containerize, characterize, and properly dispose of any oils or pollutants released from the damaged facility.
   c. Provide provisions for alternate or temporary service until damaged facility is repaired.
   d. Provide assistance to the owner of the damaged facility during repairs unless authorized by the facility's owner to undertake such repairs directly.
5. Necessary changes in the location of the Work may be directed by Engineer to avoid Underground Facilities not shown or indicated on the Contract Documents.
6. If permanent relocation of an existing Underground Facilities is required and is not otherwise shown or indicated in the Contract Documents, Engineer will direct Contractor in writing to perform the Work. Contract modification procedures and payment for such Work shall be in accordance with the Contract Documents when the relocation Work results in a change in the Contract Price and/or Project Schedule.

B. Surface Structures:
1. Surface structures are existing buildings, retaining walls, other structures, and other facilities at or above ground surface, including their foundations or any extension below ground surface. Surface structures include, but are not limited to, buildings, tanks, walls, bridges, roads, dams, channels, open drainage, exposed piping and utilities, poles, exposed wires, posts, signs, markers, curbs, walks, fencing, and other facilities visible at or above ground surface.
2. Replace and restore existing surface facilities to their original condition at Contractor's expense, including but not limited to guard rails, posts, guard cables, signs, poles, markers, curbs, and fencing, that are damaged or temporarily removed to facilitate the Work.

C. Protection of Underground Facilities and Surface Structures:
1. Sustain in their places and protect from direct or indirect injury all Underground Facilities and surface structures located within or adjacent to the limits of the Work. Such sustaining and supporting shall be done as required by the party owning or controlling such facility or structure. Before proceeding with the Work of sustaining and supporting such facility or structure, Contractor shall satisfy Engineer that methods and procedures to be used have been approved by party owning same.
2. Contractor shall bear all risks relating to the presence or proximity of all Underground Facilities and surface structures within or adjacent to the limits of the Work, in accordance with the Contract Documents. Contractor shall be responsible for damage and expense for direct or indirect injury caused by its Work to facilities and structures. Contractor shall immediately and completely repair damage caused by its Work, to the satisfaction of the owner of damaged facility or structure.

3. Comply with 16 NYCRR 753 (Protection of Underground Facilities) and other Laws and Regulations regarding the protection of Underground Facilities.

D. Protection of Cultural Resources:
   1. Inadvertent Discoveries. If, during construction activities, Contractor observes items that may have historic or archeological value, such observations shall be reported immediately to the Engineer so the appropriate authorities may be notified and a determination made as to their significance and what, if any, special disposition of the finds should be made. Contractor shall cease all activities that may result in the destruction of these resources and shall prevent its employees from trespassing on, removing, or otherwise damaging such resources.
   2. Claims for Downtime due to Inadvertent Discoveries. Upon discovery and subsequent reporting of a possible inadvertent discovery of cultural resources, Contractor shall seek to continue Work well away from, or otherwise protectively avoiding, the area of interest, or in some other manner that strives to continue productive activities in keeping with the Contract. Should an inadvertent discovery be of the nature that substantial impact(s) to the Project Schedule are evident; such delays shall be coordinated with the Engineer, and formal notice of delay provided in writing.

E. Coordinate Work in this Part with 31 23 00 – Excavation and Fill.

3.05 PROTECTION OF INSTALLED MATERIALS, EQUIPMENT, AND LANDSCAPING

A. Protect installed materials and equipment to prevent damage from subsequent operations. Remove protection facilities when no longer needed prior to completion of the Work.

B. Control traffic to prevent damage to equipment, materials, and surfaces.

C. Provide coverings to protect materials and equipment from damage.

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SECTION 01 74 05

CLEANING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope:
   1. Executing cleaning during the Project, at completion of the Work, and as required by this Section.
   2. Maintaining in a clean manner the Site, the Work, and areas adjacent to or affected by the Work.

B. Related Sections:
   1. Section 01 57 05 – Temporary Controls.

1.02 REFERENCES

A. Standards: The following standards are referenced in this Section:
   1. NFPA 241, Safeguarding Construction, Alteration, and Demolition Operations.

1.03 PROGRESS CLEANING

A. General: Clean the Site, work areas, and other areas occupied by Contractor at least weekly. Dispose of materials in accordance with the following:
   1. Comply with NFPA 241 for removing combustible waste materials and debris.
   2. Do not hold non-combustible materials at the Site for more than three days if the temperature is expected to rise above 80 degrees F. When temperature is less than 80 degrees F, dispose of non-combustible materials within seven days of their generation.
   3. Provide suitable containers for storage of waste materials and debris.
   4. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately.

B. Site:
   1. Keep outdoor, dust-generating areas wetted down or otherwise control dust emissions in accordance with Section 01 57 05 – Temporary Controls.
   2. Brush-sweep at least weekly, roadways and paved areas at the Site that are used by construction vehicles or otherwise affected by construction activities.

C. Work Areas:
   1. Clean areas where the Work is in progress to level of cleanliness necessary for proper execution of the Work.
   2. Remove liquid spills promptly and immediately report spills to the Owner and Engineer, and authorities having jurisdiction.
   3. Where dust would impair proper execution of the Work, broom-clean or vacuum entire work area, as appropriate.
   4. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

D. Installed Work: Keep installed Work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of material or equipment installed, using only cleaning agents and methods specifically recommended by material or equipment manufacturer. If manufacturer does not recommend specific cleaning agents or methods, use

cleaning agents and methods that are not hazardous to health and property and that will not damage exposed surfaces.

E. Exposed Surfaces: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration until Substantial Completion.

F. Waste Disposal:
   1. Properly dispose of waste materials, surplus materials, debris, and rubbish off the Site.
   2. Do not burn or bury rubbish and waste materials at the Site.
   3. Do not discharge volatile or hazardous substances, such as mineral spirits, oil, or paint thinner, into storm sewers or sanitary sewers.
   4. Do not discharge wastes into surface waters or drainage routes.
   5. Contractor shall be solely responsible for complying with Laws and Regulations regarding storing, transporting, and disposing of waste.

G. During handling and installation of materials and equipment, clean and protect construction in progress and adjoining materials and equipment already in place. Apply protective covering where required for protection from damage or deterioration, until Substantial Completion.

H. Clean completed construction as frequently as necessary throughout the construction period.

1.04 CLOSEOUT CLEANING

A. Complete the following prior to requesting inspection for Substantial Completion:
   1. Clean and remove from the Site rubbish, waste material, debris, and other foreign substances.
   2. Sweep paved areas broom-clean. Remove petrochemical spills, stains, and other foreign deposits.
   3. Sweep and/or vacuum sidewalks and loading areas.
   4. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
   5. Leave surface waterways, drainage routes, storm sewers, and gutters open and clean.
   6. Repair pavement, roads, sod, and other areas affected by construction operations and restore to specified condition. If condition is not specified, restore to pre-construction condition.
   7. Clean exposed exterior and interior hard-surfaced finishes to dirt-free condition, free of spatter, grease, stains, fingerprints, films, and similar foreign substances.
   8. Remove debris and surface dust from limited-access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, and similar spaces.
   9. Remove non-permanent tags and labels.
   10. Leave the Site clean, and in neat, orderly condition, satisfactory to the Owner and Engineer.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 74 19

CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope:
   1. This Section includes administrative and procedural requirements for:
      a. Recycling non-hazardous, uncontaminated demolition and construction waste.
      b. Disposing of non-hazardous, uncontaminated demolition and construction waste.
   2. Furnish all labor, materials, tools, vehicles, and equipment necessary for the transportation of uncontaminated debris and vegetation offsite:
      a. Uncontaminated debris, but is not limited to, debris generated during project construction activities that have not come into contact with impacted soil or other Contaminated Materials and that meet the definitions of recognizable C&D debris in 6 NYCRR Part 360.2.
      b. Potentially acceptable materials consist of recognizable uncontaminated concrete and concrete products (including steel or fiberglass reinforcing rods that are embedded in the concrete), asphalt pavement, brick, glass, soil and rock.
   3. Uncontaminated vegetation shall be disposed of at the designated area at the Site at the direction of the Engineer.
   4. Uncontaminated scrap metal (if discovered) shall be placed in a scrap metal container and recycled to the extent practicable.

B. Coordination:
   1. Coordinate recycling and disposing of waste as specified under this and other Sections.
   2. Contaminated materials shall be disposed of in accordance with Section 02 60 05 – Contaminated Material Removal and Disposal. Materials in contact with soils containing constituents greater than cleanup levels shall be treated as contaminated materials, unless sampling indicates material is not contaminated.

C. Related Sections:
   1. Section 02 60 05 – Contaminated Material Management and Disposal.

1.02 TERMINOLOGY

A. The following words or terms are not defined but, when used in this Section, have the following meaning:
   1. “Construction waste” is building and site improvement materials and other solid waste resulting from remedial operations or existing onsite debris indicated for removal on the Design Drawings. Construction waste includes packaging.
   2. “Disposal” is removal to an offsite location of demolition and construction waste or subsequent sale, recycling, reuse, or placement in the Owner-approved landfill or incinerator facility conforming to Laws and Regulations and acceptable to authorities having jurisdiction.

1.03 QUALITY ASSURANCE

A. Regulatory Requirements:
   1. Comply with hauling and disposal Laws and Regulations of authorities having jurisdiction.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 WASTE MANAGEMENT

A. Contaminated material shall be managed in accordance with Section 02 60 05 – Contaminated Material Management and Disposal.

B. Provide handling, containers, storage, signage, transportation, and other items required to manage wastes during the Project:
   1. Cover dumpsters as needed and prevent windblown trash.
   2. Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at the Site to the maximum extent practical.

C. Site Access and Temporary Controls:
   1. Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent facilities:
      a. Designate and label specific areas of the Site necessary for separating materials to be recycled or reused.
      b. Provide temporary controls in accordance with the Contract Documents.

D. Shipping Documents: Contractor shall prepare a non-hazardous waste manifest for each shipment of demolition and construction waste. Owner or an authorized agent will review and sign each manifest as generator of waste.

3.02 DISPOSAL OF WASTE

A. General: Except for items or materials to be recycled or recycled and reused, remove from the Site and properly dispose of waste at the Owner-approved facility such as permitted landfill, or other method acceptable to the Owner and authorities having jurisdiction.
   1. Except as otherwise specified, remove from the Site all waste and debris from the Work as it accumulates. Upon completion of the Work, remove materials, equipment, waste, and debris and leave the Site clean, neat, and orderly. Comply with the Contract Documents regarding cleaning and removal of trash, debris, and waste.
   2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn waste materials at the Site.

END OF SECTION

SECTION 01 77 19

CLOSEOUT REQUIREMENTS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope:
   1. Provisions of this section apply to the procedural requirements for closeout of Work executed by the Contractor.

B. Related Sections:
   1. Section 01 29 76 – Progress Payment Procedures.

1.02 SUBMITTALS

A. Informational Submittals: Submit the following:
   1. Removal documentation. Provide all documentation pertaining to all components of the executed Work and requiring inspection prior to submitting an application for Final Certification Inspection including, but not limited to, tables showing actual excavated and backfilled volumes, Construction Drawings, certified survey data, executed warranties, maintenance agreements, inspection certificates and similar required documentation for specific units of Work.
   2. Truck volume counts and measurement summary. Following completion of construction and as a pre-requisite for Final Certification Inspection provide the Engineer with final truck volume counts and measurement summary tables. Provide supporting data that was used to develop the measurement summary tables.

1.03 INSPECTION PROCEDURES

A. Substantial Completion:
   1. Preliminary Procedures: Prior to requesting an inspection for Substantial Completion, the Contractor shall complete the following:
      a. Prepare a list of items to be completed and corrected, including the value of the items on the list, and the reasons why the items are not completed. Submit the list to the Engineer.
      b. Advise the Engineer, in writing, of pending insurance changeover requirements, if applicable.
      c. Terminate and remove temporary facilities, including mockups, construction tools, and similar elements from the Site, as necessary.
      d. Complete grading, restoration, and final cleaning.
   2. Inspection: Submit a written request for inspection for Substantial Completion. Upon receipt of the request, the Engineer will proceed with the inspection or notify the Contractor of unfulfilled requirements. The Engineer will prepare the Certificate of Substantial Completion after inspection or will notify the Contractor of items, either on Contractor's list or additional items identified by the Engineer, that must be completed or corrected before the Certificate of Substantial Completion will be issued. Any outstanding items required for Substantial Completion at this time will be documented as the formal punch-list for Substantial Completion:
      a. Re-inspection: Request re-inspection when the punch-list is completed or corrected.
      b. Results of completed inspection will form the basis of requirements for Final Completion.

B. Final Acceptance:
   1. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:
      a. Submit a Request for Payment in accordance with the procedures specified in Section 01 29 76 – Progress Payment Procedures.
      b. Submit a Certification for the Engineer stating that all items, actions, and requirements of the punch-list have been completed, corrected, satisfied, or otherwise resolved.
   2. Inspection: Submit a written request for final inspection for acceptance. The Engineer will prepare a Recommendation of Final Payment after inspection or will notify the Contractor of work that must be completed or corrected before the Certificate will be issued.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 FINAL CLEANING

A. At the time of project closeout, clean and restore the Work area to its pre-construction condition or as indicated on the Design Drawings. Complete the following operations before requesting the Engineer's inspection for certification of substantial completion:
   1. Remove non-permanent protection and labels.
   2. Remove debris.
   3. Inspect Project Work Limits.

END OF SECTION

SECTION 01 78 39

PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope:
   1. Maintaining and submitting record documents in accordance with this Section.

B. Related Sections:
   1. Section 01 33 00 – Submittal Procedures.

1.02 SUBMITTALS

A. Closeout Submittals:
   1. Record Documents: Submit in accordance with Part 1.04 of this Section.

1.03 MAINTENANCE OF RECORD DOCUMENTS

A. Maintain in Contractor's field office, in clean, dry, legible condition, complete sets of the following record documents:
   1. Design Drawings, Project Specifications, and Addenda.
   2. Shop Drawings, Samples, and other Contractor submittals, including records of test results, reviewed or accepted, as applicable, by the Engineer.
   3. Change Orders, Work Change Directives, Field Orders, photographic documentation, survey data, permits, and all other documents pertinent to the Work.

B. Provide files and racks for proper storage and easy access to record documents. File record documents in accordance with the edition of the Construction Specification Institute's "MasterFormat" used for organizing the Project Manual, unless otherwise accepted by Engineer.

C. Make record documents available for inspection upon request of the Owner or Engineer.

D. Do not use record documents for purpose other than serving as Project record. Do not remove record documents from Contractor's field office without Engineer's approval.

1.04 SUBMITTAL OF RECORD DOCUMENTS

A. Prior to readiness for final payment, submit to Engineer one copy of the following record documents:
   1. Drawings.
   2. Specifications and Addenda.

B. Submit record documents with transmittal letter on Contractor letterhead complying with letter of transmittal requirements in Section 01 33 00 – Submittal Procedures.

C. Record documents submittal shall include certification, with original signature of an official authorized to execute legal agreements on behalf of Contractor, reading as follows:

"*[Insert Contractor's corporate name]* has maintained and submitted record documentation in accordance with Section 01 78 39 – Project Record Documents and other elements of

Contract Documents, for the Remedial Design – Operable Unit 2 project for the Former Philips Display Components Facility Remedial Construction, Seneca Falls, New York. We certify that each record document submitted is complete, accurate, and legible relative to the Work performed under our Contract, and that the record documents comply with the requirements of the Contract Documents.

[Provide signature, print name, print signing party's corporate title, and date]"

1.05 RECORDING CHANGES

A. General:
   1. At the start of the Project, label each record document to be submitted as "PROJECT RECORD" using legible, printed letters. Letters on record copy of the Drawings shall be 2 inches high.
   2. Keep record documents current. Make entries on record documents within two working days of receipt of information required to record the change.
   3. Do not permanently conceal the Work until required information has been recorded.
   4. Accuracy of record documents shall be such that future searches for items shown on the record documents may rely reasonably on information obtained from Engineer-accepted record documents.
   5. Marking of Entries:
      a. Use erasable, colored pencils (not ink or indelible pencil) for marking changes, revisions, additions, and deletions to record documents.
      b. Clearly describe the change by graphic line and make notations as required. Use straight-edge to mark straight lines. Writing shall be legible and sufficiently dark to allow scanning of record documents into legible electronic files.
      c. Date all entries on record documents.
      d. Call attention to changes by drawing a "cloud" around the change(s) indicated.
      e. Mark initial revisions in red. In the event of overlapping changes, use different colors for subsequent changes.

B. Drawings:
   1. Record changes on a copy of the Design Drawings. Submittal of Contractor-originated or -produced drawings as a substitute for recording changes on the Design Drawings is unacceptable.
   2. Record changes on plans, sections, schematics, and details as required for clarity, making reference dimensions and elevations (to Project datum) for complete record documentation.
   3. Record actual construction, including:
      a. Horizontal and vertical location of existing Underground Facilities and surface structures demolished, realigned, or abandoned in-place, referenced to permanent surface improvements. For each Underground Facility or surface structure, provide dimensions to at least two permanent, visible surface improvements.
      b. Horizontal and vertical limits of excavation.
      c. Location of exposed utilities and appurtenances concealed in construction, referenced to visible and accessible features of structure.
      d. Changes in structural and architectural elements of the Work, including changes in reinforcing.
      e. Field changes of dimensions, arrangements, and details.
      f. Changes made in accordance with Change Orders, Work Change Directives, and Field Orders.
      g. Changes in details on the Contract Drawings. Submit additional details prepared by Contractor when required to document changes.

4. Supplemental Drawings:
    a. In some cases, drawings produced during construction by Engineer or Contractor supplement the Design Drawings and shall be included with record documents submitted by Contractor. Supplemental record drawings shall include the following:
        1) Drawings provided with Change Orders, Work Change Directives, and Field Orders.
        2) Drawings that cannot be incorporated into the Design Drawings due to space limitations.
        3) Certified survey drawings, in accordance with Part 1.06 of this Section.
    b. Supplemental drawings provided with record drawings shall be integrated with the Design Drawings and include necessary cross-references between drawings. Supplemental record drawings shall be on sheets the same size as the Design Drawings.
    c. When supplemental drawings developed by Contractor using computer-aided drafting/design (CADD) software are to be included in record drawings, submit electronic files for such drawings in AutoCAD Civil 3D (2020 or later) format as part of record drawing submittal. Submit electronic files on compact disc labeled, “Supplemental Record Drawings”, together with Contractor name, Project name, and Contract name and number.

C. Specifications and Addenda:
1. Mark each Section to record:
    a. Manufacturer, trade name, catalog number, and Supplier of each product and item of equipment actually provided.
    b. Changes made by Addendum, Change Orders, Work Change Directives, and Field Orders.

1.06 CERTIFIED SURVEY DRAWINGS

A. Prepare the following survey drawings:
1. Excavation plan, depicting the final horizontal and vertical limits of excavation for each excavation area, including subgrade spot elevations, bottom and horizontal extents of documentation sample locations, and topographic contours, depicting final (post-construction) Site conditions and grades.

B. Drawing Requirements:
1. General Content:
    a. Property lines, easements, and rights-of-way.
    b. Topographic contours at minimum 1-foot intervals.
    c. Horizontal and vertical location of buildings, foundations, and walls adjacent to work areas.
    d. Horizontal location of exposed piping and utilities, poles, exposed wires, posts, signs, markers, curbs, fencing, gates, guard rails, guard cables, and other facilities visible at or above ground surface adjacent to work areas.
    e. Horizontal limits of lawns, pavements, roads, walks, drives, and other surface improvements adjacent to work areas.
    f. Horizontal location, size (diameter), and species of trees and other plantings adjacent to work areas.
2. Format: Submit survey drawings in the following formats:
    a. Hard copy:
        1) Sheet Size: 34 inches wide by 22 inches high.
    b. Electronic copy:
        1) Adobe PDF.

2) AutoCAD Civil 3D (2020 or later) format or another program format approved by the Engineer.

C. Certification:
   1. Each survey drawing shall be signed and sealed by a professional land surveyor licensed and registered in the State of New York.

1.07 ELECTRONIC FILES FURNISHED BY ENGINEER

A. CADD files will be furnished by Engineer upon the following conditions:
   1. Contractor shall submit to Engineer a letter on Contractor letterhead requesting CADD files and providing specific definition(s) or description(s) of how files will be used, and specific description of benefits to the Owner if the request is granted.
   2. Contractor shall execute Engineer's standard agreement for release of electronic files and shall abide by all provisions of the agreement for release of electronic files.
   3. Layering system incorporated in CADD files shall be maintained as transmitted by Engineer. CADD files transmitted by Engineer containing cross-referenced files shall not be bound by Contractor. Drawing cross-references and paths shall be maintained. If Contractor alters layers or cross-reference files, Contractor shall restore all layers and cross-references prior to submitting record documents to Engineer.
   4. Contractor shall submit record drawings to Engineer in same CADD format that files were furnished to Contractor.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 02 51 00

DECONTAMINATION

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope:
1. Furnish all materials, equipment, accessories, appurtenances and labor necessary to construct decontamination areas in accordance with the Design Drawings and maintain decontamination areas for the duration of the work.
2. Furnish all supervision, labor, materials, tools, equipment, accessories, and appurtenances necessary to decontaminate all Contractor's vehicles, vessels, tools, and equipment (herein collectively referred to as equipment) that comes in contact with contaminated materials. Work includes decontaminating equipment, tracking and reporting equipment decontamination status, and transporting and disposing of all decontamination waste.
3. Personnel decontamination procedures shall be addressed in the Contractor's Health and Safety Plan to be prepared in accordance with Section 01 35 29 – Contractor's Health and Safety Plan.

