Remedial Action Work Plan

North Aud Block
NYSDEC Site No. C915406
P/O 130 Main Street
Buffalo, New York 14202

February 2026

Prepared for:

North Aud Owner LLC

Prepared by:

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Certification

I, Thomas H. Forbes, certify that I am currently a NYS registered professional engineer and that this February 2026 Remedial Action Work Plan (RAWP) for North Aud Block, on a portion of 130 Main Street, Buffalo, New York was prepared in accordance with applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

Thomas H. Forbes, P.E.	2-19-26	
NYS Professional Engineer #070950-1	Date	Signature

It is a violation of Article 145 of New York State Education Law for any person to alter this document in any way without the express written verification of adoption by any New York State licensed engineer in accordance with Section 7209(2), Article 145, New York State Education Law.

1. Introduction

Roux Environmental Engineering and Geology, D.P.C. (Roux), has prepared this Remedial Action Work Plan (RAWP) on behalf of North Aud Owner LLC to present the proposed scope of work and implementation procedures for completion of remedial activities at the New York State Brownfield Cleanup Program (BCP) North Aud Block site (Site, C915406), located on a portion of 130 Main Street in the City of Buffalo, New York (see Figures 1 and 2).

The remedial activities will be completed by North Aud Owner LLC and their designated remedial contractors and subcontractors, with oversight provided by Roux. The work will be completed in accordance with 6NYCRR Part 375 and New York State Department of Environmental Conservation (NYSDEC) DER-10 guidelines.

1.1 Background and History

The Site consists of a 1.87-acre portion of a greater parcel addressed at 130 Main Street (SBL No. 111.17-14-11), Buffalo, Erie County, New York. The Site is mostly vacant and covered with grass, light vegetation, and stone. The southern portion of the Site is developed with three structures associated with the Ice at Canalside, including a 2,012-square-foot (SF) building used as a ticketing office and ice skate rental facility, a 143-SF metal outbuilding used as restrooms and a 156-SF metal outbuilding used as a snack shack[1]. Small areas of the Site are covered with concrete sidewalks/stairs associated with the adjacent ice rink. A wooden/sheet pile retaining wall is located proximate to the north, east, and west boundaries of the Site and a smaller concrete wall is located near the western Site boundary. A chain link fence surrounds the majority of the Site (excluding the southern portion associated with the adjacent ice rink), which restricts access.

Historic Site uses and the presence of fill material remaining at the Site from unknown origins have resulted in environmental impacts at the Site, representing a source of contamination. Specifically, previous investigation activities indicated the presence of impacted urban fill material, as evidenced by the widespread presence of black sand, cinders, ash, and an unknown black material intermingled with the fill across the Site. The investigations also noted significantly elevated concentrations of polycyclic aromatic hydrocarbons (PAHs) and metals in fill samples.

Environmental impacts identified at the North Aud Block Site appear similar to those identified at the nearby 130 Main Street BCP site (C915347), except for higher concentrations of lead identified in a discrete area at the North Aud Block Site. The 130 Main Street site was successfully remediated under the BCP to a Track 1 Unrestricted Use, which is the anticipated target cleanup goal for the North Aud Block Site.

1.2 Summary of Environmental Conditions

A summary of the findings of previous environmental investigations completed at the Site is provided below. Appendix A contains analytical tables from the historic and remedial investigations. Figures 3 and 4 show the historic and Remedial Investigation (RI) sampling locations and analytical results.

[1] The existing buildings are slated for removal prior to remedial activities in order to access underlying fill materials for removal to achieve the planned Track 1 Unrestricted Use remedy.

1.2.1 July 2020 – Environmental Site Review Addendum

Sienna Environmental Technologies (Sienna) completed an Environmental Site Review Addendum for the Site in July 2020. Sienna references a subsurface investigation with soil sampling analysis completed by SJB Services Inc. (SJB) in June 2020. Based on SJB's investigation, five soil borings (B-1 through B-5) were advanced to 36 feet below ground surface (fbgs). Fill material was encountered from depths ranging from 4 fbgs to 7 fbgs. The soil/fill was variable and consisted of silty sand, sandy silt, silty clay, and gravel, with crushed stone, cobble, brick, cinders, concrete, coal, organics, and possible fly ash. Laboratory analytical results revealed mercury at B-1 at a concentration of 0.205 milligrams per kilogram (mg/kg), exceeding its 6NYCRR Part 375 Unrestricted Soil Cleanup Objective (USCO, 0.18 mg/kg), and mercury was also identified at B-4 at a concentration of 1.62 mg/kg, exceeding the Restricted Residential SCO (RRSCO, 0.81 mg/kg).