B. Related Sections:
1. Section 01 32 26 – Construction Progress Reporting.
2. Section 01 35 29 – Contractor's Health and Safety Plan.
3. Section 02 60 05 – Contaminated Material Management and Disposal.
4. Section 02 73 00 – Construction Water Management and Disposal.

1.02 QUALITY ASSURANCE

A. Regulatory Requirements:
1. Laws and Regulations applying to the Work under this Section include, but are not limited to, the following:
a. Occupational Safety and Health Administration (OSHA) regulations.
b. United States Coast Guard (USCG) regulations.
c. United States Environmental Protection Agency (USEPA) regulations.
2. Comply with the applicable provisions and recommendations of the following:
a. Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities (October 1985), as prepared by the National Institute of Occupational Safety and Health (NIOSH).

1.03 SUBMITTALS

A. Action Submittals:
1. Equipment Decontamination Plan. Submit an Equipment Decontamination Plan that includes, at a minimum, the following information:
a. Description of the decontamination procedures and equipment to be used to decontaminate the equipment, including:
1) Procedures to inspect, test, and document decontamination.
2) Procedures, materials, and equipment to remove contaminated materials from the equipment that complies with the Laws and Regulations.
3) Management of any waste, in accordance with applicable federal, state, and local laws, generated by the sampling and decontamination activities.

b. Description of the location(s) where equipment decontamination will be conducted, including materials of construction and methods for containment and collection of decontamination fluids.
c. A plan (drawn to scale) showing the proposed layout of equipment decontamination stations, relative to material handling areas and the temporary water treatment system, along with construction details for equipment decontamination stations and collection of decontamination fluids.
d. A list of all equipment and vessels that are expected to come in contact with contaminated materials.
e. A list of all materials and equipment planned for disposal as a result of decontamination activities including planned disposal locations.
f. A description of methods to track and report the daily decontamination status of all equipment.
g. Documentation that equipment being mobilized to the Project Site does not contain contaminants.
h. Safety Data Sheets (SDS) for all cleaning/decontamination solutions prior to import to the Site. A copy of the SDS shall also be maintained with the Contractor's Health and Safety Plan.

2. Equipment Decontamination Documentation Report and Certification. Submit an Equipment Decontamination Documentation Report and certification to the Engineer prior to the demobilization of any equipment that has contacted contaminated materials. The Equipment Decontamination Documentation Report shall include a description of decontamination procedures and the results of inspection and testing.

B. Informational Submittals:
1. Daily Activities Report. Include a Decontamination Status Report as part of the Daily Activities Reports prepared in Section 01 32 26 – Construction Progress Reporting. The Decontamination Status Report shall document all equipment and vessels that have undergone decontamination procedures and include the following, at a minimum:
a. Description of the decontamination status for each equipment, including whether it has come in contact with cadmium-containing materials.
b. Whether the status of an equipment has changed from handling contaminated materials to non-contaminated materials.
c. Results of any decontamination testing.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 PREPARATION

A. Equipment Decontamination Areas:
1. Construct and maintain decontamination area(s) to accommodate all loads, vehicles, equipment, and migration scenarios.
2. Construct decontamination areas at the locations shown on the Design Drawings. Alternative locations within the Project Work Limits shall be approved by the Owner/Engineer prior to construction. Equipment decontamination location(s) shall be established to adequately decontaminate the necessary equipment in a timely manner and adequately collect and contain any decontamination fluids generated.
3. Construct vehicle/equipment decontamination areas as specified on the Design Drawings. The Engineer will review/approve alternate decontamination area configuration/construction prior to construction.

B. Personnel Decontamination Areas:
   1. Construct and maintain appropriately-sized decontamination areas for personnel.
   2. Locate personnel decontamination areas within the contamination reduction zone and include those facilities necessary to decontaminate personnel upon exiting the work area (exclusion zone), in accordance with the Contractor's HASP, and in accordance with local, state, and federal laws and regulations.
   3. At a minimum, personnel decontamination areas shall include run-on/run-off controls.

3.02 DECONTAMINATION REQUIREMENTS:

A. General:
   1. Decontaminate all equipment that comes in contact with contaminated material prior to handling clean materials or prior to demobilization from the Project Site.
   2. Decontaminate equipment in accordance with applicable federal and state regulations and the procedures described below, as well as in the Contractor's approved Equipment Decontamination Plan.
   3. Take precautions to limit contact between the vehicle/equipment, personnel performing the decontamination activities, and any decontamination liquids that may accumulate in the decontamination area. Use personal protective equipment, including disposable clothing for personnel engaged in decontamination activities, as required by the Contractor's HASP.
   4. Surfactants shall not be used to decontaminate equipment.

B. Vehicles:
   1. All vehicles requiring decontamination shall be washed sufficiently to remove all visible soil/sediment from the vehicle body, undercarriage, and tires. Contractor shall ensure no visible tracking of sediment onto roadways occurs, as visually confirmed by the Engineer.

C. Heavy Equipment – Remain on Site:
   1. For equipment that will remain on site and be dedicated to future potential Project use and may be used for other operations (such as backfilling):
      a. Remove all visible sediment on the surface of the equipment to satisfaction of the Owner and/or Engineer.

D. Heavy Equipment – Demobilization:
   1. For equipment that will no longer be used on the Project:
      a. Contractor shall remove all visible material on the surface of the equipment to satisfaction of the Owner and/or Engineer.
   2. Contractor shall certify that all equipment being demobilized from the Project Site has been decontaminated in accordance with all applicable federal and state regulations and the approved Equipment Decontamination Plan.

E. Personnel:
   1. Personnel decontamination shall be performed in accordance with the Contractor's HASP.

3.03 DECONTAMINATION PROCEDURES

A. The decontamination process shall be performed in such a manner that wastes generated during decontamination is captured and contained from contact with adjacent surfaces and waterways.

B. Decontamination solids and water captured shall be removed as operationally necessary, or as required by the Engineer.

C. Equipment decontamination procedure shall, at a minimum, include the following actions by the Contractor unless otherwise specified:
   1. Decontaminate equipment at locations approved by the Engineer.
   2. Remove remaining soil/sediment from equipment surfaces using shovels, brooms, and other hand tools as necessary.
   3. Wash equipment surfaces using pressure washers and related supplies (e.g., equipment for scrubbing and plastic sheeting), where appropriate, to remove any additional soil/sediment that may remain.
   4. Visually inspect equipment surfaces to verify the removal of all visible sediment.
   5. Engineer may collect wipe samples from equipment surfaces to verify proper decontamination.
   6. Re-clean and re-test equipment if proper decontamination is not achieved.
   7. Collect and transport all decontamination-related solids and personal protective equipment to an approved off-site disposal facility in accordance with Section 02 60 05 – Contaminated Material Management and Disposal.
   8. Collect and dispose offsite all decontamination-related liquids to an approved disposal facility in accordance with Section 02 73 00 – Construction Water Management and Disposal.
   9. Maintain a daily log for equipment designated for impacted material handling versus backfilling/clean material handling. Equipment shall be appropriately marked as designated for impacted material or clean material to prevent the potential for cross-contamination.
   10. Submit a Decontamination Status Report to the Engineer daily documenting the status of equipment that will be used for continued operation.
   11. Submit an Equipment Decontamination Documentation Report to the Construction Manager to certify decontamination has been completed on equipment before it is demobilized.

3.04 DISPOSAL OF DECONTAMINATION RESIDUES AND FLUIDS

A. Management and disposal of wastes generated through the course of decontaminating Project vessels and equipment will be the responsibility of the Contractor.
   1. Decontamination fluids shall be managed as construction water under Section 02 73 00 – Construction Water Management and Disposal. Remove accumulated liquids on a periodic basis so as to not exceed the capacity of the decontamination area.
   2. Decontamination residues, including waste sediments/soils, shall be managed in accordance with Section 02 60 05 – Contaminated Material Management and Disposal.
   3. Used PPE shall be bagged and placed in designated containers for disposal in accordance with Section 02 60 05 – Contaminated Material Management and Disposal.

END OF SECTION

SECTION 02 60 05

CONTAMINATED MATERIAL MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope:
   1. Provide all labor, materials, equipment, vehicles, tools, and incidentals as specified and required for the loading and transportation of solid Contaminated Materials and other solid wastes from the Work Area to an Owner approved offsite disposal facility. Contaminated Materials include, but are not limited to, excavated material, debris, vegetation, and personal protective equipment.
   2. Provide all labor, supervision, materials, tools, equipment, services, accessories, and appurtenances for or incidental to material handling, processing, stockpiling, and management necessary to facilitate disposal in accordance with the Design Drawings and in the Project Specifications. This includes, but is not limited to, construction of any material processing area(s); processing and dewatering the excavated materials and debris to meet the specified landfill criteria; segregating, handling, and staging material at the material processing areas(s) prior to transport offsite; managing excavated material stockpiles; and testing excavated materials as required for transport and disposal.
   3. Pay all fees (unless otherwise paid by the Owner) associated with transporting and disposing contaminated material.
   4. Provide all labor, materials, equipment, tools, and incidentals required for removal and restoration of material processing areas(s) in accordance with the Contract Documents.
   5. Engineer has conducted pre-excavation in-situ waste characterization sampling on behalf of Owner to assess soils to be generated from remedial excavations for the toxicity characteristic (D006). Soils shall be managed as follows, unless otherwise indicated by Engineer:
      a. Soils from Historical Outfalls 2, 3, 4, and 5 shall be managed as hazardous waste (D006). These soils shall also carry the F002 code. These soils will be transported for offsite treatment at the U.S. Ecology Michigan Disposal, Inc. facility in Belleville, Michigan, with final disposal at the U.S. Ecology Wayne Disposal, Inc. facility in Wayne, Michigan, unless otherwise indicated by Engineer.
      b. Soils from Historical Outfalls 6, 7, and 6/7 shall be managed as hazardous waste (F002). Owner or Engineer may elect to pursue a contained-in determination from NYSDEC to allow these soils to be disposed of as non-hazardous waste. In the case of a contained-in approval from NYSDEC, these soils will be transported for offsite disposal at the Waste Management, Inc. High Acres Landfill in Fairport, New York, unless otherwise indicated by Engineer.
      c. Engineer will obtain waste profile acceptance from the above disposal facilities and will coordinate with Owner for signature of waste manifests.

B. Related Sections:
   1. Section 01 32 16 – Construction Project Schedule.
   2. Section 01 35 29 – Contractor's Health and Safety Plan.
   3. Section 01 57 05 – Temporary Controls.
   4. Section 01 74 19 – Construction Waste Management and Disposal.
   5. Section 02 73 00 – Construction Water Management and Disposal.

1.02 REFERENCES

A. Reference Standards:
   1. The following standards are referenced in this Section:
      a. ASTM D1557, Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3 [2,700 kN-m/m^3]).
      b. USEPA SW-846 Method 9095, Paint Filter Liquids Test.

1.03 TERMINOLOGY

A. The following words or terms are not defined but, when used in this Section, have the following meaning:
   1. “Construction water” is water that comes into contact with contaminated materials or surfaces, which includes water from excavation dewatering, material staging and processing, Stormwater that accumulates within excavation or staging areas, backwash water generated during operation of the pretreatment system, and water used for decontamination. Construction water shall be managed in accordance with Section 02 73 00 – Construction Water Management and Disposal.
   2. “Contaminated material” is material within the specified removal limits, materials containing visual staining or site-related contaminants of concern, including cadmium laden material. Examples of potential contaminated material include, but are not limited to, the following:
      a. Site clearing and grubbing wastes within the excavation areas.
      b. Excavation waste.
   3. “Disposal” is removal to an off-site location of contaminated material or subsequent recycling, reuse, or disposal in the Owner-approved landfill conforming to Laws and Regulations and acceptable to authorities having jurisdiction.
   4. “Excavation waste” is earth; sand; clay; gravel; hardpan; soft, weathered, or decomposed rock; debris; and other materials removed from within the excavation limits.

1.04 QUALITY ASSURANCE

A. Regulatory Requirements:
   1. Laws and Regulations applying to the Work under this Section include, but are not limited to, the following:
      a. 40 CFR 261.3, 264, and 265, Resource Conservation and Recovery Act (RCRA).
      b. 40 CFR 461.Cadmium Manufacturing, Processing, Distribution In Commerce, And Use Prohibitions.
      c. 49 CFR 171.8, Transportation, Definitions and Abbreviations.
      d. 49 CFR Part 172, Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, And Training Requirements including Subpart H – Training.
      e. 6 New York Codes, Rules, and Regulations (6 NYCRR) Parts 360, Solid Waste Management Facilities.
      f. 6 NYCRR 364, Waste Transporter Permits.
      g. 6 NYCRR 370, Hazardous Waste Management System – General.
      h. 6 NYCRR 371, Identification and Listing of Hazardous Wastes.
      i. 6 NYCRR 372, Hazardous Waste Manifest System and Related Standards for Generators, Transporters, and Facilities.
      j. 6 NYCRR 373, Hazardous Waste Management Facilities.
      k. 6 NYCRR 375, Environmental Remediation Programs.
      l. 6 NYCRR 376, Land Disposal Restrictions.
      m. USDOT Regulations.
      n. NYSDOT Regulations.

2. Comply with applicable provisions and recommendations of the following:
    a. National Manual on Uniform Traffic Control Devices for Streets and Highways.

1.05 SUBMITTALS

A. Action Submittals:
    1. Product Data: Submit manufacturer's product data for proposed soil drying agent.
    2. Material Handling and Dewatering Plan, which will include solid material management and drying, and solidification means and methods for review and approval by the Engineer. The information shall include, but is not limited to, the following:
        a. A detailed description of the means and methods, including all equipment and personnel, for managing, handling, processing, dewatering, and stockpiling excavated material. This shall include details regarding the types, sizes, specifications, and quantities of equipment the Contractor proposes to utilize for material removal and processing.
        b. Description of construction methodology for the material staging areas and access roads shown on the Design Drawings.
        c. Figures showing the locations, arrangement, and layout of the material processing areas including unloading/transfer areas, processing areas (i.e., typical containment area shown on the Design Drawings), equipment locations, and any other details pertinent to the processing and handling of the excavated materials.
        d. Description, number, and type of trucks (watertight) or other vehicles to be used for on-site material transport, including debris from point of removal. Description shall include method to water-tight containment and covering utilized to safely transport materials.
        e. Details related to the Contractor's proposed dewatering and stabilizing means and methods if dewatering and stabilization is required. Contractor shall identify any stabilization agent(s) proposed for use in the dewatering process to satisfy disposal facility requirements. The information shall include specific manufacturer and material information and performance data for any proposed stabilization agents. Contractor shall include calculations and assumptions associated with the selection of the stabilization agent(s) and the estimated quantity of stabilization agent(s) to be used by weight.
        f. A detailed description of the means and techniques for storing, introduction, and mixing of any stabilization agents, including a detailed description of measures for controlling and mitigating dust generation.
        g. Results of any supplemental testing and studies to support the Contractor's proposed dewatering activities.
        h. Description of all necessary containment systems for material staging, including:
            1) Description of all necessary measures and materials for covering stockpiles and limiting exposure of material to inclement weather.
            2) Description of the stockpile cover installation sequence to ensure efficient covering of the stockpile. Include details of cover installation methods, erosion protection features where cover sheds water outside of material staging area, methodology for moving ponded water off of the cover, ballasting plan to prevent uplift due to high winds, and material specifications of the proposed cover.
    3. Waste Transportation and Disposal Plan. Submit acceptable plan for managing waste within 14 days after Project Award, and before generating any Project waste. At a minimum the Waste Transportation and Disposal Plan shall include the following:
        a. Name and address of all waste transporters to be used to complete the Project.
        b. Federal/State Transporter Identification Numbers and expiration date.
        c. Proof of permit, license, or authorization to transport hazardous material in New York State.
        d. Identification of Contractor's Waste Transport Manager.

e. Procedures for separating each type of waste, including sizes of containers, container labeling, and designated location at the Site where materials will be separated and stored.
f. Draft waste manifests for hazardous and non-hazardous wastes.
g. A description of the procedures, materials, and equipment to be used for transporting waste materials to the disposal location including, but not limited to, the following:
    1) Traffic control procedures.
    2) Truck inspection and decontamination procedures.
    3) Coordination with the Landfill Operations Contractor.
    4) Record keeping procedures and submittal of daily transport reports/trucking logs.
    5) A list of expected waste streams.
    6) Estimated number of truckloads to be transported offsite each week along with the maximum truckload weights.
    7) Means and methods for lining and covering trucks.
    8) Means, methods, and locations for loading material onto trucks.
    9) A description of the means and methods to weigh each truckload.
    10) A description of the waste manifest and chain-of-custody procedures.
    11) A template for waste manifests that will be used to document the chain of custody of each truckload of materials transported offsite.
    12) Emergency response plan.
    13) Waste profiles.
    14) A list of all disposal facilities including name, address, telephone number, contact name, and Federal/State ID numbers.

B. Informational Submittals:
   1. Daily Transportation Reports/Logs: Submitted to the Engineer on the day following Work on the Project. At a minimum, the daily reports/logs shall summarize the following information for each truckload:
      a. Date.
      b. Load number (sequential).
      c. Waste Manifest Number.
      d. Type of material transported (e.g., hazardous waste, non-hazardous waste, debris, vegetation).
      e. Disposal location (e.g., disposal facility name).
      f. Approximate volume and weight of the material.
      g. Transporter vehicle container type, license plate number (truck and trailer, if used), and driver name.

   2. Records
      a. Initial and final signed manifests for hazardous and non-hazardous wastes.
      b. Decontamination certificates.
      c. Written confirmation of acceptance of waste from disposal facility.
      d. Certificates of disposal for hazardous waste and non-hazardous waste.
      e. Signed bills of lading for salvaged or recycled materials.
      f. Weight tickets for hazardous waste and non-hazardous waste.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver bulk soil drying agent and store the drying agent under polyethylene sheeting until needed for solidification activities.

PART 2 - PRODUCTS

2.01 SOLIDIFICATION/DRYING AGENT (IF NECESSARY)

A. Provide solidification/drying agents in sufficient quantities to reduce water content of sediment and saturated soils requiring disposal.

B. Solidification/drying agent may include Portland cement, cement kiln dust, lime kiln dust, non-biodegradable sorbent containing no more than 50 percent reactive (free) calcium oxide (CaO) and magnesium oxide (MgO) by weight, or other product acceptable by the Engineer prior to acquisition, shipment to site, and use. Test alternate materials at the Contractor's cost to show conformance with required moisture and strength properties. Such data shall be provided to the Engineer for review and approval prior to import or use of such materials at the site.

PART 3 - EXECUTION

3.01 GENERAL

A. Site Access and Temporary Controls:
   1. Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent facilities.
   2. Designate and label specific areas of the site necessary for separating and storing wastes. Segregate waste streams as required.

3. Provide temporary controls in accordance with Section 01 57 05 – Temporary Controls.
4. Material dewatering, processing, and mixing operations shall be performed in a manner that minimizes dust generated such that dust is not visible beyond the immediate vicinity of the mixing location and is compliant with the requirements in Section 01 57 05 – Temporary Controls. Contractor shall use control measures and techniques to comply with these requirements.
5. Contractor shall monitor air in the breathing zone during material dewatering, processing, and mixing operations in accordance with the Contractor's Health and Safety Plan prepared in accordance with Section 01 35 29 – Contractor's Health and Safety Plan.

B. Material Processing Area(s):
1. Contractor shall construct any necessary material processing area(s) in accordance with the Contractor's approved Material Handling and Dewatering Plan and the requirements of the Contract Documents.
2. Contractor shall maintain the containment area at the material processing area(s) to contain excavated materials, debris, and liquids and to prevent release or spillage to surrounding land and adjacent surface water.
3. Material processing area(s) shall be sloped to facilitate the collection and treatment of liquids generated.
4. Contractor shall install, maintain, and operate transfer pumps, sump pumps, piping, storage tank(s), and appurtenances as necessary to collect and transfer water that accumulates in the containment area to the temporary water pretreatment system in accordance with Section 02 73 00 – Construction Water Management and Disposal.
5. The Contractor shall have readily available adequate spill containment and cleanup supplies at the material processing area.

C. Water Management:
1. Manage construction water from the material dewatering process, if necessary; Stormwater runoff into excavation areas and temporary containment area(s), water collection system, and sumps; decontamination wash water; and water from other water-generating activities conducted in the material processing area(s). This water shall be collected and disposed of as detailed in Section 02 73 00 – Construction Water Management and Disposal and in accordance with all permits.

D. Maintenance and Housekeeping:
1. Perform all necessary maintenance activities at the material processing area(s) throughout the duration of the Work.
2. Inspect the material processing area(s) at least once per day and include an inspection summary in the Daily Activities Report to be prepared and submitted in accordance with Section 01 32 26 – Construction Progress Reporting. The inspection and associated maintenance shall include the following activities:
    a. Inspecting all areas to ensure integrity of the surface.
    b. Inspecting water collection systems and sump locations to verify effective performance of the system.
    c. Inspecting all barriers, liners, containment systems, and environmental controls.
    d. Inspecting stockpile sheeting or covering at least once per day.
    e. Maintaining the material processing area(s) clean and free from rubbish and debris at all times.
    f. Any deficiencies or necessary repairs noted during inspections shall be reported to the Engineer and repairs implemented immediately.

E. Misplaced Materials:
1. Implement measures to prevent materials from being misplaced. Contractor shall use drip aprons, spill plates, splash shields, secondary containment, and other approved equipment or controls to prevent the loss of materials during the Work. Any materials that

spill or are misplaced by the Contractor in areas not approved by the Engineer shall be reported to the Engineer immediately and removed at no additional cost to the Owner.

3.02 DEWATERING OF EXCAVATED MATERIALS

A. General:
   1. Contractor shall dewater and stabilize excavated material in accordance with all applicable laws and regulations for transportation over public roadways. Materials shall be processed to meet the requirements of this Section.
   2. Dewatering may include one or more of the following:
      a. Active dewatering of soil/sediment before or during excavation.
      b. Blending of dry soil/sediment with wet soils.
      c. Stockpiling excavated soil/sediment within the removal limits on a temporary basis to allow for gravity dewatering.
      d. Use of approved soil/sediment drying agent to amend excavated soil/sediment.
         1) Unless otherwise directed by Engineer, excavated soil/sediment shall be amended with no more than five percent soil drying agent by weight.
         2) If amendments or stabilization additives are used to process the excavated material, Contractor shall optimize the volume or weight added to the excavated material. In addition, the amendments or additives shall not significantly change the characterization of the excavated material.
   3. Excavated material handling, processing, dewatering, and staging activities shall be conducted within excavation areas or within material processing area(s) constructed by the Contractor in accordance with the Contract Documents.

B. Material Processing Requirements:
   1. Excavated material shall be dewatered or otherwise processed to meet the following offsite transport requirements:
      a. Material shall not contain free liquids (based on the Paint Filter Liquids Test [EPA SW-846 Method 9095B] and visual observation).
      b. Material shall not be a characteristic hazardous waste through application of any amendments or stabilization agents.
      c. Material shall have a minimum bearing strength of 6 pounds per square inch. Bearing strength will be measured using a pocket penetrometer test performed on a sample of the processed waste compacted in a compaction mold using a Proctor compaction effort (ASTM D1557). Pocket penetrometer testing, including sample preparation, will be performed by the Engineer or their designer.
      d. Processed material shall be capable of being loaded and unloaded with a standard excavator and wheel loader.
      e. At its discretion, Engineer may test processed material in accordance with Part 3.07 to verify compliance with these criteria. If the processed material or debris does not meet these criteria, the material shall be reprocessed by the Contractor as required to meet the requirements specified herein with no additional cost to the Owner or Engineer.

C. Addition of Solidification and Drying Agents
   1. Provide required solidification and drying agents in sufficient quantities as specified, without delay. Bulk shipments of the approved drying agent shall be covered with polyethylene sheeting prior to use.
   2. Determine the actual amount of solidification agent needed for drying of sediments requiring off-site disposal. Provide a means for accurate measurement and documentation for verifying that the appropriate quantities of solidification and drying agents are maintained.
   3. Place and mix the appropriate quantities of drying reagent in such a manner as to achieve thorough mixing with excavated material, as needed to reduce water content until the material passes the paint filter testing procedures. Thoroughly mix the agents and sediment/soil as required to achieve a homogeneous mixture.
   4. Measures shall be implemented to monitor, control, and minimize the amount of heat, if generated, during the mixing and the stabilization process.
   5. Control measures shall be implemented to minimize the potential for airborne dust during mixing operations and to maintain compliance with the air quality requirements.

3.03 DEBRIS SEGREGATION AND PROCESSING

A. Grubbing waste that have contacted contaminated material shall be managed for disposal in a manner consistent with the soils from the associated excavation area. Vegetative material from clearing activities (i.e., above-ground removal) will be recycled by chipping it into mulch and beneficially reusing on site. Debris and vegetation that have not come in contact with impacted material shall be segregated and transported for management in accordance with Section 01 74 19 – Construction Waste Management and Disposal.

B. Contractor may elect to or be required to segregate and decontaminate certain removed debris for reuse of the material as part of removal area restoration activities (e.g., shoreline rip rap). The Engineer may identify and notify the Contractor of items identified for reuse. Materials for reuse shall be decontaminated by the Contractor using a high-pressure water spray and any other methods necessary (e.g., brushing) to remove all adhered soils, sediments, and other solids to the satisfaction of the Engineer. Decontaminated materials shall be subject to visual inspection by the Engineer prior to reuse. Decontamination shall be performed within a contained area where water and solids can be collected for proper disposal. Decontaminated debris shall be segregated and staged separately from other materials in a location approved by the Engineer.

3.04 TEMPORARY STORAGE OF CONTAMINATED MATERIAL

A. General:
   1. Provide temporary staging areas adequate to support and withstand traffic loads during the Project. Locate temporary staging areas in Engineer-approved locations.
   2. Store waste materials destined for disposal in locations approved by the Engineer so as not to endanger the work, and so that easy access may be had at all times to all parts of the work area. Maintain stored materials in neatly piled and trimmed for stability and to facilitate covering with polyethylene sheeting.
   3. Provide safe and adequate vehicle/ equipment access to and egress from excavations.
   4. Take necessary precautions to permit access at all times to fire hydrants, fire alarm boxes, driveways, and other points where access may involve the safety and welfare of the general public. Maintain site access for utility personnel at all times.

B. Excavated Soil, Sediment, and Debris:
   1. It may be necessary to store excavated materials on-site on a temporary basis to accommodate one or more of the following:
      a. Construction sequencing.
      b. Disposal facility scheduling issues.
      c. Soil dewatering requirements.
   2. Only stockpile excavated materials within the limits of excavation or in a properly constructed temporary containment area.
      a. Maintain separate piles based on the type and characteristics of the material (e.g., hazardous vs. non-hazardous, unprocessed soil/sediment, processed soil/sediment, oversized debris, and processed debris).
      b. Neatly pile and trim stockpiles.
      c. Securely cover stockpiles at all times (during both working and non-working hours) with minimum 10-mil polyethylene sheeting when not in use. Properly anchor sheeting to prevent uplift due to wind conditions and install to minimize the ponding of precipitation.
      d. Based on site conditions, Engineer may elect to limit the maximum allowable stockpile size. Limitations to stockpile size shall not result in any additional cost to the Owner or Engineer.
      e. Stockpiles shall be inspected daily (at a minimum), and any noted deficiencies shall be immediately corrected by the Contractor to the satisfaction of the Owner/Engineer.
   3. Measures shall be implemented to control the potential for airborne dust during material staging and to maintain compliance with the specified requirements.

3.05 LOADING, TRANSPORTATION, AND DISPOSAL

A. General:
   1. Trucks used to transport Contaminated Material over public roads will require a Waste Transporter Permit issued pursuant to 6 NYCRR Part 364. Contractor shall obtain all federal, state, and local permits as required for the transport of the Contaminated Material. Contractor shall adhere to all permit requirements.
   2. Contractor shall comply with the requirements of 6 NYCRR Part 372 - Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities, and specifically 372.3(b) – Manifest Requirements.
   3. Contractor shall be responsible for delivery and unloading of the materials at the disposal facility.
   4. Contractor shall assign at least one Waste Transport Manager to coordinate the loading, transport, and unloading of trucks transporting materials from the Work Areas to the offsite disposal facility. The Waste Transport Manager shall:
      a. Be present at the Project Site when waste is being transported.
      b. Be trained in accordance with the requirements of 49 CFR Part 172 Subpart H.
      c. Ensure the approved transport haul routes and chain of custody requirements are followed.
      d. Prepare, review, and coordinate signature of waste manifests with Engineer for each truck prior to departing work area.
      e. Be responsible for marking/labeling/placarding each shipment in accordance with applicable Department of Transportation requirements.
      f. Be responsible for tracking the location of each truck transporting materials from the work areas to the disposal location and shall be capable of communicating directly with the truck driver by telephone or radio.
   5. Contractor personnel shall wear personal protective equipment and protective clothing consistent with the levels of protection indicated in the Contractor's Health and Safety Plan.
   6. Contractor shall be responsible for removal of solid waste and debris at the Project Site throughout the duration of the Work. At all times, Contractor shall ensure that the area within the Limits of Work and the adjoining areas, including roadways, access areas, and storage areas used, are free of solid waste and debris and shall clean up the Project Site and remove all solid waste and debris as Work progresses.

B. Waste Profiles and Shipping Documents:
   1. Contractor shall prepare a waste manifest for each truckload of excavation waste to be transported offsite. Waste manifests shall:
      a. Be completed in compliance with all USEPA, DOT, and State regulations.
      b. Include transportation vehicle truck ID number (e.g., license plate number of the truck and/or trailer used).
      c. Include date and time of loading at the site.
      d. For hazardous wastes, comply with 40 CFR 262 and 49 CFR 172.101.
      e. For hazardous wastes, be accompanied by a written certification from the Contractor's Waste Transporter Manager that the manifest has been filled out in compliance with all USEPA, DOT, and State regulations.
      f. Be used to guarantee the identity and integrity of the materials transported offsite and shall serve as a chain of custody.
   2. Contractor shall be responsible for preparing all applicable documentation (e.g., waste profiles, bills of lading, manifests) for disposal of any waste materials.
   3. The Contractor shall submit to the Engineer documentation certifying that all waste materials were transported and disposed of properly. Documentation shall include:
      a. Signed manifests, within 48 hours of shipment offsite.
      b. Signed bills of lading, within 48 hours of shipment offsite.
      c. Certificates of Disposal from the disposal facility for all wastes shipped off-site, within 180 days of shipment offsite.

C. Loading:
   1. Contractor shall dewater and stabilize material in accordance with Part 3.02 of this Section prior to loading material into trucks for transport offsite.
   2. Contractor shall be responsible for segregating, processing, and sizing debris and vegetation as necessary to meet the landfill criteria described in Part 3.03 of this Section prior to loading material into trucks for transport offsite.
   3. All processed material and debris shall not contain free liquids (based on Paint Filter Testing and visual observation by the Engineer) prior to loading into trucks for transport.
   4. Contractor shall load dewatered/stabilized soil/sediment, debris, and vegetation into lined and covered roll-off containers, lined and covered dump trucks, or lined and covered dump trailers in accordance with the Contractor's approved Waste Transportation and Disposal Plan.
      a. Transportation vehicles and roll-off containers transporting waste from the site shall be lined with 10-mil or two 6-mil polyethylene sheeting, and covered with waterproof tarps.
   5. Load contaminated material in a manner as to avoid contamination of their exteriors, including tires (e.g., loaded with 10-mil polyethylene sheeting draped over the side of the truck).
   6. A written certification shall be provided to Engineer for each shipment stating that:
      a. No soil from the exclusion zone or the contamination reduction zone adheres to the vehicle (including tires and undercarriage).
      b. The transportation vehicle is not leaking materials or dripping liquids in any amount.
      c. Any waste materials, debris, or contaminated materials are covered with a tarp, or are otherwise completely enclosed so as not to cause or permit discharge from the vehicle during transport.

D. Transportation and Disposal:
   1. Contractor shall transport all waste in accordance with all applicable federal, state and local regulations.

2. Contractor shall inspect vehicles before leaving the site. Clean vehicles of visible soil or debris within temporary decontamination area in accordance with Contractor's HASP.
3. Contractor shall be responsible for providing adequate measures to prevent the development of free liquids (as determined by the Paint Filter Test) during transport and to prevent spillage or discharge of waste from the transportation vehicle during waste hauling operations.
4. Materials shall only be transported in trucks licensed and designed for secure soil transport as to prevent the release and deposit of any materials over public roads, private roads, and other pavements. No leakage is allowed from trucks.
5. All material transported from the work area shall be completely covered. Loads shall be secured so that there is no material or dust being released from the vehicle during transport. Contractor shall ensure that soil, sediment, liquid, or other material is not released during transport.
6. Contractor shall estimate the volume of each truckload prior to leaving the work area. Trucks shall not be overloaded.
7. Trucks transporting excavated material from the work areas offsite shall follow the haul route shown on the Design Drawings.

3.06 MEASUREMENT

A. Upon entering and leaving the site, the transportation vehicle shall be weighed on a scale certified by the NYS Bureau of Weights and Measures. The scale shall be independent from the disposal facility and located within 25 miles of the Site.

B. A printed ticket with the time, date, and net weight of material being transported for disposal shall be obtained and provided to Engineer.

3.07 DECONTAMINATION

A. Equipment and vehicles that enter the material processing area or come in contact with contaminated material shall be decontaminated in accordance with the Contractor's Health and Safety Plan before being removed from the exclusion zone or before demobilization from the Project Site.

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SECTION 02 73 00

CONSTRUCTION WATER MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope:
   1. Provide all labor, materials, and equipment and execute all activities necessary to collect and manage construction water generated during work performed under this contract.
      a. Impacted water that must be collected, containerized, characterized for disposal, and disposed of off-site include, but are not limited to:
         1) Rainfall runoff which accumulates in excavation areas to any depth.
         2) Direct precipitation in soil excavation areas to any depth.
         3) Water generated from soil dewatering operations.
         4) Water generated from equipment and personnel decontamination/cleaning activities.
         5) Groundwater/surface water encountered during construction activities.
      b. Unimpacted Stormwater collected in or diverted from Historical Outfall ditches upstream from excavation areas must be discharged to same Historical Outfall ditch downstream of excavation areas.

B. Coordination:
   1. Coordinate proper collection of waters as specified under this Section.
   2. Coordinate proper storage of collected waters as specified under this Section.
   3. Coordinate proper disposal of collected waters as specified under this Section.

C. Related Sections:
   1. Section 01 35 29 – Contractor's Health and Safety Plan.
   2. Section 01 53 53 – Temporary Water Treatment System.
   3. Section 02 60 05 – Contaminated Material Management and Disposal.

1.02 TERMINOLOGY

A. The following words or terms are not defined but, when used in this Section, have the following meaning:
   1. "Impacted Water" is water that comes into contact with contaminated materials or surfaces, which includes water from excavation dewatering, material staging and processing, stormwater that accumulates in excavation or staging areas, and water used for decontamination.
   2. "Contaminated material" is material containing visual staining or site-related contaminants of concern, including Cadmium-impacted material. Examples of potential contaminated material include, but are not limited to, the following:
      a. Site clearing and grubbing wastes.
      b. Excavation waste.
   3. "Excavation waste" is earth; sand; clay; gravel; hardpan; soft, weathered, or decomposed rock; debris; and other materials removed from within the excavation limits.
   4. "Unimpacted Stormwater" is water encountered or generated during construction activities that has not contacted contaminated materials or equipment, including stormwater originating upstream from excavations that is collected and/or diverted before entering excavation areas.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 CONSTRUCTION WATER MANAGEMENT

A. Collection of Liquids:
   1. Collect and containerize all impacted water that requires handling (i.e., liquids in contact with contaminated soils and/or construction equipment prior to decontamination). The method(s) by which the water is collected shall be area-specific, and shall be conducted in a manner that prohibits the spillage, leakage, or other release of water as collected.
   2. Maintain timely and accurate records concerning the volumes and areas from which accumulated liquids are removed.
   3. Properly clean all equipment utilized to collect and treat accumulated liquids prior to its removal from the Site.
   4. Minimize the amount of solids present in the water extracted from the removal areas, (e.g., constructing sumps and keeping the intake of the pump off the bottom and away from the sidewalls of the area being dewatered). The sump shall consist of one of or a combination of the following methods:
      a. A sump backfilled with washed gravel.
      b. A perforated vessel (i.e., a corrugated metal pipe or drum), wrapped with a non-woven geotextile fabric and/or filled with gravel.
      c. Straw bales/silt fences around the area where surface water/groundwater is being pumped.
   5. Impacted Water Management:
      a. Collect and process rainfall runoff and direct precipitation that accumulates in excavation areas and as discussed in this Section.
      b. Collect and process water from soil dewatering that accumulates in the staging area as discussed in this Section.
      c. Collect and process water generated from equipment and personnel decontamination/ cleaning activities as discussed in this Section.
      d. Collect and process groundwater that pools in the excavation areas during construction activities as discussed in this Section.
   6. Unimpacted Stormwater Management:
      a. Collect or divert, and discharge downstream, stormwater that originates upstream from excavation areas in accordance with New York State Erosion and Sediment Control Manual requirements.
      b. Do not use collection and processing equipment that has been used for handling Impacted Water unless decontamination has been conducted in accordance with the Specifications.

B. Handling and Storage:
   1. Store all collected Impacted Water in DOT-approved containers at all times. Storage containers may be reused by the Contractor, unless directed otherwise by the Engineer. Under no circumstances are uncontaminated liquids to be placed in containers previously occupied with Impacted Water.
   2. Clearly mark all storage containers to indicate the known or suspected contents, source area(s), and date(s) of generation.

C. Disposal:
   1. Dispose of Impacted Water at an Owner approved disposal facility in accordance with all Federal, State, and Local laws and regulations. Contractor shall provide documentation

from transporter and disposal facility consistent with Specification Section 02 60 05 where applicable.

END OF SECTION

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SECTION 03 37 00

FABRIC FORMED CONCRETE

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope:
   1. Furnish all labor, materials, equipment, and incidentals required and perform all operations in connection with the installation of the fabric formed concrete erosion control lining systems in accordance with the lines, grades, design, and dimensions shown on the Contract Drawings and as specified herein. If the contractor is inexperienced, then the fabric formed concrete manufacturer's representative shall provide on-site technical assistance at the beginning of the installation for a length of time the contractor is sufficiently experienced to complete the remaining installation.
   2. The work shall consist of installing an unreinforced concrete lining by positioning specially woven, double-layer synthetic forms on the surface to be protected and filling them with a pumpable fine aggregate concrete (structural grout) in such a manner as to form a stable lining of required thickness, weight and configuration.

B. Related Sections:
   1. Section 31 23 00 – Excavation and Fill.

1.02 REFERENCES

A. Reference Standards:
   1. The following standards are referenced in this Section:
      a. ASTM C 31 Standard Practice for Making and Curing Concrete Test Specimens in the Field.
      b. ASTM C 33 Standard Specification for Concrete Aggregates.
      c. ASTM C 94 Standard Specification for Ready-Mixed Concrete.
      d. ASTM C 109 Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-inch or [50-mm] Cube Specimens).
      e. ASTM C 150 Standard Specification for Portland Cement.
      f. ASTM C 260 Standard Specification for Air-Entraining Admixtures for Concrete.
      g. ASTM C 494 Standard Specification for Chemical Admixtures for Concrete.
      h. ASTM C 618 Standard Specification for Coal Fly Ash and Calcined Natural Pozzolan for Use in Concrete.
      i. ASTM C 685 Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing.
      j. ASTM C 1602 Standard Specification for Mixing Water Used in the Production of Hydraulic Cement.
      k. Concrete.
      l. ASTM C 1603 Standard Test Method for Measurement of Solids in Water.
      m. ASTM D 2061 Standard Test Method of Strength of Zippers.
      n. ASTM D 2256 Standard Test Method for Tensile Properties of Yarns by the Single-Strand Method.
      o. ASTM D 4354 Practice for Sampling of Geotextiles for Testing.
      p. ASTM D 4491 Standard Test Methods for Water Permeability of Geotextiles by Permittivity.
      q. ASTM D 4533 Standard Test Method for Trapezoidal Tearing Strength of Geotextiles.
      r. ASTM D 4595 Test Method for Tensile Properties of Geotextiles by the Wide Width Strip Method.

s. ASTM D 4632 Test Method for Breaking Load and Elongation of Geotextiles (Grab Method).
t. ASTM D 4751 Test Method for Determining Apparent Opening Size for a Geotextile.
u. ASTM D 4759 Practice for Determining the Specification Conformance of Geotextiles.
v. ASTM D 4873 Standard Guide for Identification, Storage, and Handling of Geotextiles.
w. ASTM D 4884 Test Method for Seam Strength of Sewn Geotextiles.
x. ASTM D 5199 Test Method for Measuring Nominal Thickness of Geotextiles and Geomembranes.
y. ASTM D 5261 Test Method for Measuring Mass per Unit Area of Geotextiles.
z. ASTM D 6241 Standard Test Method for Static Puncture Strength of Geotextiles and Geotextile-Related Products Using a 2-inch [50-mm] Probe.
aa. ASTM D 6449 Standard Method for Flow of Fine Aggregate Concrete for Fabric Formed Concrete.