1.2.2 April 2023 – Phase I Environmental Site Assessment

Hilllman Consulting (Hillman) completed an Environmental Site Assessment (ESA) in the area of the BCP Site in April 2023. Hillman Consulting identified the following recognized environmental condition (REC):

- Based on the results of the SJB soil investigation summarized in the Sienna Environmental Site Review Addendum, Hillman concluded that the verified presence of historic fill material within the Property is considered a REC due to the detection of mercury in the fill above USCOs.

Based on an investigation figure, the soil borings by SJB used as the basis of the stated REC, were all located within the boundaries of the BCP Site. Supplemental investigations have identified similar impacted fill material throughout the BCP Site (see Test Pit Investigation, discussed below). Therefore, the REC identified in this ESA is applicable to the North Aud Block BCP Site.

1.2.3 May/June 2023 – Test Pit Investigation

Benchmark Civil/Environmental Engineering & Geology, PLLC (now Roux) completed a Test Pit Investigation on the Site in May/June 2023. Twenty-three test pits (designated as TP-1 through TP-23) were advanced at the Site on May 18, 2023, and June 20, 2023. Ten samples (T-4 1-3 ft, TP-4 3-5 ft, TP-7 2-4 ft, TP-8 2-4 ft, TP-10 24 ft, TP-12 1-3 ft, TP-18 1-3 ft, TP-19 1-3 ft, TP-20 4-6 ft, TP-21 1-3 ft) were submitted for chemical analysis of PAHs and Resource and Recovery Act (RCRA) metals. Select samples were also submitted for polychlorinated biphenyls (PCBs). Results of the investigation are summarized below:

- Urban fill materials were identified across the Site to depths ranging from 2 fbgs to greater than 7 fbgs.
- Semi-volatile organic compounds (SVOCs), specifically PAHs, were identified at concentrations exceeding USCOs at TP-12.
- Metals, including arsenic, barium, lead, and mercury, were identified exceeding USCOs at TP-4, TP-8, TP-12, TP-18, TP-19, TP-20, and TP-21. Arsenic was detected up to 107 mg/kg, exceeding its USCO (13 mg/kg) at TP-18; barium was detected up to 9,720 mg/kg, exceeding its USCO (350 mg/kg) at TP-21; lead was detected up to 11,400 mg/kg, exceeding its USCO (63 mg/kg) at TP-18; and mercury was detected up to 6.4 mg/kg, exceeding its USCO (0.18 mg/kg) at TP-18.
- PCBs were not detected at concentrations above laboratory detection limits.

The Site was entered into the BCP based on the soil/fill environmental impacts identified in the previous studies discussed above.

1.2.4 May 2025 – Remedial Investigation/Alternatives Analysis Report

Roux completed RI activities between February 2025 and April 2025. Results of the RI are summarized below.

1.2.3.1 Remedial Investigation

RI activities completed at the Site include the following:

- Collection of 10 surface soil/fill samples (SS-1 through SS-10) from 0 to 2 inches below ground surface.
- Advancement of 15 soil borings (RISB-1 through RISB-9 and MW-1 through MW-6) to depths ranging between 12 and 24 fbgs (with the exception of RISB-1, where shallow refusal was encountered due to concrete) and six test pits (TP-28, TP-30, and TP-31 through TP-34) to depths ranging between 7 and 15 fbgs and collection of subsurface soil/fill samples.
- Installation of six monitoring wells (MW-1 through MW-6) at depths ranging between 18 and 20 fbgs, monitoring well development, and collection of groundwater samples.
- Collection of five soil vapor samples (SV-1 through SV-5) and one ambient outdoor air sample (OA-1) from the exterior portion of the Site.

Results of the RI are summarized below:

- Soil: Based on the historic and RI subsurface soil/fill findings, PAHs, metals, and, to a much lesser extent, a pesticide, 4,4-DDT, were identified exceeding USCOs in soil/fill samples collected across the Site at varying depths. Characteristically hazardous lead was identified in subsurface soil/fill at RISB-2.
- Groundwater: Volatile organic compounds (VOCs), SVOCs, PCBs, pesticides, herbicides, and 1,4-dioxane were not detected above their respective TOGS 1.1.1 Groundwater Quality Standards/Guidance Values (GWQS/GV). Naturally occurring metals were detected under total and dissolved metals analysis. Dissolved metals concentrations were generally lower in comparison to total metals. Total lead was detected above its GWQS/GV but dissolved lead was detected below its GWQS/GV. One individual per- and polyfluoroalkyl substances (PFAS) compound, perfluorooctanoic acid (PFOA) was detected at a concentration slightly exceeding its GWQS at one location (MW-6); however, based on the minimal concentration identified, it is not considered a constituent of concern or a finding that requires further work.
- Soil Vapor: Low level concentrations of VOCs were detected in the soil vapor samples, indicating soil vapor is not a concern at the Site.