1.03 TERMINOLOGY

A. The following words or terms are not defined but, when used in this Section, have the following meaning:
1. “Compaction” is the densification of a soil by means of mechanical manipulation.
2. “Subgrade” is the ground surface usually specially prepared against which lining shall be placed. In cases where lining is to be retained the same shall be considered as subgrade.
3. “Fabric Forms” are constructed of woven, double-layer synthetic fabric. Cap shall be installed by positioning fabric forms over the areas to be protected and then pumping, high-strength, fine aggregate concrete into the forms. The fabric forms can be placed and filled either underwater or in-the-dry. The high-strength, fine aggregate concrete is used in place of conventional concrete because of its pumpability, high-strength, impermeability, and absorption resistance.

1.04 SUBMITTALS

A. Action Submittals
1. The Contractor shall furnish the fine aggregate concrete manufacturer’s certificates of compliance, mix design, fine aggregate gradation and fineness modulus for the fine aggregate concrete.
2. The Contractor shall furnish the fabric form manufacturer’s certificates of compliance for the fabric forms. The Contractor shall also furnish the manufacturer’s specifications, literature, shop drawings for the layout of the concrete lining panels, and any recommendations, if applicable, that are specifically related to the project.
3. Alternative fabric formed concrete lining materials may be considered. Such materials must be pre-approved in writing by the Engineer prior to the bid date. Alternative material packages must be submitted to the Engineer a minimum of fourteen (14) days prior to the bid date. Submittal packages must include, as a minimum, the following:
a. Material testing reports prepared by a certified geotextile laboratory attesting to the alternative fabric form material’s compliance with this Specification. Material laboratory testing shall have been performed within ninety (90) days of the bid date.

PART 2 - PRODUCTS

2.01 FABRIC FORMED CONCRETE LINING

A. Fabric formed concrete lining shall be Uniform Section type and have a finished average thickness of 6.0 inches, a nominal mass per unit area of 68 lbs./ft2, and a comparatively

uniform section with a brick pattern surface appearance. The shear resistance of the concrete lining shall be a minimum of 14 lbs./ft^2, as demonstrated by full scale flume testing.

B. Fabric form concrete lining shall be Uniform Section US600-PET Fabric Form Concrete Manufactured by Synthetex, LLC. or approved equivalent.

2.02 FABRIC FORMS

A. The fabric forms shall be composed of synthetic yarns formed into a woven fabric. Yarns used in the manufacture of the fabric shall be composed of polyester. Forms shall be woven with a minimum of 50% textured yarns (by weight). Partially-oriented (POY), draw-textured, and/or staple yarns shall not be used in the manufacture of the fabric. Each layer of fabric shall conform to the physical, mechanical and hydraulic requirements Mean Average Roll Values listed in Table 03 37 00-A. The fabric forms shall be free of defects or flaws which significantly affect their physical, mechanical, or hydraulic properties.

TABLE 03 37 00-A
MINIMUM DENSITY REQUIREMENTS

Property	Test Method	Units	MARV
Mass Per Unit Area (double layer)	ASTM D5261	oz/yd^2	13
Thickness (single layer)	ASTM D5199	mils	15
Mill Width (Woven)	-	inch	84
Wide-Width Strip Tensile Strength - MD | TD	ASTM D4595	lbs./in	300/350
Elongation at Break - MD **|** TD - Max.	ASTM D4595	%	15/15
Trapezoidal Tear Strength - MD | TD	ASTM D4533	lbs.	150/175
CBR Puncture Strength	ASTM D6241	lbs.	1250
Mullen Burst Strength	ASTM D3786 (Mod)	psi	500
Apparent Opening Size	ASTM D4751	U.S. Standard Sieve	30-40
Flow Rate	ASTM D4491	gal/min/ft^2	30-55

Notes:
1. Conformance of fabric to specification property requirements shall be based on ASTM D 4759.
2. All numerical values represent minimum average roll values (i.e., average of test results from any sample roll in a lot shall meet or exceed the minimum values). Lots shall be sampled according to ASTM D 4354.

B. Fabric forms shall consist of double-layer woven fabric joined together by spaced, interwoven cords of uniform length to form a concrete lining of the specified average thickness. The cords shall be interwoven between the two layers of fabric, in parallel pairs, so that the two (2) cords together in the top layer and two (2) cords together in the bottom layer cross between layers at drop points. Each cord shall have a minimum breaking strength of 160 lb./ft^2 when tested in accordance with ASTM D 2256.

C. Mill widths of fabric shall be a minimum of 84 inches. Each selvage edge of the top and bottom layers of fabric shall be reinforced for a width of not less than 1.35 inches by adding a minimum of 6 warp yarns to each selvage construction. Mill width rolls shall be cut to the length required, and the double-layer fabric separately joined, bottom layer to bottom layer and top layer to top layer, by means of sewing thread, to form multiple mill width panels with sewn seams on not less than 80-inch centers.

D. Fabric form panels shall be factory-sewn, by joining together the layers of fabric, top layer to top layer and bottom layer to bottom layer, into predetermined custom sized panels. Sewn seams shall be downward facing as shown on the Contract Drawings. All sewn seams and zipper attachments shall be made using a double line of U.S. Federal Standard Type 401 stitch. All seams sewn shall be not less than 100 lb./ft/inch when tested in accordance with

ASTM D 4884. Both lines of stitches shall be sewn simultaneously and be parallel to each other, spaced between 0.25 inches to 0.75 inches apart. Each row of stitching shall consist of 4 to 7 stitches per inch. Thread used for seaming shall be polyester.

E. Baffles shall be installed at predetermined mill width intervals to regulate the distance of lateral flow of fine aggregate concrete. The baffles shall be designed to maintain a full concrete lining thickness along the full length of the baffle. The baffle material shall be nonwoven filter fabric. The grab tensile strength of the filter fabric shall be not less than 180 lb./ft/inch when tested in accordance with ASTM D 4632.

F. Minimum 4-inch diameter schedule 40 PVC void forms shall be provided within the fabric forms in accordance with Manufacturer recommendations. Void forms shall provide a means for insertion of earth anchors as depicted on the Design Drawings. Contractor shall submit shop drawings of forms and void forms to the Engineer for approval prior to construction.

G. The fabric forms shall be kept dry and wrapped such that they are protected from the elements during shipping and storage. If stored outdoors, they shall be elevated and protected with a waterproof cover that is opaque to ultraviolet light. The fabric forms shall be labeled as per ASTM D 4873.

H. The Contractor shall submit a manufacturer's certificate that the supplied fabric forms meet the criteria of these Specifications, as measured in full accordance with the test methods and standards referenced herein. The certificates shall include the following information about each fabric form delivered:
   1. Manufacturer's name and current address.
   2. Full product name.
   3. Style and product code number.
   4. Form number(s).
   5. Composition of yarns.
   6. Manufacturer's certification statement.

2.03 FINE AGGREGATE CONCRETE

A. Fine aggregate concrete consists of a mixture of Portland cement, fine aggregate (sand) and water, so proportioned and mixed as to provide a pumpable fine aggregate concrete.

B. The water/cement ratio of the fine aggregate concrete shall be determined by the ready-mix manufacturer, but generally should be on the order of 0.65 to 0.70. The pumping of fine aggregate concrete into the fabric forms causes a reduction in the water content by filtering excess mixing water through the permeable fabric. The reduction of mixing water substantially improves the water/cement ratio of the in-place fine aggregate concrete thereby increasing its strength and durability. The sand/cement ratio should be determined by the ready-mix manufacturer and should be on the order of 2.4:1.

C. The consistency of the fine aggregate concrete delivered to the concrete pump should be proportioned and mixed as to have a flow time of 9-12 seconds when passed through the ¾-inch [19 mm] orifice of the standard flow cone that is described in ASTM C6449-99. Additional Pozzolan and/or admixtures may be used with the approval of the Engineer-in-charge. The water/cement ratio varies with the exact granulometry of the fine aggregate (sand) and should be determined by the ready-mix manufacturer using the above referenced flow cone.

D. The Contractor shall demonstrate the suitability by placing the proposed fine aggregate concrete mix into three (3) 2-inch concrete cubes. The mix should exhibit a minimum

compressive strength of 3500 psi at 28 days, when made and tested in accordance ASTM C109/C109M-13.

TABLE 03 37 00-B
TYPICAL RANGE OF MIX PROPORTIONS

Material	Mix Proportions (lb./yd^3)	After Placement Proportions (lb./yd^3)
Cement	750-850	805-915
Sand	2120-2030	2290-2190
Water	540-555	460-470
Air	As Required	As Required

E. With a typical loss of approximately 15% of the total mixing water, 27 ft^3 of pumpable fine aggregate concrete will reduce to approximately 25 ft^3 of hardened concrete. The mixing water reduction will also result in an increase of approximately 8% in the sand and cement per cubic foot of concrete. The range of fine aggregate concrete mix proportions provided in Table 03 37 00-B has been developed under a variety of field conditions.

F. Components:
   1. Portland Cement:
      a. Portland cement should conform to ASTM C 150/150M, Type I, II or V. Pozzolan grade fly ash may be substituted for up to 35% of the cement as an aid to pumpability. (The pumpability of fine aggregate concrete mixes containing coarse sand is improved by the addition of fly ash.) Pozzolan, if used, should conform to ASTM C 618, Class C, F or N.
   2. Fine Aggregate (sand):
      a. Fine aggregate should consist of suitable clean, hard, strong and durable natural or manufactured sand. It should not contain dust, lumps, soft or flaky materials, mica or other deleterious materials in such quantities as to reduce the strength and durability of the concrete, or to attack any embedded steel, neoprene, rubber, plastic, etc. Motorized sand washing machines should be used to remove impurities from the fine aggregate. Fine aggregate having positive alkali-silica reaction should not be used. All fine aggregates should conform to ASTM C33/C33M-13. The fine aggregate should not have more than 45% passing any sieve and retained on the next consecutive sieve. The fineness modulus of fine aggregate should neither be less than 2.3 nor greater than 3.1. Fine aggregate with grading near the minimum for passing the No. 50 and No. 100 sometimes have difficulties with workability or pumping. The additions of entrained air, additional cement, or the addition of an approved mineral admixture to supply the deficient fines, are methods used to alleviate such difficulties.
      b. ASTM C33/C33M-13 defines the requirements for grading and quality of fine aggregate for use in fine aggregate concrete and is for use by a contractor as part of the purchase document describing the material to be furnished.
   3. Water:
      a. Water used for mixing and curing should be clean and free from injurious amounts of oils, acids, alkalis, salts, sugar, organic materials or other substances that may be deleterious to concrete.
      b. Potable water is permitted to be used as mixing water in fine aggregate concrete without testing for conformance with the requirements of ASTM C1602/C1602M-12.
      c. ASTM C1602/C1602M-12 covers the compositional and performance requirements for water used as mixing water in hydraulic cement fine aggregate concrete. It defines sources of water and provides requirements and testing frequencies for qualified individual or combined water sources.
   4. Plasticizing and Air Entraining Admixtures:

a. Grout fluidifier, water reducing or set time controlling agents may be used as recommended by their manufacturers to improve the pumpability and set time of the fine aggregate concrete.
b. Any air entraining agent or any other admixture may be used, as approved, by the Engineer-in-charge to increase workability, to make concrete impervious and more durable. Air entraining admixture should conform to ASTM C494/C494M and ASTM C260/C260M, respectively. Mixes designed with 5% to 8% air content will improve the pumpability of the fine aggregate concrete, freeze-thaw and sulfate resistance of the hardened concrete.

G. Ready-Mix Concrete:
1. The basis of standard specifications for ready-mixed concrete should be ASTM C94/C94M-13a.
a. The contractor should require the manufacturer to assume full responsibility for the selection of the proportions for the concrete mixture, the contractor should also specify the following:
1) Requirements for compressive strength as determined on samples taken from the transportation unit at the point of discharge. Unless otherwise specified the age at test should be 28 days.
2) That the manufacturer, prior to the actual delivery of the fine aggregate concrete, furnish a statement to the contractor, giving the dry mass of cement and saturated surface-dry-mass of fine aggregate and quantities, type, and name of admixtures (if any) and the water per cubic yard or cubic meter of fine aggregate concrete that will be used in the manufacture. The manufacturer should also furnish evidence satisfactory to the contractor that the materials to be used and proportions selected will produce fine aggregate concrete of the quality specified.
2. Mixing and Delivery:
a. Ready-mixed fine aggregate concrete should be mixed and delivered to the point of discharge by means of one of the following combinations of operation:
1) Central-Mixed Concrete is mixed completely in a stationary mixer and transported to the point of delivery in a truck agitator, or a truck mixer operating at agitating speed, or in non-agitating equipment meeting the requirements of Section 13 of ASTM C94/C94M-13a. The acceptable mixing time for mixers having capacity of 1 yd3or less is one (1) minute. For mixers of greater capacity, this minimum should be increased 15 seconds for each cubic yard [cubic meter] of fraction thereof of additional capacity.
2) Shrink-Mixed Concrete—Concrete that is first partially mixed in a stationary mixer, and then completely in a truck mixer, should conform to the following: The time for the partial mixing should be the minimum required to intermingle the ingredients. After transfer to a truck mixer the amount of mixing at the designated mixing speed will be that necessary to meet the requirements for uniformity of concrete.
3) Truck-Mixed Concrete—Concrete that is completely mixed in a truck mixer, 70 to 100 revolutions at the mixing speed designated by the manufacturer to produce the uniformity of concrete.
4) No water from the truck water system should or elsewhere should be added after the initial introduction of mixing water for the batch except when on arrival to the project site the flow rate of the fine aggregate concrete is less than 9 seconds. If the flow rate is less than 9 seconds obtain the desired flow rate within 9 to 15 seconds with a one-time addition of water. A one-time addition of water is not prohibited from being several distinct additions of water provided that no fine aggregate concrete has been discharged except for flow testing. All water additions should be completed within 15 minutes from the start of the first water addition. Such addition should be injected into the mixer under such pressure and direction of flow to allow for proper distribution within the mixer. The drum

should be turned an additional 30 revolutions, or more if necessary, at mixing speed to ensure that a homogenous mixture is attained. Water should not be added to the batch at any later time.

5) Discharge of fine aggregate concrete should be completed within 1 1/2 hours after the introduction of mixing water to the cement and fine aggregate. This limitation may be waived by the contractor if concrete is of such flow after 1 1/2 hours' time has been reached so that it can be placed, without the addition of water to the batch. In hot weather, or under conditions contributing to rapid stiffening of the fine aggregate concrete, a time less than 1 1/2 hours is permitted to be specified by the contractor. Depending on the project requirements the technology is available to the manufacture to alter fresh fine aggregate properties (such as setting time or flow.) On some projects the manufacturer may request changes to certain fresh fine aggregate concrete properties due to the distance or projected transportation time between the batch plant and the point of delivery.

3. Sampling for Uniformity:
   a. The fine aggregate concrete should be discharged at the normal operating rate for the mixer being tested, with care being exercised not to obstruct or retard the discharge by an incompletely opened gate or seal. As the mixer is being emptied, individual samples should be taken after discharge of approximately 15% and 85% of the load. No samples should be taken before 10% or after 90% of the batch has been discharged. Due to the difficulties of determining the actual quantity of fine aggregate discharged, the intent is to provide samples that are representative of widely separated portions, but not the beginning and end of the load.
4. Batch Ticket Information:
   a. The manufacturer of the concrete should furnish to the contractor with each batch of fine aggregate concrete before unloading at the site, a delivery ticket with the following information:
      1) Name of ready-mix company and batch plant, or batch plant number.
      2) Serial number of ticket.
      3) Date.
      4) Truck number.
      5) Specific designation of job (name and location).
      6) Specific call or designation of the concrete in conformance with that employed in project specifications.
      7) Amount of fine aggregate concrete in cubic yards.
      8) Time loaded or of first mixing of cement and fine aggregate.
      9) Amount of water added to the fine aggregate concrete by the contractor, at site, or the contractor's designated representative and their initials.
   b. The following information, for certification purposes, required by the project specifications should be furnished:
      1) Type, brand, and amount of cement.
      2) Class, brand, and amount of coal fly ash, or raw or calcined natural pozzolans.
      3) Type, brand, and amount of admixtures.
      4) Source and amount of each metered or weighted water.
      5) Information necessary to calculate the total mixing water. Total mixing water includes water on fine aggregates, batch water (metered or weighted) including ice batched at the plant, wash water retained in the mixing drum, and water added by the truck operator from the mixer tank.
      6) Amount of fine aggregate.

7) Ingredients certified as being previously approved.
8) Signature or initials of manufacturer's' representative.

2.04 GEOTEXTILE FILTER FABRICS

A. The geotextile filter fabrics shall be composed of synthetic fibers or yarns formed into a nonwoven or woven fabric. Fibers and yarns used in the manufacture of filter fabrics shall be composed of at least 85% by weight of polypropylene, polyester, or polyethylene. They shall be formed into a network such that the filaments or yarns retain dimensional stability relative to each other, including selvages. The geotextile shall be free of defects or flaws which significantly affect its mechanical or hydraulic properties.

B. The geotextile filter fabric must be permitted to function properly by allowing relief of hydrostatic pressure; therefore, fine soil parts shall not be allowed to clog the geotextile. The geotextile filter fabric shall be as specified elsewhere in the Contract Specifications.

C. The geotextile filter fabric shall be kept dry and wrapped such that they are protected from the elements during shipping and storage. If stored outdoors, they shall be elevated and protected with a waterproof cover that is opaque to ultraviolet light. The fabric forms shall be labeled as per ASTM D 4873.

PART 3 - EXECUTION

3.01 SITE PREPARATION AND GRADING

A. Areas on which fabric forms are to be placed shall be constructed to the lines, grades, contours, and dimensions shown on the Contract Drawings. The areas shall be graded and uniformly compacted to a smooth plane surface with an allowable tolerance of plus or minus 0.2 feet from bottom grade, as long as ponding does not occur, and plus or minus 0.2 foot from a side slope grade as long as humps or pockets are removed.

B. The areas shall be free of organic material and obstructions, such as roots and projecting stones, and grade stakes shall be removed. Where required by the Contract Specifications, soft and otherwise unsuitable subgrade soils shall be identified, excavated and replaced with select materials in accordance with the Contract Specifications. Where areas are below the allowable grades, they shall be brought to grade by placing compacted layers of select material. The thickness of layers and the amount of compaction shall be as specified by the Engineer.

C. Excavation and preparation of aprons as well as anchor, terminal or toe trenches shall be done in accordance with the lines, grades, contours, and dimensions shown on the Contract Drawings.

D. The terminal edges of the fabric form lining should be keyed into the subgrade to the lines, grades, and dimensions shown on the Contract Drawings.

3.02 INSPECTION

A. Immediately prior to placing the fabric forms, the prepared area shall be inspected by the Engineer, and no forms shall be placed thereon until the area has been approved.

3.03 GEOTEXTILE FILTER FABRIC PLACEMENT

A. The geotextile filter fabric shall be placed directly on the prepared area, in intimate contact with the subgrade, and free of folds or wrinkles. The geotextile filter fabric shall be placed so that the upstream roll of fabric overlaps the downstream roll. The longitudinal and transverse joints will be overlapped at least 2 feet. The geotextile will extend at least 1 foot beyond the top and bottom concrete lining termination points, or as required by the Engineer.

B. A geotextile filter fabric, as specified elsewhere, shall be placed on the graded surface approved by the Engineer.

3.04 FABRIC FORM PLACEMENT

A. Factory assembled fabric form panels shall be placed over the geotextile filter fabric and within the limits shown on the Contract Drawings. Perimeter termination of the fabric forms shall be accomplished through the use of anchor, flank and toe trenches, as shown on the Contract Drawings. When placing panels an allowance for approximately 10% contraction of the form in each direction which will occur as a result of fine aggregate concrete filling. The contractor shall gather and fold the additional slope direction fabric form in the anchor trench to be secured in such a manner as to be gradually released as fabric forms contract during filling. The contractor shall gather the additional transverse direction fabric form at each baffle for self-release during filling.

B. Adjacent fabric form panels shall be joined in the field by means of sewing or zippering closures. Adjacent panels shall be joined top layers to top layer and bottom layer to bottom. All field seams shall be made using two lines of U.S. Federal Standard Type 101 stitches. All sewn seams shall be downward facing.

C. When conventional joining of fabric forms is impractical or where called for on the Contract Drawings, adjacent forms may be overlapped a minimum of 3 ft to form a lap joint, pending approval by the Engineer. Based on the predominant flow direction, the upstream form shall overlap the downstream form. In no case shall simple butt joints between forms be permitted. Simple butt joints between panels shall not be allowed.

D. Expansion joints shall be provided as shown on the Contract Drawings, or as specified by the Engineer.

E. Immediately prior to filling with fine aggregate concrete, the assembled fabric forms shall be inspected by the Engineer, and no fine aggregate concrete shall be pumped therein until the fabric seams have been approved. At no time shall the unfilled fabric forms be exposed to ultraviolet light (including direct sunlight) for a period exceeding five (5) days.

3.05 FINE AGGREGATE CONCRETE PLACEMENT

A. Following the placement of the fabric forms over the geotextile filter fabric, fine aggregate concrete shall be pumped between the top and bottom layers of the fabric form through small slits to be cut in the top layer of the fabric form or manufacturer supplied valves. The slits shall be of the minimum length to allow proper insertion of a filling pipe inserted at the end of a 2-inch I.D. concrete pump hose. Fine aggregate concrete shall be pumped between the top and bottom layers of fabric, filling the forms to the recommended thickness and configuration.

B. Holes in the fabric forms left by the removal of the filling pipe shall be temporarily closed by inserting a piece of fabric. The fabric shall be removed when the concrete is no longer fluid and the concrete surface at the hole shall be cleaned and smoothed by hand.

C. Fine aggregate concrete coverage for US1200 shall net 25 ft2/yd3(see Section 2.3).

D. Fine aggregate concrete shall be pumped in such a manner that excessive pressure on the fabric forms is avoided. Consultation with the fabric form manufacturer with regard to the selection of grout/concrete pumps is recommended.

E. Cold joints shall be avoided. A cold joint is defined as one in which the pumping of the fine aggregate concrete into a given section of form is discontinued or interrupted for an interval of forty-five (45) or more minutes.

F. The sequence of fine aggregate concrete shall be such as to ensure complete filling of the fabric formed concrete lining to the thickness specified by the Engineer. The flow of the fine aggregate concrete shall first be directed into the lower edge of the fabric form and working back up the slope, followed by redirecting the flow into the anchor trench.

G. Prior to removing the filling pipe from the current concrete lining section and proceeding to the fine aggregate concrete filling of the adjacent lining section, the thickness of the current lining section shall be measured by inserting a length of stiff wire through the lining at several locations from the crest to the toe of the slope. The average of all thickness measurements shall be not less than the specified average thickness of the concrete lining. Should the measurements not meet the specified average thickness, pumping shall continue until the specified average thickness has been attained.

H. Excessive fine aggregate concrete that has inadvertently spilled on the concrete lining surface shall be removed. The use of a high-pressure water hose to remove spilled fine aggregate concrete from the surface of the freshly pumped concrete lining shall not be permitted.

I. Foot traffic will not be permitted on the freshly pumped concrete lining when such traffic will cause permanent indentations in the lining surface. Walk boards shall be used where necessary.

J. After the fine aggregate concrete has been set, all anchor, flank and toe trenches shall be backfilled and compacted flush with the top of the concrete lining. The integrity of the trench backfill must be maintained so as to ensure a surface that is flush with the top surface of the concrete lining for its entire service life. Toe trenches shall be backfilled as shown on the Contract Drawings. Backfilling and compaction of trenches shall be completed in a timely fashion to protect the completed concrete lining. No more than 500 linear feet of pumped concrete lining with non-completed anchor, anchor, flank, or toe trenches will be permitted at any time.

END OF SECTION

SECTION 31 05 16

AGGREGATES FOR EARTHWORK

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope:
   1. Furnish temporary and permanent fill materials from off-site sources as specified in this Section for the backfilling of excavations, restoration of surfaces, and other purposes required by the Contract Documents.
   2. Perform source quality control testing as required by this Section.

B. Related Sections:
   1. Section 01 35 29 – Contractor's Health and Safety Plan.
   2. Section 01 57 05 – Temporary Controls.
   3. Section 31 23 00 – Excavation and Fill.

1.02 REFERENCES

A. Reference Standards:
   1. The following standards are referenced in this Section:
      a. AASHTO M43, Standard Specification for Sizes of Aggregate for Road and Bridge Construction.
      b. ASTM C136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
      c. ASTM D2216, Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass.
      d. ASTM D2974, Standard Test Methods for Moisture, Ash, and Organic Matter of Peat and Other Organic Soils.
      e. ASTM D4253, Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.
      f. ASTM D4254, Standard Test Methods for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density.
      g. ASTM D4318, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
      h. ASTM D4972, Standard Test Method for pH of Soils.
      i. ASTM D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft3 [600 kN-m/m3]).
      j. ASTM E329, Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection.
      k. USEPA SW-846 Method 6010, Inductively Coupled Plasma-Atomic Emission Spectrometry.
      l. USEPA SW-846 Method 7471, Mercury in Solid or Semisolid Waste (Manual Cold Vapor Technique).
      m. USEPA SW-846 Method 8081, Organochlorine Pesticides by Gas Chromatography.
      n. USEPA SW-846 Method 8082, Polychlorinated Biphenyls (PCBs) by Gas Chromatography.
      o. USEPA SW-846 Method 8151, Chlorinated Herbicides by GC Using Methylation or Pentafluoro benzylation Derivatization.
      p. USEPA SW-846 Method 8260, Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS).
      q. USEPA SW-846 Method 8270, Semi-volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS).

r. USEPA SW-846 Method 9012, Total and Amenable Cyanide (Automated Colorimetric, with Off-Line Distillation).
s. USEPA SW-846 Method 9060A, Total Organic Carbon.

1.03 QUALITY ASSURANCE

A. Qualifications:
1. Testing Laboratory:
a. Retain the services of an independent testing laboratory authorized to operate in the New York State to perform quality assurance testing required in this Section. Testing laboratory shall comply with ASTM E329, and shall be experienced in the types of testing required.
b. Testing laboratory shall have current National Environmental Laboratory Accreditation Program (NELAP) and New York State Environmental Laboratory Approval Program (ELAP) certification for specific methods they are performing from a recognized state or federal laboratory accreditation program.
c. Testing laboratory shall be capable of achieving detection limits that are less than the specified criteria.
2. Off-Site Fill Sources:
a. Source of off-site general fill shall be a NYSDEC-permitted mine, pit, or quarry, and shall be approved by NYSDOT for furnishing aggregates for NYSDOT projects.

B. Quality Assurance Testing:
1. Materials used in the Work may require testing and retesting, as directed by Engineer, during the Project. Contractor shall provide the Engineer with free access to material stockpiles and facilities at all times. Costs for testing, including retesting of rejected materials and installed Work, shall be Contractor's responsibility.
2. Engineer reserves the right to visit each material source and conduct visual observation of the materials proposed for use. Contractor shall coordinate access with the material sources for the Engineer to perform visits.
3. Quality assurance testing of the imported materials shall be performed at the source location prior to shipment to the Project Site unless otherwise approved by the Engineer.
4. Results of the tests shall be submitted to the Engineer within 24 hours of test completion and prior to material use on the Project. The Engineer reserves the right to reject material based on the results of these conformance tests or independent quality assurance testing conducted by the Engineer. Rejected materials shall be removed from the Project Site at no cost to the Owner or Engineer.
5. Required Quality Assurance Material Testing: Perform the testing described below at the frequency indicated. Additional sampling may be required at the discretion of the Engineer if concerns arise that the characteristics of the fill materials have changed.
a. Geotechnical Testing:
1) Grain size in accordance with ASTM D6913 or ASTM C136. Perform one test for each type and source of material indicated in Part 2.
2) Atterberg limits in accordance with ASTM D4318. Perform one test for each source of general fill
3) Moisture/density relations in accordance with ASTM D698, ASTM D4253, or ASTM D4254, as applicable. Perform one test for each source for the following types of materials incorporated into the Work: General Fill, Crushed Stone
b. Chemical Testing: For each material with greater than 10 percent by weight passing the No. 80 sieve, as determined by gradation testing performed in accordance with this Section, and at a minimum for General Fill and Topsoil, perform chemical testing as follows:

1) Frequency:
   a) Collect samples at the following frequency based on quantity to be imported:

Quantity Imported	Discrete Samples	Composite Samples
0 to 50 cy	1	1
50 to 100 cy	2	1
100 to 200 cy	3	1
200 to 300 cy	4	1
300 to 400 cy	4	2
400 to 500 cy	5	2
500 to 800 cy	6	2
800 to 1000 cy	7	2
1000 to 2000 cy	9	3
2000 to 3000 cy	11	4

2) Analyses: Collected samples shall be submitted for the following:
   a) Discrete Grab Samples:
      i. Target Compound List (TCL) volatile organic compounds (VOCs) by USEPA SW-846 Method 8260C.
   b) Composite Samples:
      i. TCL SVOCs by USEPA SW-846 Method 8270D.
      ii. PCBs by USEPA SW-846 Method 8082.
      iii. Pesticides by USEPA SW-846 Method 8081B.
      iv. Herbicides by USEPA SW-846 Method 8151A.
      v. Target Analyte List (TAL) metals by USEPA EPA SW-846 Method 6010C/6020A/7471B.
      vi. Total mercury by USEPA SW-846 Methods 7471.
      vii. Total cyanide by USEPA SW-846 Method 9012B.
      viii. Per- and polyfluoroalkyl substances (PFAS).
   c) Soils to be imported for use shall meet the following minimum requirements:
      i. “Protection of Ecological Resources” as per 6 NYCRR Part 375-6.7(d) and DER-10.
      ii. For PFAS, guidance values as per the most recent applicable NYSDEC guidance document including DER-10.
      iii. For 1,4-dioxane, guidance value as per the most recent applicable NYSDEC guidance documents including DER-10.

c. Physical Testing:
   1) For each topsoil source, perform the following analyses on one representative sample from each source:
      a) pH by ASTM D4972.
      b) Organic content by ASTM D2974.
   2) For blended chemical isolation layer material, Contractor shall collect one sample from stockpiled material and analyze sample for total organic carbon content by USEPA SW-846 Method 9060A Modified.
d. Materials that have been previously tested may be periodically subjected to additional testing and be rejected if it is determined they no longer conform to the requirements of these Project Specifications. Rejected materials shall be removed from the Work immediately by the Contractor as instructed by the Engineer.
e. If testing results indicate that a proposed off-site fill material does not comply with the Contract Documents, Contractor shall identify and propose a new off-site source of the specified material.

C. Regulatory Requirements:
   1. 6 NYCRR 375, Environmental Remediation Programs.
   2. NYSDOT Standard Specifications.
   3. NYSDEC Technical Guidance for Site Investigation and Evaluation (DER-10).

1.04 SUBMITTALS

A. Action Submittals:
   1. Borrow Source Characterization Reports: At least four weeks prior to import of materials to project site, submit a Borrow Source Characterization Reports for each source and each material type specified in Part 2. The Borrow Source Characterization Reports shall include, at a minimum following:
      a. The material source, including name, address, and contact information.
      b. A certification letter from the borrow source owner or operator certifying that the source is not from an industrial site or suspected to have been modified by the addition of manufactured chemicals and that the material does not contain oil or hazardous material as supported by test data to be provided with certification letter and a copy of applicable current permits (e.g., NYSDEC mining permit) and approvals (e.g., NYSDOT quarry certification).
      c. The results of quality assurance testing as specified in Part 1.03.B for all materials proposed from each source.
   2. Additional Material Testing Results. The Contractor shall submit additional material testing results as required in Part 1.03.B.

B. Informational Submittals:
   1. Testing Laboratory Qualification. Submit the name and qualifications for testing laboratory(ies) used for testing required under this Section.
   2. Fill Material Samples. Submit materials samples for each source and each material type specified in Part 2.
   3. Delivery Tickets. Submit copy of delivery ticket for each load of off-site material delivered to the Site. Each delivery ticket shall indicate Supplier name and source address, project name, contract number, date, material type, NYSDOT item number when applicable, and weight delivered as measured on certified scales at the source location.

1.05 DELIVERY, STORAGE, AND HANDLING

A. General:
   1. Notify the Engineer one (1) week in advance of delivery of all granular materials.
   2. All unloading, storing, and loading shall be the responsibility of the Contractor. Contractor shall protect all environmental resources, including dust control to protect air quality, in accordance with Section 01 57 05 – Temporary Controls.
   3. Contractor shall remove and dispose of rejected materials as directed by the Engineer at no additional cost to the Owner or Engineer.
   4. Contractor shall implement measures to prevent soil and aggregate materials from being misplaced on land or in the waterway during material delivery, storage, and loading and unloading.

B. Delivery:
   1. Contractor shall be responsible for delivery to the Project Site of all materials and equipment necessary to perform the Work and shall pay all freight and handling charges for same.
   2. Contractor is solely responsible for ensuring that the selected material sources are able to meet the delivery schedule to produce material of the required quality and in sufficient quantity for the project. If the Contractor is unable to obtain a sufficient amount of acceptable material from an approved source to meet the progress of construction, the Contractor shall identify and obtain Engineer approval for an alternate source or sources. All costs incurred due to change of material sources, including sampling and testing requirements, shall be borne by the Contractor. In addition, no extension of project schedule milestones shall be allowed due to change of material sources.

3. Do not deliver off-site fill materials to the Site until proposed materials, sources, and Suppliers are accepted by Engineer.
4. Contractor shall visually inspect imported materials upon delivery. Imported materials shall be inspected for the presence of foreign, recycled, or reprocessed material. Engineer may, at any and all times, perform an independent inspection. Imported materials may be rejected if identified as substandard or if test results show it to be substandard. Imported materials may be segregated for testing based on appearance or odor. Engineer reserves the right to request that the Contractor test the segregated materials according to designated procedures at the Engineer's discretion.

C. Storage:
1. If granular fill materials are delivered to the Project Site prior to placement approval, materials shall be stockpiled on site in areas as directed by the Engineer. Provision shall be implemented to minimize surface water impact on the stockpile. Removal and placement of granular fill material shall be done in a manner to minimize intrusion of soils adjacent to and beneath the stockpile.
2. Contractor shall stockpile backfill and cap materials at the Project Site in sufficient quantities to meet schedule requirements.
3. Contractor shall provide for temporary onsite stockpiling and staging of imported fill materials.
   a. Imported fill materials shall be segregated from any contaminated areas. Temporary stockpiling of imported materials shall not be in any Contaminated Material processing or staging area.
   b. Contractor shall construct and maintain stockpiles, so they are tidy, well drained, free of foreign materials, free of standing surface water, and of adequate bearing capacity to support the weight of materials placed thereon.
   c. Contractor shall separate differing materials with substantial dividers or stockpile them apart to prevent mixing.
   d. All material stockpiles shall be labeled with a sign to indicate the material type.
   e. Contractor shall install and maintain erosion control measures per Section 01 57 05 – Temporary Controls.

D. Handling:
1. Any equipment used for excavation or management of contaminated material must be adequately decontaminated prior to handling backfill or cap materials. Decontamination shall be performed in accordance with the Contractor's Health and Safety Plan prepared in accordance with Section 01 35 29 – Contractor's Health and Safety Plan.
2. Material handling and placement shall be in accordance with the Design Drawings and Section 31 23 00 - Excavation and Fill.

PART 2 - PRODUCTS

2.01 FILL MATERIALS

A. General Requirements
1. Perform quality assurance testing, and submit results to Engineer, in accordance with the "Quality Assurance" Part in Part 1 of this Section. All fill imported to the site shall meet the following: 6 NYCRR Part 375 restricted-residential soil cleanup objectives.
2. Materials shall not be obtained from an industrial site or suspected to have been modified by the addition of manufactured chemicals or petroleum products.
3. Imported fill materials shall be free of all organic material, trash, debris, waste, snow, ice, frozen soil, or other objectionable materials.
4. Soft, wet, plastic soils that may be expansive, clay soils having a natural, in-place water content in excess of 30%, soils containing more than 5% (by weight) fibrous organic

materials, and soils having a plasticity index greater than 30 shall be considered unsuitable for use as backfill and fill.

5. Backfill and fill materials shall have a maximum expansion of 1% when testing is performed on a sample remolded to 95% of maximum dry density (per ASTM D698) at 2% below optimum moisture content under a 100 pound per square foot surcharge.

B. General Fill:
   1. Material shall be free of rock and gravel larger than 3 inches in any dimension, debris, waste, frozen materials, organic material, and other deleterious matter.
   2. General Fill shall have the following gradation:

U.S. Sieve Size	Percent Passing (by weight)
3-inch	100
No. 200	5-15

   3. Fill shall have a liquid limit not greater than 45, and plasticity index not greater than 25.

C. Crushed Stone:
   1. Crushed Stone shall be consistent with the gradation of NYSDOT crushed gravel specification for No. 2 Stone (703-0202; NYSDOT Standard Specifications) as listed below:

U.S. Sieve Size	Percent Passing (by weight)
1 ½-inch	100
1-inch	90-100
½-inch	0-15

   2. The Contractor may propose alternative stone size to the Engineer for approval if cost and/or availability require such an alternate material, or if additional benefit to the Owner is achieved through the use of approved alternate size.

D. Topsoil:
   1. Topsoil shall be imported from a naturally occurring source approved by the Engineer.
   2. Topsoil shall be friable loam, neither heavy clay nor of a very light sandy nature. Topsoil shall not be less than 20% fine textured material (passing No. 200 sieve), and less than 15% clay.
   3. Topsoil shall be reasonably free of roots or rocks larger than 1 inch, weeds, vegetation, and seeds of noxious weeds, and will be less than 10% gravel.
   4. Topsoil shall have an acidity range (pH) between 5.5 to 7.5.
   5. Topsoil shall have organic content not less than 6 percent and no greater than 20 percent.
   6. Topsoil shall be free of unsuitable materials, including, but not limited to, the following:
      a. Commercially or municipally produced organic waste, sewage sludge, or composted waste materials.
      b. Frozen material or material containing snow or ice.
      c. Trees, stumps, branches, roots, or other wood or lumber.
      d. Wire, steel, cast iron, cans, drums, or other foreign material.
      e. Topsoil shall not contain soluble salts greater than 500 parts per million (ppm).

E. Type 1 Rip Rap:
   1. Stone used for riprap shall be hard; durable; angular in shape; resistant to weathering and to water action; free from overburden, spoil, shale and organic material; and shall meet the gradation requirements for the type specified. Neither breadth nor thickness of a single stone should be less than one-third its length. Shale and stone with shale seams are not acceptable.

2. Riprap shall be Medium Stone Fill in accordance with Section 620 of the New York State DOT Standard Specifications or shall have the following approximate gradation:

Size Designation	Stone Size
D_{max}	18 inches
D_{50}	12 inches
D_{min}	8 inches

PART 3 - EXECUTION (NOT USED)

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SECTION 31 05 19

GEOSYNTHETICS FOR EARTHWORK

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope:
   1. Providing all labor, materials, tools, equipment, and services as shown, specified, and required to furnish and install geotextiles.
   2. Furnishing and installing geomembrane liner for material staging areas (if constructed), and decontamination areas as specified in this section and in accordance with the manufacturer's recommendations/specifications.

B. Related Sections:
   1. Section 31 23 00 – Excavation and Fill.

1.02 REFERENCES

A. Reference Standards:
   1. The following standards are referenced in this Section:
      a. AASHTO M 288, Standard Specification for Geotextile Specification for Highway Applications.
      b. ASTM D1004, Standard Test Method for Tear Resistance (Graves Tear) of Plastic Film and Sheeting.
      c. ASTM D1505, Standard Test Method for Density of Plastics by the Density-Gradient Technique.
      d. ASTM D1603, Standard Test Method for Carbon Black Content in Olefin Plastics.
      e. ASTM D3895, Standard Test Method for Oxidative-Induction Time of Polyolefins by Differential Scanning Calorimetry.
      f. ASTM D4218, Standard Test Method for Determination of Carbon Black Content in Polyethylene Compounds by the Muffle-Furnace Technique.
      g. ASTM D4491, Standard Test Methods for Water Permeability of Geotextiles by Permittivity.
      h. ASTM D4533, Standard Test Method for Trapezoid Tearing Strength of Geotextiles.
      i. ASTM D4632, Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.
      j. ASTM D4751, Standard Test Methods for Determining Apparent Opening Size of a Geotextile.
      k. ASTM D4833, Standard Test Method for Index Puncture Resistance of Geomembranes and Related Products.
      l. ASTM D5199, Standard Test Method for Measuring the Nominal Thickness of Geosynthetics.
      m. ASTM D5261, Standard Test Method for Measuring Mass per Unit Area of Geotextiles.
      n. ASTM D5596, Standard Test Method For Microscopic Evaluation of the Dispersion of Carbon Black in Polyolefin Geosynthetics.
      o. ASTM D6241, Standard Test Method for Static Puncture Strength of Geotextiles and Geotextile-Related Products Using a 50-mm Probe.
      p. ASTM D6693, Standard Test Method for Determining Tensile Properties of Nonreinforced Polyethylene and Nonreinforced Flexible Polypropylene Geomembranes.

q. ASTM D7238, Standard Test Method for Effect of Exposure of Unreinforced Polyolefin Geomembrane Using Fluorescent UV Condensation Apparatus.
r. GRI GT12, Standard Specification for Test Methods and Properties for Nonwoven Geotextiles Used as Protection (or Cushioning) Materials.

1.03 QUALITY ASSURANCE

A. Qualifications:
1. Manufacturer: Geotextile manufacturer shall be a specialist in the manufacture of geotextile separation and stabilization fabrics, and shall have produced and successfully installed a minimum of five million square feet.

1.04 SUBMITTALS

A. Informational Submittals:
1. Geotextile Product Data: Prior to shipment of any geotextile materials, submit the following information on the geotextile production to the Engineer.
a. Lot and roll identification numbers for materials proposed for use on the project.
b. Manufacturer signed quality control certificates that provide reference to the lot and roll identification numbers, sampling procedures, test methods and test results and other items such as:
1) Name of Manufacturer.
2) Chemical Composition.
3) Product Identification.
4) Statement of Compliance.
5) Signature of Authorization.
c. Geotextile quality assurance tests from the manufacturer including:
1) Unit Weight by ASTM D5261.
2) Flow Rate by ASTM D4491.
3) Permittivity by ASTM D4491.
4) Trapezoidal Tear Strength by ASTM D4533.
5) Grab Elongation by ASTM D4632.
6) Apparent Opening Size by ASTM D4751.
7) CBR Puncture by ASTM D6241.
d. Unless otherwise specified, the quality assurance tests by the manufacturer shall be conducted at the frequency of one per lot or one per each 50,000 square feet. One lot is defined as a group of consecutively numbered rolls or panels from the same manufacturing line and using raw materials from the same resin batch.
e. The geotextile manufacturer shall replace any rolls that are rejected for non-compliance with these Project Specifications.
f. If a sample fails to meet the quality control requirements, the manufacturer shall test each roll manufactured from the same resin batch or at the same time as the failing roll. Testing shall be at the manufacturer's expense and shall continue until a pattern of acceptable test results is established.
2. Geomembrane Product Data: Prior to shipment of any geomembrane materials, submit the following information on the geomembrane to the Engineer:
a. Lot and roll identification numbers for materials proposed for use on the project.
b. Manufacturer signed quality control certificates that provide reference to the lot and roll identification numbers, sampling procedures, test methods and test results and other items such as:
1) Name of Manufacturer.
2) Chemical Composition.
3) Product Identification.
4) Statement of Compliance.
5) Signature of Authorization.

c. Manufacturer's standard warranty for the geomembrane.
d. Results of quality assurance tests conducted by the manufacturer. At a minimum, results shall be submitted for:
    1) Thickness (ASTM D5994).
    2) Asperity Height (ASTM D7466).
    3) Density (ASTM D1505).
    4) Tensile Properties (ASTM D6693).
    5) Tear Resistance (ASTM D1004).
    6) Puncture Resistance (ASTM D4833).
    7) Stress Crack Resistance (ASTM D5397).
    8) Carbon Black Content (ASTM D1603).
    9) Carbon Black Dispersion (ASTM D5596).
    10) Oxidative Induction Time (OIT) (ASTM D3895 or D5885).
    11) Oven Aging at 85°C (ASTM D5721).
    12) Ultraviolet (UV) Resistance (GRI GM11).

1.05 DELIVERY, STORAGE, AND HANDLING

A. Each roll of geosynthetic delivered to the Site shall be labeled by the manufacturer identifying the manufacturer's name, product identification, lot number, roll number, and roll dimensions.

B. Inspect all rolls and packages upon delivery to the Site to confirm that the materials have not been damaged due to improper transportation, handling, or storage. If the protective wrapping is damaged, or if damage to the roll is suspected, separate the roll from the lot for more detailed inspection.

C. Notify Engineer if any loss or damage exists to geosynthetics. Replace loss and repair damage to new condition, in accordance with manufacturer's instructions.

D. Protect geosynthetics from ultraviolet light exposure, precipitation or other inundation, mud, dirt, dust, puncture, cutting, or any other damaging or deleterious conditions. Ship and store geosynthetics rolls in relatively opaque and watertight wrappings.

E. Place geosynthetics only after the required submittals have been received and reviewed by the Engineer.

PART 2 - PRODUCTS

2.01 GEOTEXTILE MATERIALS

A. General:
    1. Acceptable manufacturers include:
        a. GSE Environmental.
        b. TenCate Mirafi.
        c. U.S. Fabrics.
        d. Approved equal.

B. Cushioning Fabric (Type 1 Non-Woven Geotextile):
    1. Type 1 non-woven geotextile for use as a cushioning layer shall have a minimum nominal weight of 16 ounces per square yard (e.g., Mirafi S1600, or approved equivalent).
    2. Type 1 non-woven geotextile shall be of needle-punched construction and consist of long-chain polymeric fibers or filaments composed of polypropylene. The non-woven

geotextile shall be chemically inert to naturally encountered chemicals, acids, and bases and resist biological degradation.

3. Type 1 non-woven geotextile shall be used as a cushion layer for geomembrane material as shown on the Design Drawings. The Type 1 non-woven geotextile shall meet GRI GT12b specifications and have the following MARVs:
   a. Unit Weight (ASTM D5261): 16 oz/yd^2.
   b. Grab Tensile Strength (ASTM D4632): 400lb.
   c. Grab Tensile Elongation (ASTM D4632): 50%.
   d. Trapezoidal Tear Strength (ASTM D4533): 150 lb.
   e. CBR Puncture Strength (ASTM D6241): 1200 lb.
   f. UV Resistance at 500 hours (ASTM D7238): 80% strength retained.

C. Separator Fabric (Type 2 Non-Woven Geotextile):
   1. Type 2 non-woven geotextile for use as a separation layer between dissimilar materials and shall meet AASHTO M 288-17 requirements for Class 2 separation geotextile (e.g., Mirafi S800, or approved equivalent).
   2. Type 2 non-woven geotextile shall be of needle-punched construction and consist of long-chain polymeric fibers or filaments composed of polypropylene. The non-woven geotextile shall be chemically inert to naturally encountered chemicals, acids, and bases and resist biological degradation.
   3. Type 2 non-woven geotextile shall have the following MARVs:
      a. Unit Weight (ASTM D5261): 8.0 oz/yd^2.
      b. Grab Tensile Strength (ASTM D4632):230 lb.
      c. Grab Tensile Elongation (ASTM D4632): 50%.
      d. Trapezoidal Tear Strength (ASTM D4533): 95 lb.
      e. CBR Puncture Strength (ASTM D6241): 600 lb.
      f. UV Resistance at 500 hours (ASTM D7238): 90% strength retained.

D. Orange Demarcation Fabric
   1. Demarcation fabric shall be non-woven geotextile for use as a demarcation layer following remedial excavation and prior to soil backfill. Demarcation fabric shall meet AASHTO M 288-17 requirements for Class 1 separation geotextile (e.g., Mirafi 180NO or approved equivalent).
   2. Type 2 non-woven geotextile shall be of needle-punched construction and consist of long-chain polymeric fibers or filaments composed of polypropylene. The non-woven geotextile shall be chemically inert to naturally encountered chemicals, acids, and bases and resist biological degradation.
   3. Type 2 non-woven geotextile shall have the following MARVs:
      a. Unit Weight (ASTM D5261): 8.0 oz/yd^2.
      b. Grab Tensile Strength (ASTM D4632):240 lb.
      c. Grab Tensile Elongation (ASTM D4632): 70%.
      d. Trapezoidal Tear Strength (ASTM D4533): 90 lb.
      e. CBR Puncture Strength (ASTM D6241): 630 lb.
      f. UV Resistance at 500 hours (ASTM D7238): 80% strength retained.

2.02 GEOMEMBRANE MATERIALS

A. General:
   1. Acceptable manufacturers include:
      a. Solmax Geosynthetics.
      b. GSE Environmental.
      c. Poly-Flex, Inc.
      d. Approved equal.

B. Geomembrane Materials:
   1. Geomembrane shall be linear low-density polyethylene (LLDPE) or high-density polyethylene (HDPE) impermeable liner. Geomembrane shall be inert to biological degradation and naturally encountered chemicals, alkalizes, and acids.
   2. Geomembrane liner shall be smooth and manufactured as wide as possible to minimize factory and field seams. Geomembrane shall be free of cuts, abrasions, holes, blisters, contaminants and other imperfections.
   3. Geomembrane liner shall have the following physical properties as a minimum:
      a. Thickness (ASTM D5199): 40 mil (lowest individual reading 36 mil).
      b. Density (ASTM D1505):
         1) HDPE: minimum 0.940 g/cm^3.
         2) LLDPE: maximum 0.939 g/cm^3.
      c. Break Strength (ASTM D6693, Type IV): 152 lb./in-width.
      d. Elongation at Break (ASTM D6693, Type IV): 700%.
      e. Tear Resistance (ASTM D1004): 22 lb.
      f. Puncture Resistance (ASTM D4833): 56 lb.
      g. Carbon Black Content (ASTM D1603/4218): 2.0-3.0%.
      h. Carbon Black Dispersion (ASTM D5596) (only applies to mear spherical agglomerates):
         1) 9 of 10 views shall be Category 1 or 2.
         2) No more than 1 view from Category 3.
      i. Oxidative Induction Time (ASTM D3895): 100 minutes.

C. Welding Material:
   1. The resin used in the welding material must be identical to the liner material.
   2. All welding materials shall be of a type recommended and supplied by the manufacturer and shall be delivered in the original sealed containers, each with an indelible label bearing the brand name, Manufacturer's mark number, and complete directions as to proper storage.

PART 3 - EXECUTION

3.01 INSPECTION

A. Examine the areas and conditions under which the Work will be performed and notify Engineer in writing of conditions detrimental to the proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions are corrected in a manner acceptable to Engineer.

3.02 PREPARATION

A. Excavate or fill subgrade, as required, to bring subgrade to elevations shown or indicated. Maintain all angles of repose. Confirm that subgrade is at proper elevations and that no further earthwork is required to bring the subgrade to proper elevations. Provide subgrade elevations that slope parallel to finished grade and in the direction shown on the Design Drawings.

B. Remove all stones greater than 2 inches in any dimension, construction debris, trash, rubble, and all other extraneous materials from the subgrade.

C. Notify Engineer that subgrade has been prepared and obtain Engineer’s approval before installing geotextile.

3.03 GEOTEXTILE INSTALLATION

A. General:
   1. Place (roll out) geotextiles in the direction of most frequent vehicular travel.
   2. Overlap adjoining edges of geotextiles at least 18 inches or as recommended by manufacturer.
   3. Weight geotextiles with sandbags or equivalent when required. Install sandbags (or equivalent) during placement and maintain until replaced with cover materials.
   4. During placement of geotextiles, take care not to entrap excessive dust, mud, or moisture in the geotextile stone, that could damage or cause clogging of the geotextile, or hamper subsequent seaming.
   5. Use proper tools to cut and size geotextiles; exercise care while cutting geotextiles.
   6. Do not expose geotextiles to precipitation prior to being installed, and do not expose geotextiles to direct sunlight for more than 15 days.

B. Repair:
   1. Any holes or tears in the geotextile fabric shall be repaired as follows:
      a. On Slopes: Sew a fabric patch into place using a double sewn lock stitch (1/4 inch to 3/4 inch apart and no closer than 1 inch from any edge). Should any tear exceed 10 percent of the width of the roll, that roll shall be removed from the slope and replaced.
      b. Non-Slopes: Spot-seam a fabric patch in place with a minimum of 18 inches of overlap in all directions.

3.04 GEOMEMBRANE INSTALLATION

A. General Requirements:
   1. All surfaces on which the liner is to be installed shall be acceptable to the Engineer at the time of installation.
   2. Placed, seam, and test the liner in accordance with the manufacturer's recommendations/specifications.
   3. Install of geomembrane liner on geotextile-covered surfaces free from stones or other protruding objects.
   4. Do not place liner on an area that has become softened by precipitation. Appropriate methods of moisture control are the responsibility of the Contractor.
   5. Do not install liner on frozen soil material. Remove and replace such material with acceptable material.

B. Placement:
   1. Place geomembrane panels according to all instructions on the boxes or wrapping containing the material that describe the proper methods of unrolling the panels.
   2. Do not deploy liner if weather conditions will preclude material seaming following deployment.
   3. Visually inspect geomembrane during placement for uniformity, tears, punctures, blisters, or other damage or imperfections. Immediately repair and re-inspect any such damage or imperfections at Contractor's expense.
   4. No equipment used shall damage the liner by handling, trafficking, leakage of hydrocarbons, or other means.
   5. No personnel working on the liner shall smoke, wear damaging shoes, or engage in other activities that could damage the liner.
   6. Do not allow the prepared surface underlying the liner to deteriorate after acceptance. Maintain the surface up to the time of liner installation and until completion of the project.
   7. Place adequate temporary loading and/or anchoring (e.g., sand bags), not likely to damage the liner, to prevent uplift by wind (in case of high winds, continuous loading is recommended along edges of panels to minimize risk of wind flow under the panels).

8. Minimize direct contact with the liner. Protect the liner in high-traffic areas using geotextiles, extra geomembrane, or other suitable materials.
9. Do not allow the method used to unroll or adjust the panels to cause excessive scratches or crimps in the liner or damage the supporting soil or underlying geotextile (where applicable).
10. The method used to place the panels shall minimize the potential for wrinkles (especially differential wrinkles between adjacent panels).
11. Repair any damage to the geomembrane panels or portions of the panels as a result of placement at Contractor's expense. The Engineer will determine whether replacement or repair any panel or portions of panels is necessary.

C. Seaming:
1. Utilize personnel who are qualified by experience or who successfully passing seaming tests to perform seaming operations.
2. Generally, orient all seams whether field or factory, parallel to the line of slope, not across slope. At liner penetrations and corners, minimize the number of seams.
3. Clean and prepare the area of the liner to be seamed in accordance with the manufacturer's specified procedures. Do not allow any abrading of the liner to extend more than 0.5 inch on either side of the weld. Take care to eliminate or minimize the number of wrinkles and "fish-mouths" resulting from seam orientation.
4. Do not conduct field seaming when either the air or sheet temperature is below 32ºF, when the sheet temperature exceeds 122ºF, or when the air temperature is above 104ºF. Conduct seaming directly behind a preheating device when the air or sheet temperatures are between 32ºF and 40ºF. In addition, do not conduct seaming when the liner material is wet from precipitation, dew, fog, etc., or when winds are in excess of 20 miles per hour.
5. Do not perform seaming on frozen or excessively wet underlying surfaces.
6. Seem overlaps beyond the weld must be large enough to perform destructive peel tests, but must not exceed 5 inches.
7. Perform trial seams on excess liner material.
    a. Prior to the start of each seaming succession for each seaming crew, every 4 hours, after any significant change in weather conditions or liner temperature, or after any change in seaming equipment, fabricate a 1-foot by 3-foot seamed liner sample with the seam running down the 3-foot length in the center of the sample.
    b. Take four test specimens from each trial seam by cutting 1-inch by 12-inch strips perpendicular to the trial seam.
    c. Conduct shear tests on two of the test specimens shall be shear tested.
    d. Conduct peel tests on the other two test specimens using a field tensometer, and recorded as pass (failure of liner material) or fail (failure of seam).
    e. Upon initial failure, a second trial seam shall be made; if both trial seams fail, then the seaming device and its operator shall not perform any seaming operations until the deficiencies are corrected, and two successive passing trial seams are produced.
    f. Completed trial seam samples cannot be used as portions of a second sample and must be discarded.
8. Where "fish-mouths" occur, cut, overlap, and make an overlap weld on the material. Where necessary, patching using the same liner material shall be welded to the geomembrane.
9. Acceptable seaming methods include:
    a. Extrusion welding using extrudate with identical physical, chemical, and environmental properties.
    b. Hot-wedge welding using a proven fusion welder and master seamer.
10. The seaming device shall not have any sharp edges that might damage the liner. Prevent "bulldozing" of self-propelled seaming devices (if used) into the underlying soil.
11. Perform non-destructive seam testing on all field seams.
    a. Conduct non-destructive seam testing under the direct observation of the Engineer.

b. Air pressure testing may be used if double-track hot-wedge welding has been used to seam the liner. Use approved equipment and the following procedures to perform non-destructive air pressure seam testing:
   1) Seal both ends of the air channel separating the double-track hot-wedge welds.
   2) Insert pressure needle into air channel and pressurize the air channel to 27 psi.
   3) Monitor pressure gauge for 3 minutes and determine whether pressure is maintained without a loss of more than 2 psi.
   4) If the pressure test fails, locate the leak and mark the area for repair.

c. Perform vacuum testing on all seams not tested using air pressure testing. Use an approved vacuum box and the following procedures to perform non-destructive vacuum testing:
   1) Apply a soapy water mixture over the seam.
   2) Place vacuum box over soapy seam and form a tight seal.
   3) Create a vacuum by reducing the vacuum box pressure to 5 psi for 10 seconds.
   4) Observe through the vacuum box window any bubbles.
   5) Where bubbles are observed, mark seam for repair.
   6) Move vacuum box further down seam, overlapping tested seam by 3 inches.
   7) Where hot-wedge seaming has been performed, cut back the overlap to the weld.

D. Repairs:
   1. Repair all imperfections, flaws, construction damage, and seam failures at no additional cost to the Owner.
   2. Acceptable repair methods include:
      a. Patching, to repair holes, tears, undispersed raw materials, and contamination by foreign matter.
      b. Grinding and re-welding, to repair small sections of extruded seams.
      c. Spot Welding or Seaming, to repair pinholes or other minor, localized flaws.
      d. Capping, to repair large lengths of failed seams.
      e. Topping, to repair areas of inadequate seams which have an exposed edge.
      f. Removing bad seams and replacing them with a strip of new material welded into place.

3.05 PLACEMENT OF MATERIALS

A. Place granular fill in accordance with the Design Drawings and Section 31 23 00 – Excavation and Fill. Place all granular materials located on top of the geotextile in such a manner as to ensure:
   1. No damage of the geotextile or underlying layers.
   2. Minimal slippage between the geotextile and the underlying layers.
   3. No excess tensile stresses in the geotextile.

B. Do not drive equipment directly on the geosynthetics.

C. Utilize equipment exerting the lowest ground pressure practicable to place the granular materials to minimize the potential for damage to the geosynthetics. Under no circumstances shall the placement equipment exert more than 5 psi ground pressure.

END OF SECTION

SECTION 31 11 00

CLEARING AND GRUBBING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope:
   1. Providing all labor, materials, equipment, and incidentals required to perform clearing and grubbing as specified in the Contract Documents.
   2. Removing and disposing of trees, shrubs, brush, logs, vegetation, rubbish, and other objectionable material.
   3. Paying all fees associated with transport and disposal of debris resulting from clearing and grubbing.
   4. Clearing and grubbing, as necessary, to facilitate removal activities at the site.

B. Related Sections:
   1. Section 01 41 26 – Stormwater Pollution Prevention Plan and Permit.
   2. Section 01 57 05 – Temporary Controls.
   3. Section 01 71 33 – Protection of Work and Property.
   4. Section 01 74 19 – Construction Waste Management and Disposal.
   5. Section 02 60 05 – Contaminated Material Management and Disposal.

1.02 WARRANTY

A. Warrant that Work performed under this Section will not permanently damage trees, shrubs, turf, and plants designated to remain, or other adjacent work, facilities, or property. If damage resulting from Contractor's operations becomes evident during the correction period, Contractor shall replace damaged items and property at no additional cost to the Owner or Engineer.

1.03 SUBMITTALS

A. Action Submittals:
   1. Tree Removal Plan. The Tree Removal Plan shall identify all trees with a diameter at breast height (DBH) of 6 inches or greater that the Contractor proposes to trim or remove. The Tree Removal Plan shall include a table and drawings identifying the location, size, species, and condition of each tree that the Contractor proposes to trim or remove. The Tree Removal Plan shall describe all equipment and procedures to be used to remove, transport, and dispose of trees, as well as protect trees designated to remain in place where work within the drip line is planned, and provide a schedule for operations. The plan shall identify the procedures and locations for chipping and sizing of removed trees. The Tree Removal Plan will also describe procedures for removal and disposal of vegetative material root systems (i.e., grubbing debris).
      a. Upon submittal, the Tree Removal Plan will be reviewed by Engineer to determine if the trees proposed for trimming/removal represent a potential roosting tree for the Indiana bat (*Myotis sodalist*) or the northern long-eared bat (*Myotis septentrionalis*).

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 PREPARATION

A. Protection:
   1. Protect existing site improvements, including streets, drives, underground facilities to remain (if any), and adjacent property and structures throughout the Work. Repair damage caused by Contractor to original condition or replace in kind, to satisfaction of Engineer, and at no additional cost to the Owner or Engineer.
   2. Protect trees (extending to drip line), shrubs, vegetation, and grassed areas to remain by providing temporary fencing, barricades, wrapping, or other methods shown, specified, or accepted by Engineer. Correct, at Contractor's expense, damage caused by Contractor outside the limits of clearing and grubbing Work.
   3. Protect trees (extending to drip line) not designated for removal in accordance with Section 01 71 33 – Protection of Work and Property.
   4. Do not perform clearing until the Tree Removal Plan is approved by the Engineer.
   5. Implement conservation measures, as deemed necessary by Engineer, for any potential roosting tree for the Indiana bat (*Myotis sodalis*) or northern long-eared bat (*Myotis septentrionalis*). Conservation measures may include, but are not limited to, additional field surveys, delaying tree removal until after the bat mating and pup season, or other measures identified by Engineer.
   6. Do not remove trees without the approval of Engineer, unless shown or indicated for removal on the Design Drawings.
   7. Do not locate construction equipment, stored materials, or stockpiles within the drip line of trees and vegetation to remain.

B. Site Preparation:
   1. Obtain, pay costs associated with, and comply with applicable permits, if any, required for clearing and grubbing Work.
   2. Delineation of Clearing and Grubbing Limits:
      a. Locate and clearly flag trees, vegetation, and other items to remain within the limits of clearing and grubbing.
      b. Provide flagging to delineate limits of areas to be cleared or grubbed. Review at Site with Engineer before initiating clearing and grubbing Work.
      c. Replace flagging that is lost, removed, or destroyed until clearing and grubbing Work is complete and Engineer allows removal of flagging.
   3. Erosion and Sediment Controls:
      a. Install applicable erosion and sediment controls before initiating clearing and grubbing Work.
      b. Comply with Section 01 41 26 – Stormwater Pollution Prevention Plan and Permit, and erosion and sediment control requirements of Section 01 57 05 – Temporary Controls.
      c. Adjust, relocate, or install additional erosion and sediment controls as clearing and grubbing Work progresses to previously uncleared, ungrubbed areas of the Site.

3.02 CLEARING AND GRUBBING

A. Remove all trees, shrubs, brush, logs, vegetation, rubbish, and other objectionable material within the removal limits and support areas (i.e., soil/sediment removal areas, staging areas, access roads, consolidation areas, and as indicated in the Contract Documents), unless otherwise shown or indicated. Blanket tree removal is prohibited. Where possible, during construction of site support areas, trees shall be cut flush with the ground and roots left in place. Stumps and roots shall be removed from within soil/sediment excavation areas.

B. Trees and shrubs to remain that have been damaged or require trimming shall be treated and repaired under the direction of a qualified arborist, or other professional with qualifications acceptable to Engineer. Replace trees and shrubs that are damaged beyond repair or that are removed, but were intended to remain, at no additional cost to the Owner or Engineer.

3.03 DISPOSAL OF CLEARED AND GRUBBED MATERIALS

A. Properly transport and dispose of cleared and grubbed materials at appropriate, Engineer-approved, facilities in accordance with Laws and Regulations.
   1. Site-Clearing Wastes: Comply with Section 01 74 19 – Construction Waste Management and Disposal.
   2. Site-Grubbing Wastes: Comply with Section 02 60 05 – Contaminated Material Management and Disposal.

END OF SECTION

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SECTION 31 23 00

EXCAVATION AND FILL

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope:
   1. Excavate materials to facilitate the Work as specified on the Design Drawings or as directed by the Engineer.
   2. Backfill excavation with acceptable materials to the required lines and grades. Acceptable materials shall conform with the requirements of Section 31 05 16 – Aggregates for Earthwork.
   3. Provide all materials, equipment, and labor necessary to complete the excavation and fill activities required by the Work.

B. Coordination:
   1. Review procedures under this and other Sections and coordinate Work that must be performed with or before excavation and fill Work.

C. Related Sections:
   1. Section 01 32 26 – Construction Progress Reporting.
   2. Section 01 41 26 – Stormwater Pollution Prevention Plan and Permit.
   3. Section 01 57 05 – Temporary Controls.
   4. Section 01 71 26 – Construction Surveying and Layout.
   5. Section 01 71 33 – Protection of Work and Property.
   6. Section 01 74 19 – Construction Waste Management and Disposal.
   7. Section 02 41 19 – Selective Demolition.
   8. Section 02 60 05 – Contaminated Material Management and Disposal.
   9. Section 02 73 00 – Construction Water Management and Disposal.
   10. Section 31 05 16 – Aggregates for Earthwork.
   11. Section 31 11 00 – Clearing and Grubbing.
   12. Section 31 23 00 – Excavation and Fill.
   13. Section 32 21 00 – Site Restoration.

1.02 REFERENCES

A. Reference Standards:
   1. The following standards are referenced in this Section:
      a. ASTM D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft3 [600 kN-m/m3]).
      b. ASTM D6938, Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).
      c. ASTM E329, Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection.

1.03 TERMINOLOGY

A. The following words or terms are not defined but, when used in this Section, have the following meaning:
   1. “Debris” means man-placed buried material including, but not limited to, brick, concrete, metal, wood, ash, cinders, and glass.
   2. “Earth” means materials, such as sand, gravel, sediment, clay, loam, ashes, cinders, pavements, muck, roots, pieces of timber, soft or disintegrated rock, not requiring blasting, barring, or wedging from their original beds, and specifically excluding all ledge

or bedrock and individual boulders, masonry, or debris larger than 0.5 cubic yard in volume.

3. "Backfill" means the refilling of excavated areas to the elevations indicated on the Design Drawings or as directed using specified materials for refilling of excavated areas; and the compacting of all materials used in filling or refilling by rolling, ramming, or as may be required and approved by the Owner or Engineer.

1.04 QUALITY ASSURANCE

A. Qualifications:
   1. Contractor's Testing Laboratory: Retain the services of an independent testing laboratory to perform field quality control testing required in this Section. Testing laboratory shall comply with ASTM E329, and shall be experienced in the types of testing required.

B. Regulatory Requirements:
   1. Laws and Regulations applying to the Work under this Section include, but are not limited to, the following:
      a. 29 CFR 1926.650 through 29 CFR 1926.652, Subpart P – Excavations.
      b. 6 NYCRR 360, Solid Waste Management Facilities.
      c. 6 NYCRR 375, Environmental Remediation Programs.
      d. 12 NYCRR 23-4.1 through 12 NYCRR 23-4.5, Subpart 23-4 – Excavation Operations.
      e. 16 NYCRR 753, Protection of Underground Utilities.
   2. Comply with applicable provisions and recommendations of the following:
      a. NYSDOT Standard Specifications and Standard Sheets.
   3. Obtain required permits and approvals for excavation and fill Work, including work permits from right-of-way owners.

1.05 SUBMITTALS

A. Action Submittals: Submit the following:
   1. Excavation and Backfilling Plan: Submit acceptable plan for excavation, backfilling, and related Work not less than 10 days prior to starting excavation Work. Include the following:
      a. Plan for coordinating shut-offs, locating, capping, temporary services, and continuing utility services if needed to perform the Work.
      b. Proposed excavation, dewatering, backfilling, and compaction procedures. Where different procedures or equipment will be used for different types of material or at different locations at the Site, indicate where each procedure and equipment item will be used.
      c. List of proposed equipment for excavation, dewatering, backfilling, and compaction Work.
      d. Planned sequence of excavation and backfilling operations, with consideration for excavation support and post-excavation verification sampling.
      e. Detailed schedule of excavation and backfilling Work in accordance with the accepted Project Schedule.
      f. Method(s) for monitoring excavation and backfill progress.
      g. Copies of required permits and approvals, from authorities having jurisdiction and affected utility owners, for excavation methods proposed.

B. Informational Submittals: Submit the following:
   1. Testing Laboratory Qualifications: Submit qualifications for the firm proposed for field nuclear density testing of granular materials.
   2. Field Quality Control Submittals: Submit laboratory test reports for field quality control testing performed in accordance with Part 3.11 of this Section.

3. Excavation Support Plan(s) (if necessary based on Contractor's work plan and applicable codes): Contractor and Contractor's professional engineer shall prepare the following as stand-along submittal or include in the applicable installation plans:
    a. Proposed excavation support means and methods. Means and methods may include sheeting and bracing, pre-engineered systems, or other protective system(s). Where different methods will be used for different types of work or at different locations at the Site, indicate where each method will be used.
    b. Sequence for installation, use, and removal of support system.
    c. Monitoring and maintenance to be performed to ensure safe completion of the Work.
    d. Copies of "manufacturer's data" or other tabulated data if protective system(s) are designed on the basis of such data.
    e. Drawings and calculations shall be prepared by a professional engineer qualified in the specialty involved and licensed to practice Engineering in New York State. Engineer's review and acceptance of submittal does not imply approval by Engineer of the associated Work. Contractor shall be solely responsible for designing, installing, operating and maintaining the system(s) required to satisfactorily perform all necessary sheeting, bracing, protection, underpinning, and dewatering.

1.06 SITE CONDITIONS

A. Subsurface Information:
    1. The Contract Documents indicate information available relative to subsurface conditions at the site. Such information and data is not intended as a representation or warranty of continuity of conditions between soil borings or test pits, nor of groundwater levels at dates and times other than date and time when measured, nor that purpose of obtaining the information and data were appropriate for use by Contractor. Neither the Owner nor Engineer will not be responsible for interpretations or conclusions drawn therefrom by Contractor.
    2. Soil borings and other exploratory operations may be made by Contractor, at no additional cost to the Owner or Engineer. Coordinate Contractor-performed test borings and other exploratory operations with the Engineer and utility owners as appropriate. Perform such explorations without disrupting or otherwise adversely affecting operations of the Property Owner or utility owners. Comply with Laws and Regulations relative to required notifications.

B. Existing Structures:
    1. The Contract Documents show or indicate certain structures and Underground Facilities adjacent to or within the limits of the Work. Such information was obtained from existing records and is not guaranteed to be correct or complete. Contractor shall explore ahead of trenching, excavation, or other subsurface Work to determine the exact location of all existing structures and Underground Facilities. Existing structures and Underground Facilities shall be supported and protected from damage by Contractor. Immediately repair and restore existing structures and Underground Facilities damaged by Contractor without additional cost to the Owner or Engineer.
    2. Movement or operation of construction equipment over Underground Facilities shall be at Contractor's sole risk and only after Contractor has prepared and submitted to Engineer and utility owners (as applicable), and received acceptance therefrom, a plan describing Contractor's analysis of the loads to be imparted and Contractor's proposed measures to protect structures and Underground Facilities during the Project.
    3. Do not interrupt existing utilities serving facilities occupied and used by the Property Owner or others, except when such interruption is indicated in the Contract Documents or when allowed in writing by Engineer after acceptable temporary utility services are provided by Contractor for the affected structure or property.

C. Slope Stability:
   1. Contractor shall take all necessary precautions to avoid a slope stability or bearing-capacity failure due to excavation, fill placement, stockpiling construction materials, ineffective dewatering, or any other construction activities.
   2. Contractor shall be solely responsible for the stability of all roadway embankments, unbalanced fills, stockpiles, and all other construction operations.

PART 2 - PRODUCTS

2.01 MATERIAL HANDLING EQUIPMENT

A. Utilize typical earth moving equipment to facilitate completion of the work to the design limits. Soil removal and handling equipment shall include, but not be limited to excavators and loaders.

B. Any equipment used for removal or management of contaminated material must be adequately decontaminated prior to handling backfill materials.

2.02 ODOR, VAPOR AND DUST CONTROL

A. Requirement for odor, vapor and dust control are presented in - Section 01 57 05 – Temporary Controls.

2.03 BACKFILL

A. Fill materials shall meet the requirements of Section 31 05 16 – Aggregates for Earthwork.

B. Use drum-type, power-driven, hand-guided vibratory compactor, or by hand-guided vibratory plate tamper to meet backfill compaction specifications. Propose in a written request to the Engineer, alternate compaction methods. Alternate compaction methods shall be reviewed and approved by the Engineer.

PART 3 - EXECUTION

3.01 PROTECTION

A. Maintenance and Protection of Utilities:
   1. Maintain and protect utilities in accordance with Section 01 71 33 – Protection of Work and Property.

B. Environmental Protections:
   1. Provide temporary erosion and sediment controls in accordance with Section 01 57 05 – Temporary Controls, and comply with Section 01 41 26 – Stormwater Pollution Prevention and Permit.

3.02 INSPECTION

A. Provide Engineer with sufficient notice and with means to examine areas and conditions under which excavating, filling, and grading Work will be performed. Engineer will advise Contractor in writing when Engineer is aware of conditions that may be detrimental to proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions are corrected.

B. Monitor excavation and backfill activities via conventional survey techniques, equipment positioning and visualization software, or other method approved by the Engineer. Include excavation and backfill progress in daily reports in accordance with Section 01 32 26 – Construction Progress Reporting.

C. Notification of Changes:
   1. Differing Site Conditions: Promptly notify the Engineer through written and verbal notice upon discovery and before the following conditions are further disturbed:
      a. Physical conditions that differ materially from those indicated in Design Documents.
      b. Unknown physical conditions at site, of an unexpected nature, which differ materially from those ordinarily encountered and are generally recognized as inherent in type of work provided in this project.
   2. Project Delays: Upon discovery, promptly provide written and verbal notice to the Engineer of delays in schedule due to equipment malfunction or weather.

3.03 PREPARATION

A. Site Preparation:
   1. Comply with Section 31 11 00 – Clearing and Grubbing.

B. Pre-Construction Survey:
   1. Perform a pre-construction survey in accordance with Section 01 71 26 – Construction Surveying and Layout.

C. Debris Removal:
   1. The limits of the excavation activities are known to contain obstructions and debris including, but not limited to brick, concrete, and other general construction debris. Remove all debris during excavation activities to the limits shown on the Design Drawings.
   2. Where known, the approximate locations of obstructions/debris are shown on the Design Drawings, however, the Contractor should anticipate additional obstructions/debris that have not been identified or shown.
   3. Manage, transport and recycle or dispose of debris in accordance with Sections 01 74 19 – Construction Waste Management and Disposal and 02 60 05 – Contaminated Material Management and Disposal, as appropriate.
   4. Not Used

D. Use of Explosives:
   1. Use of explosives is not allowed.

3.04 TEMPORARY BARRIERS

A. Provide temporary barrier surrounding excavations and excavation work areas to provide temporary protection to persons and property. Barrier shall have openings only at vehicular, equipment, and worker access points.

B. Minimum Material Requirements for Temporary Barriers:
   1. Temporary barrier shall not be less than snow fence-type fencing 4 feet high.
   2. Posts:
      a. Posts shall be steel, either “U”-, “Y”-, or “T”-shaped, or channel section.
      b. Posts shall have a nominal weight of not less than 1/3-pound per linear foot, exclusive of the anchor.
      c. Posts shall have tapered anchors weighing not less than 0.67 pound, each firmly attached by means of welding, riveting, or clamping.

d. Posts shall have corrugations, knobs, notches, or studs placed and constructed to engage a substantial number of fence line wire in the proper position.

3. Provide each post with sufficient quantity of galvanized wire fasteners or clamps, of not less than 0.120 inch in diameter, for attaching fence wire to post.
4. Provide privacy fabric for continuous fence length.

3.05 TEST PITS

A. General: In advance of the construction, excavate, make observations and measurements, and fill test pits to determine conditions or location of existing structures and Underground Facilities. Perform all work required in connection with excavating, stockpiling, maintaining, sheeting, shoring, and filling test pits. Contractor shall be responsible for determining the definite location of each existing structure and Underground Facility involved within the areas of excavation for the Work. Exercise care during such location work to avoid damaging and disrupting the affected structure or Underground Facility. Repair, at Contractor's expense, damage caused during the Work to existing structures or Underground Facilities to remain.

B. Payment for Test Pits: There shall be no separate payment for test pits.

3.06 DEWATERING

A. Provide surface water diversion for stormwater at the upgradient side of excavation areas in accordance with Section 01 41 26 – Stormwater Pollution Prevention and Permit and Section 01 57 05 – Temporary Controls.

B. General:
1. Water that comes into contact with soil exceeding applicable NYSDEC soil cleanup objectives shall be managed in accordance with Section 02 73 00 – Construction Water Management and Disposal.
2. Continuously monitor the water removal system and at no time leave the removal system operating without qualified attending personnel present at the site.
3. Take precautions to minimize the amount of solids present in the water extracted from the removal area (e.g., constructing a sump and keeping the intake of the pump off the bottom and away from the sidewalls of the area being dewatered). Sump may consist of one of or a combination of the following methods:
   a. A sump backfilled with washed gravel.
   b. A perforated vessel (i.e., a corrugated metal pipe or drum), wrapped with a non-woven geotextile fabric and/or filled with gravel.
   c. Straw bales/silt fences around the area where surface water/groundwater is being pumped.

C. Soil Excavation Area Dewatering:
1. Remove water that accumulates within the excavation area to perform soil excavation in the dry.
2. Provide and maintain proper and satisfactory means and devices for the removal of all water currently present within and/or entering the excavation areas.
3. Remove all such water as it may collect, in such manner as shall not interfere with the prosecution of the work.

3.07 EXCAVATION

A. General:
1. Perform all excavation required to complete the Work as shown, specified, and required. Excavation shall be made to the grades and extend to the width and depths shown on the Design Drawings or as specified herein. Excavation shall include removing and handling

of earth, sand, clay, gravel, hardpan, soft, weathered, or decomposed rock, pavements, rubbish, and other materials within the excavation limits.
2. Maintain excavations in dry or low water conditions in accordance with Part 3.06 of this Section.
3. Excavation equipment shall be satisfactory for carrying out the Work in accordance with the requirements specified. Excavation near sensitive structures such as existing shoreline features or utilities may require use of low ground pressure equipment or excavation around such features may have to be performed under restricted or limited access conditions immediately adjacent to the feature to avoid excessive surcharge loading on the feature. Hand excavation of material around sensitive features may be required to obtain a satisfactory, undisturbed subgrade.

B. Excavation Support:
1. Provide excavation protection system(s) in accordance with Laws and Regulations to prevent injury to persons and property, including Underground Facilities.
2. Excavation Less Than Four Feet Deep: Excavations in stable rock or in soil conditions where there is no potential for a cave-in may be made with vertical sides. Under all other conditions, excavations shall be sloped and benched, shielded, or shored and braced.
3. Excavations Greater Than Four Feet Deep: Excavations in stable rock may be made with vertical sides. Under all other conditions, excavations shall be sloped and benched, shielded, or shored and braced.
4. Provide and maintain excavation protection system(s) in accordance with submittals prepared under this Section and reviewed by the Engineer.

C. Subgrades:
1. Excavation shall be accomplished by methods that preserve the undisturbed state of subgrade soils.
2. Subgrades shall be firm and intact, dense, and thoroughly compacted and consolidated; shall be free of standing water and mud, muck, and other soft or unsuitable materials; and shall remain firm and intact under all construction operations. Subgrades that are otherwise solid but become soft or mucky on top due to construction operations shall be reinforced with general fill material.
3. Clay and silt soils are particularly susceptible to disturbance due to construction operations. When excavation is to end in such soils, a smooth-edge bucket shall be used to excavate the last 1 foot of depth.
4. No excavation shall end in organic soils, unless otherwise specified herein or directed by the Engineer. Contractor shall remove organic soils at the bottom of excavation and replace with crushed stone or compacted general fill.
5. If, in Engineer’s opinion, subgrade becomes softened or mucky because of construction delays, failure to dewater properly, or other cause within Contractor’s control, the subgrade shall be excavated to firm material, trimmed, and backfilled with compacted general fill material at Contractor’s expense.

D. Disposal of Excavated Materials:
1. Handling and disposal of waste material shall be in accordance with Laws and Regulations and Section 02 60 05 –Contaminated Material Management and Disposal.

E. Unauthorized Excavation:
1. All excavations outside the lines and grades shown or indicated and that are not approved by Engineer, together with removing and disposing of the excavated material and backfilling with suitable material, shall be at Contractor's expense. Fill unauthorized excavations with properly-compacted general fill material at Contractor’s expense.

3.08 FILL AND COMPACTION

A. General:
   1. Contractor shall not proceed with backfill placement until the Engineer has provided the Contractor with written notification that Work may commence. Backfill activities performed without a written notification are subject to removal and replacement or additional testing as directed by the Engineer at no expense to the Owner or Engineer.
   2. Prior to the placement of fill and during such placement, Engineer may select areas within the excavation for testing. Contractor shall cooperate fully in obtaining the information desired.
   3. Provide and compact all fill required for the finished grades as shown in the Design Drawings and as specified in this Section.
   4. Dust-control measures shall be employed at all times in accordance with Section 01 57 05 – Temporary Controls.
   5. Maintain functional erosion and sedimentation control measures and stabilize disturbed soils until permanent vegetation or stabilization measures are established. Install temporary soil stabilization measures if excavated or backfilled areas remain exposed for more than 48 hours.

B. Placement:
   1. Place fill in excavations as promptly as progress of the Work allows, but not until completing the following:
      a. Receiving approval from the Engineer including placement of geotextile fabric as directed by the Engineer.
      b. Surveying and recording horizontal and vertical limits of excavation as required by Section 01 71 26 – Construction Surveying and Layout.
      c. Inspecting, testing, approving, and recording horizontal and vertical locations of Underground Facilities.
      d. Removing trash and debris.
   2. Place fill to the grades shown or indicated.
   3. Fill and backfill materials shall be placed in horizontal, loose lifts not exceeding specified uncompacted thickness to suit the specified compaction requirements to the lines and grades required, making allowances for settlement and placement of cover materials (e.g., topsoil and sod). Place fill in a manner ensuring uniform lift thickness after placing. Soft spots or un-compacted areas shall be corrected.
   4. Fill and backfill materials shall not be placed on frozen surfaces or surfaces covered by snow or ice. Fill and backfill material shall be free of snow, ice, and frozen earth.
   5. Fill shall not be placed over organic soils (including peat and topsoil) and loose inorganic silt material. These materials shall be removed prior to fill placement as specified in this Project Specifications, unless approved by the Engineer.

C. Compaction:
   1. Compact the backfill material to provide a firm and stable surface. Compaction methods may include vibratory rollers, hand-operated vibratory equipment, or mechanical tampers, or other methods approved by the Engineer. Contractor's proposed compaction methods shall be described in the Excavation and Backfilling Plan.
   2. Furnish and use equipment capable of adding measured amounts of water to the fill materials to bring fill materials to a condition within required moisture content range. Furnish and use equipment capable of discing, aerating, and mixing the fill materials to ensure reasonable uniformity of moisture content throughout the fill materials, and to reduce moisture content of borrow materials by air drying, when necessary. When subgrade or lift of fill materials require moisture-conditioning before compaction, fill material shall be sufficiently mixed or worked on the subgrade to ensure uniform moisture content throughout the lift of material to be compacted. Materials at moisture content in excess of specified limit shall be dried by aeration or stockpiled for drying.

3. Compact fill material with equipment suitable for the type of fill material placed. Select and use equipment capable of providing the minimum density required in Table 31 23 00-A. Furnish and use equipment capable of compacting in restricted areas next to structures and around piping and Underground Facilities. Effectiveness of the equipment selected by Contractor shall be tested at start of compacted fill Work by constructing a small section of fill within or adjacent to the area where fill will be placed. Record total number of coverages with selected compaction equipment and perform field moisture content and density tests to ensure that specified compaction of fill has been obtained. If tests on the test section of fill indicate that required compaction has not obtained, do one or more of the following:
   a. Increase the amount of coverages.
   b. Decrease the lift thicknesses.
   c. Use different compaction equipment.
4. Mechanically compact each lift, by not less than two complete coverages of the compactor. One coverage is defined as the conditions reached when all portions of the fill lift have been subjected to the direct contact of compactor's compacting surface. Compaction of fill materials by inundation with water is unacceptable.
5. Do not compact fill when standing water is present on the fill to be compacted. Do not compact fill in a frozen condition or on top of frozen material.
6. Fill containing organic materials or other unacceptable material previously described shall be removed and replaced prior to compaction.
7. If required densities are not obtained because of improper control of placement or compaction procedures, or because of inadequate or improperly-functioning compaction equipment, Contractor shall perform all work required to provide the required densities. Such work shall include, at no additional cost to the Owner, complete removal of unacceptable fill areas and replacement and re-compaction until acceptable fill is provided.
8. Remove unacceptable fill material and replace with approved fill material in accordance with the Contract Documents.
9. Repair, at Contractor's expense, observed or measured settlement. Make repairs and replacements as required within five days after being so advised by Engineer.

D. Compaction Density Requirements:
   1. Compaction required for fills provided under Section 31 05 16 – Aggregates for Earthwork shall be in accordance with Table 31 23 00-A of this Section. Moisten material or aerate the material as necessary to provide the moisture content that will facilitate obtaining the required compaction.

TABLE 31 23 00-A
MINIMUM DENSITY REQUIREMENTS

Fill Material	Maximum Uncompacted Lift Thickness (inches)	Percent Compaction (ASTM D-698)
General Fill		
More Than Five Feet Below Final Grade	18	90
Less Than Five Feet Below Final Grade	12	90

   2. Wet and thoroughly mix fill to achieve optimum moisture content plus-or-minus 2%.
   3. Replace natural, undisturbed soils or compacted soil subsequently disturbed or removed by construction operations with materials compacted as indicated in Table 31 23 00-A of this Section.
   4. Field quality control testing for density, to verify that specified density was obtained, shall be performed within the top 5 feet of the excavation. The certified independent laboratory, engaged by the Contractor and acceptable to the Engineer, shall field quality control

testing to confirm fill material has been compacted in accordance with the requirements of this Project Specifications.

5. When field quality control testing indicates unsatisfactory compaction, provide additional compaction necessary to obtain the specified compaction. Perform additional compaction Work at no additional cost to the Owner or Engineer until specified compaction is obtained. Such work includes complete removal of unacceptable (as determined by Engineer) fill areas and replacement and re-compaction until acceptable fill is provided in accordance with the Contract Documents.

E. Replacement of Unacceptable Excavated Materials:
   1. In cases where over-excavation to replace unacceptable soil materials is required, backfill the excavation to required subgrade with general fill material and thoroughly compact in accordance with this Section.

3.09 GRADING

A. General:
   1. Grading shall be performed to the lines and grades shown on the Design Drawings and otherwise as directed by the Engineer. Grading shall be performed in such a manner that the requirements for formation of grades can be followed, and stable slopes achieved. The Engineer reserves the right to make minor adjustments or revisions in lines or grades if found necessary as the Work progresses, in order to obtain satisfactory construction. Uniformly grade areas within the limits of grading under this Section, including adjacent transition areas.
   2. If at the time of grading it is not possible to place any material in its proper section of the Work, it shall be stockpiled in approved areas for later use. No extra payment will be made for the stockpiling or double handling of material.
   3. Subgrades shall be completely and continuously drained and dewatered throughout the grading process. Contractor shall install temporary drains, drainage ditches, and the like to intercept or divert surface water that may affect the execution or condition of grading.

B. Compaction:
   1. After grading, compact subgrade surfaces to achieve required subgrade elevations and percentage of maximum density for each material classification.
   2. Compact with uniform levels or slopes between points where elevations are shown, or between such points and existing grades.

3.10 RESTORATION

A. Surface restoration shall be performed in accordance with the Design Drawings and Section 32 21 00, Site Restoration.

3.11 FIELD QUALITY CONTROL

A. Compaction Testing:
   1. Contractor shall notify the Engineer at least 72 hours in advance of scheduled compaction testing. The Engineer may designate areas to be tested.
   2. Perform field moisture content and density tests in accordance with ASTM D6938 to verify that specified compaction of fill materials has been obtained. Comply with the following:
      a. Fill Areas. At least one density and moisture content test shall be conducted for each 1,200 square feet of surface area for each lift of fill within excavation areas or as directed by the Engineer.
      b. Additional tests may be required as determined by the Engineer.

3. Submit test results, certified by testing laboratory, to Engineer within 24 hours of completion of test.
4. If testing laboratory reports or inspections indicate subgrade or fill compaction below specified density, remove unacceptable materials as necessary and replace with specified materials, and provide additional compaction at Contractor's expense until subgrades and fills are acceptable. Costs for retesting of subgrade or fill materials that did not originally comply with specified density shall be paid by Contractor.

B. Topographic Survey:
1. Post-excavation and post-backfill surveys shall be completed in accordance with Section 01 71 26 – Construction Surveying and Layout.

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SECTION 32 21 00

SITE RESTORATION

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope:
   1. Contractor shall provide all labor, materials, tools, equipment and incidentals as shown, specified and required to restore, repair, or replace all surfaces disturbed, damaged, or destroyed during the performance of the Work prior to demobilization.
   2. Extent of site restoration is shown on the Design Drawings. Where site restoration is not specified, areas shall be restored to match pre-construction conditions unless otherwise approved by the Engineer.
   3. Restoration types include the following:
      a. Vegetated Surface.
      b. Riprap Placement.

B. Coordination:
   1. Review installation procedures under other Sections and coordinate the installation of items that must be installed with, or before, the final surface restoration.

C. Related Sections:
   1. Section 31 05 19 – Geosynthetics for Earthwork.
   2. Section 31 05 16 – Aggregates for Earthwork.
   3. Section 31 23 00 – Excavation and Fill.

1.02 QUALITY ASSURANCE

A. Regulatory Requirements:
   1. Comply with applicable provisions and recommendations of the following:
      a. 6 New York Codes, Rules, and Regulations (6NYCRR) Part 575, Prohibited and Regulated Invasive Species.
      b. New York Environmental Conservation Law (ECL) Part 17, Title 21, Nutrient Runoff Law.
      c. New York State Standards and Specifications for Erosion and Sediment Control.

B. Quality Assurance Testing:
   1. Imported topsoil must be analyzed by an agricultural laboratory (Cornell Cooperative Extension or equivalent) for nutrient analyses and recommendations for fertilizer requirements. Analyses will be required for each source of topsoil.

C. Seed Supplier(s). Obtain seed stock only from established vendors capable of providing seed quantities adequate to complete this project. All vegetation shall be regionally sourced.

1.03 SUBMITTALS

A. Action Submittals:
   1. Restoration Plan. Submit a Restoration Plan that includes, at a minimum, the following:
      a. Means by which finished grade will be checked and verified prior to seeding and installation of erosion control fabric.

b. Methods, equipment, procedures, and sequence for seeding, fertilizer application, fabric placement, and watering.
c. A maintenance and inspection schedule.
d. Results of agricultural laboratory testing of topsoil material.
e. Datasheet and certificate for fertilizers and other topsoil amendments to be utilized.
f. Erosion control fabric manufacturer product data, as well as delivery, handling, storage, installation, and repair methods.

2. Seed Certificates. Product datasheets, certificates, and source information for proposed seed mixes. The seed certificates shall include the following:
   a. Botanical name and common name of all species included in the seed mixture.
   b. County and state of origin for seeds.
   c. Percentage of each species of seed by weight in a mixture.
   d. Percentage of pure seed for each species included in the mixture.
   e. Germination percentage.
   f. Amount of undesirable plant seed present in the mixture.
   g. Date of packaging.
   h. Name and address of supplier.

B. Informational Submittals:
1. Topsoil Amendment Testing. Submit results from Cornell Cooperative Extension (or approved equivalent) with results of topsoil nutrient testing and recommendations for fertilizer and other topsoil amendments.
2. Certificates:
   a. For standard products, submit data certifying that materials comply with specified requirements.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Fertilizer:
1. Deliver in manufacturer's standard size bags or cartons showing weight, analysis, and the name of the manufacturer.
2. Contractor shall store as approved by the Engineer.

B. Seed:
1. Deliver in vendor's unopened packages bearing labels showing vendor's name and seed analysis by weight.
2. Store all seed at the Project Site in a cool, dry place at locations approved by the Engineer.
3. Store seed in weather- and rodent-proof enclosures.
4. Contractor shall replace any seed damaged during storage at no additional cost to the Owner or Engineer.

C. Fabrics:
1. Inspect all rolls and packages upon delivery to the Site to confirm that the materials have not been damaged due to improper transportation, handling, or storage. If the protective wrapping is damaged, or if damage to the fabric is suspected, separate the roll from the lot for more detailed inspection.
2. Protect fabrics from ultraviolet light exposure, precipitation or other inundation, mud, dirt, dust, puncture, cutting, or any other damaging or deleterious conditions.

PART 2 - PRODUCTS

2.01 VEGETATED SURFACES

A. Topsoil:
   1. Refer to Section 31 05 16 – Aggregates for Earthwork.
   2. Submit topsoil for testing by the Cornell Cooperative Extension (or approved equivalent) to determine amendment requirements.

B. Topsoil Amendments: Supply all amendments required based on results of Cornell Cooperative Extension (or approved equivalent) testing.
   1. Fertilizer:
      a. Deliver fertilizers in waterproof bags showing weight, chemical analysis, and the name of the manufacturer. Application of fertilizers will be dictated by the results of soil testing prescribed in Section 31 23 05 – Excavation and Fill and is subject to approval by the Engineer. Nitrogen-based fertilizer shall be a minimum of 50% water insoluble nitrogen (WIN).
      b. Materials are to be brought on-site in original, sealed, and undamaged packaging.
   2. Compost:
      a. Compost shall be leaf or well-rotted manure compost meeting the requirements of New York State Department of Transportation (NYSDOT) Standard Specification Section 713-15.

C. Seed:
   1. Permanent Seed Mix shall be in accordance with the New York State Standards and Specifications for Erosion and Sediment control Table 4.4 for Seed Mix #1. Seed shall consist of Creeping Red Fescue and Perennial ryegrass at a rate of 10 lbs./acre for seed species.
   2. Temporary Seed shall adhere to the following requirements:
      a. Spring or summer or early fall-seed shall be ryegrass (annual or perennial) at 30 lbs. per acre (Approximately 0.7 lb./1000 sq. ft. or use 1 lb./1000 sq. ft.).
      b. Late fall or early winter-seed shall be Certified ‘Aroostook’ winter rye (cereal rye) at 100 lbs. per acre (2.5 lbs./1000 sq. ft.).
   3. All seed shall have the proper stratification or scarification, in accordance with the producer’s instructions, to break seed dormancy.
   4. Seed mixtures shall be delivered in original sealed containers. Seed in wet, torn, or otherwise obviously damaged packaging are not acceptable. Contractor shall label containers with the following information: analysis of seed mixture; percentage of pure seed by species; percentage of weed seed; year of production; net weight; date tagged and location; percentage of germination; and name and address of distributor.

D. Water:
   1. Water shall be from a source approved by the Engineer.

E. Mulch:
   1. Mulch shall be free of weed or weed seed, free of plant-growth or germination inhibitors, with a maximum moisture content of 15% and a pH range of 4.5 to 6.5.
   2. Contractor shall select, supply, and install mulch material in accordance with this Section, the New York State Standards and Specifications for Erosion and Sediment Control, and/or as directed by the Engineer.

F. Temporary Erosion Control Blanket:
   1. Erosion Control Blanket shall be SC150 as Manufactured by North American Green where indicated on the Design Drawings.

G. Permanent Erosion Control Mat:
   1. Type A Erosion Control Mat shall be P550 as Manufactured by North American Green or equivalent where indicated on the Design Drawings. Mat shall provide a minimum of 4.0 lbs./ft^2 unvegetated and velocity of 12.5 ft/sec unvegetated.
   2. Type B Erosion Control Mat shall be SC250BN as Manufactured by North American Green or equivalent where indicated on the Design Drawings. Mat shall provide a minimum of 3.0 lbs./ft^2 unvegetated and velocity of 10.0 ft/sec unvegetated.

2.02 RIPRAP AREAS

A. Riprap restoration areas shall adhere to the requirements of Section 31 05 16 – Aggregates for Earthwork.

PART 3 - EXECUTION

3.01 PREPARATION

A. Contractor shall examine the subgrade, verify the elevations, observe the conditions under which Work is to be performed, and notify Engineer, in writing, of unsatisfactory conditions. Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to Engineer.

B. Outline areas to be restored based on restoration type and secure Engineer's acceptance before start of Work. Make minor adjustments as may be requested.

C. Proceed with and complete the Work as rapidly as portions of the site become available for restoration to limit erosion, working within the seasonal limitations for each kind of landscape Work required.

3.02 INSTALLATION – VEGETATED SURFACE

A. Subgrade Preparation:
   1. Prepare subgrade to eliminate uneven areas and low spots. Contractor shall maintain lines, levels, profiles, and contours. Contractor shall make changes in grade gradual and blend slopes into level areas.
   2. Rake, level and smooth subgrade so that it is free from all stones, construction debris, weeds, undesirable plants and their roots, and other foreign material.
   3. Scarify subgrade to a depth of 3 inches where topsoil will be placed. Contractor shall repeat cultivation in areas where equipment, used for hauling and spreading topsoil, has compacted subsoil.

B. Topsoil Placement:
   1. Backfill areas to receive topsoil shall be graded to a depth at least 6 inches below the proposed finished grades shown on the Design Drawings or as directed by the Engineer.
   2. Do not spread topsoil while in a frozen condition or when moisture content is so great that excessive compaction will occur, nor when so dry that dust will form in the air or that clods will not break readily.
   3. Apply fertilizer and/or compost as recommended by the agricultural laboratory, based on results of site-specific topsoil testing. Fertilizer application (if any) shall be performed in compliance with the requirements of the Nutrient Runoff Law under New York ECL Part 17, Title 21.

C. Reconditioning Existing Seed Beds:

1. Recondition existing seed bed areas within areas disturbed by Contractor's operations including areas under access roads, staging areas, and other support construction facilities. Also recondition existing seedbed areas where minor re-grading is required.
2. Cultivate bare and compacted areas thoroughly to provide a satisfactory planting bed.
    a. Till support areas to be seeded to a depth of 3 inches prior to seeding.
    b. Remove stones over 1 inch in any dimension and sticks, roots, rubbish, and other extraneous matter.
    c. Provide new topsoil as required to fill low spots and meet new finish grades.
3. Remove diseased and unsatisfactory turf areas; do not bury into soil. Remove topsoil containing foreign materials resulting from Contractor's operations including oil drippings, stone, gravel, and other loose building materials.

D. Seeding:
1. Unless otherwise approved by the Engineer, seeding shall occur immediately after approval of topsoil placement by the Engineer. Contractor shall provide notice to the Engineer at least 48 hours prior to seeding.
2. Environmental Requirements:
    a. Seeding shall not be performed when the temperature may drop below 35 degrees Fahrenheit (°F) or rise above 90°F.
    b. Do not seed if the ground is frozen or inundated by water.
    c. Do not seed when drought, or excessive moisture, or other unsatisfactory conditions prevail.
    d. Do not spread seed when wind velocity exceeds 15 miles per hour.
    e. Do not seed on days with heavy precipitation that may result in the washing out of seed.
3. Contractor shall immediately notify the Engineer if conditions are encountered that prevent seeding.
4. Apply seed in a way that ensures the entire area receives seed. Seeding shall overlap adjoining vegetation by at least 12 inches. Contractor shall reseed areas where gaps in the seeded areas exceed 4 square feet.
5. Contractor shall lightly rake seeded areas within 12 hours to ensure proper soil-seed contact.
6. Water seeded areas to promote seed germination and growth. Contractor shall avoid creating rills and furrows as a result of watering and repair and reseed any rills and furrows resulting from overwatering.
7. Erosion control material shall be installed after immediately seeding is accepted by the Engineer.
8. Protect seeded areas to prevent intrusion from foot traffic and equipment.

E. Erosion Control Fabric:
1. Install Temporary Erosion Control Blanket and Erosion Control Mat where indicated on the Design Drawings. Notify the Engineer at least 3 work days prior to the installation of erosion control fabric.
2. The surface shall be free of rocks, clods, sticks, and grass prior to fabric installation. Fabric shall be placed to have good contact with the soil.
3. Install erosion control fabric as depicted on the Design Drawings and as described herein.
4. Contractor shall lay erosion control fabric loosely and stake or staple the fabric to the slope to maintain direct contact with the soil. The fabric shall not be stretched during installation.
5. Contractor shall install the fabric blankets vertically from top of slope to bottom of slope.
6. Contractor shall place the fabric to avoid existing trees and tree stumps.
7. Contractor shall install the fabric in a controlled manner. Contractor shall install wood stakes as the fabric is unrolled down the slope. The fabric shall not be allowed to roll down the slope without control.
8. Contractor shall bury and anchor the top of slope and toe of slope portions of the fabric as depicted on the Design Drawings.

F. Mulch:
   1. Where erosion control fabric is not installed, hand or machine spread mulch to form a continuous blanket over the seed bed, approximately 2 inches uniform thickness at loose measurement.
      a. Excessive amounts or bunching of mulch will not be permitted.
      b. Spread and anchor mulch in a manner that minimizes damaged to seeded surface.
      c. Unless otherwise specified, mulch shall be left in place and allowed to disintegrate.

3.03 CLEANING AND REPAIR

A. Remove all excess materials, soil, debris, and equipment and repair any damage resulting from the operations.
   1. Clearing and grubbing waste shall be removed in accordance with Section 02 60 05 – Contaminated Material Management and Disposal

B. Repair all erosion channels that may form until time of Substantial Completion.

C. Keep restored surface free of all foreign materials including, but not limited to, soil, debris and weeds until time of Substantial Completion.

3.04 INSPECTION

A. When the site restoration is completed, including repair and cleaning, Engineer will make an inspection to determine acceptability.

B. Where inspected surface restoration does not comply with the requirements, replace rejected Work and continue specified repair and cleaning until reinspected by Engineer and found to be acceptable.

3.05 MAINTENANCE – SEEDED AREAS

A. Contractor shall maintain the seeded areas for a period of one full growing season following seeding. Maintenance responsibilities begin immediately after seeding and continue for one full growing season after the Engineer has accepted the seeding.

B. Contractor is responsible for maintaining the seeded vegetation for one full growing season, including control of herbivores and other vectors that threaten the establishment of the seeding. Contractor shall remove undesirable plant material that interferes or inhibits the growth of the plants installed by the Contractor. Contractor shall take necessary action to correct and restore the unacceptable areas.

C. Contractor shall maintain vegetative cover by watering, fertilizing, weeding, and reseeding. In addition, the Contractor shall control prohibited and regulated invasive plant species listed in 6NYCRR Part 575, preferably by physical removal. Restricted hand application of glyphosate, subject to the appropriate limitations of local and state regulations, is acceptable during mid- to late-summer and fall, though only with the approval of the Engineer.

D. Contractor shall repeat watering weekly for at least 4 weeks after seeding if natural rainfall is less than 1/2 inch per week.

E. Contractor shall reseed areas that are unacceptable during the 1-year maintenance period. Bare areas greater than 4 square feet shall be reseeded with the specified seed mix.

F. During the growing season, Contractor shall conduct corrective action and maintenance within 30 days to address unacceptable areas if notified by the Engineer.

G. Contractor shall notify the Engineer 48 hours prior to and following any maintenance activity.

H. Approval of seeded areas will be by the Engineer at the end of the growing season the year after seeding. Approval will be provided if all requirements have been met, including the following:
   1. Seed areas are properly established.
   2. Turf is free of eroded, bare, or dead spots and free of prohibited and regulated plant species.

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