1.2.3.2 Alternatives Analysis

An Alternatives Analysis was completed to evaluate potential remedial alternatives that satisfy site-specific remedial action objectives (RAOs). Based on that analysis, the selected remedy was a Track 1 Unrestricted Use cleanup. Components of the remedy are summarized below:

- In-situ solidification (ISS) or stabilization of characteristically hazardous lead soil/fill in the RISB-2 Characteristically Hazardous Lead Area to remove the hazardous characteristic for disposal off-site at a permitted Part-363 landfill as a non-hazardous material.
- Excavation of all soil/fill where concentrations exceed USCOs and backfilling and compaction of on-site soil/fill and/or clean, imported stone/soil approved by the NYSDEC.

This remedy is fully protective of human health and the environment and fully satisfies the RAOs for the Site. Therefore, this alternative is the recommended final remedial approach for the Site.

1.3 Primary Constituents of Concern (COC)

Based on the historic use of the Site as well as results of the previous and RI activities, the contaminants of concern (COCs) are presented below:

- ***Soil/Fill:*** PAHs and metals, and to lesser extent in discrete locations, a pesticide (4,4-DDT)

1.4 Remedial Action Objectives

The remedial actions for the Site must satisfy RAOs. RAOs are site-specific statements that convey the goals for minimizing substantial risks to public health and the environment. Appropriate RAOs for the Site have been defined as:

Soil/Fill

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil.

RAOs for Environmental Protection

- Prevent migration of contaminants that would result in groundwater or surface water contamination.

1.6 Project Organization and Responsibilities

The remedial actions will be completed by remedial construction specialty contractors under contract to North Aud Owner LLC and/or Roux. Roux will provide oversight of remedial actions identified in this RAWP to be performed in accordance with the Brownfield Cleanup Agreement (BCA), the approved RAWP, 6NYCRR Part 375, and NYSDEC DER-10 guidance.

2. Preparation Tasks

The following tasks will be completed in preparation of remedial action activities.

2.1 RISB-2 Hazardous Lead Area Assessment

Elevated concentrations of total lead exceeding its RRSCO were identified during historic investigation activities at RISB-2 (see Figure 4). Soil/fill in this area was analysed for Toxicity Characteristic Leaching Procedure (TCLP) lead to assess the potential for characteristically hazardous levels of lead (5 milligrams per Liter (mg/L)). TCLP results indicated characteristically hazardous lead at RISB-2 that will need to be treated prior to disposal at a permitted Part-363 landfill. Delineation sampling will be completed to assess the horizontal and vertical extent of the RISB-2 Characteristic Hazardous Lead Area and a bench scale assessment will be completed to assess the amount of amendment material required to successfully treat the lead-impacted soil/fill to a non-hazardous concentration. These activities will be completed in accordance with the Work Plan for BCP Remediation Support Activities provided under a separate cover; results of the delineation sampling and bench scale testing (including recommended amendment dosing) will be provided to the NYSDEC for their review and approval prior to the start of remedial treatment and excavation activities.

2.2 Public Information and Outreach

A fact sheet containing information about the planned remedial work was prepared by the NYSDEC and distributed electronically through their listserv system on June 25, 2025, to those individuals signed up to receive the information. Upon approval, a copy of this RAWP will be made available for public review at the NYSDEC Region 9 office and the Buffalo-Erie County Public Library – Central Branch, the designated document repository.

2.3 Utility Clearance

Prior to intrusive activities, Dig Safely New York (Call 811) will be contacted by the site contractor at a minimum of three business days in advance of the work and informed of the intent to perform exaction work at the Site. If underground utilities are present and anticipated to interfere with intrusive activities, North Aud Owner LLC and the NYSDEC will be contacted to discuss mitigating measures

2.4 Health and Safety Plan Development

The site-specific Health and Safety Plan (HASP) prepared by Roux is provided in Appendix B. The HASP will be enforced by Roux in accordance with the requirements of 29 CFR 1910.120. North Aud Owner LLC or their designee will be responsible for Site control and Roux will be responsible for the health and safety of its authorized workers. Contractors must have a HASP either as or more stringent as the Roux HASP.

2.5 Pre-Construction Meeting

A project coordination meeting will be held with North Aud Owner LLC (or their designee), selected contractor(s), and Roux's Project Manager and field staff. The designated NYSDEC Project Manager and NYSDOH representative will also be notified and invited to attend. Agenda items will include:

- Designation of responsibilities, project personnel, and mobile phone numbers;

- Project documentation requirements;
- Staging of equipment;
- Transportation routes/Site egress;
- Health and Safety requirements;
- Temporary controls (dust suppression, stormwater management);
- Construction schedule;
- Work hours; and
- Site security.

Progress meetings will be conducted throughout the remedial action period as needed. Progress meetings will be attended by the Roux Project Manager and field staff. NYSDEC and NYSDOH will have access to all progress meetings.

2.6 Mobilization and Site Preparation

The contractor's field operations at the Site will commence with mobilizing equipment and materials to the Site and other temporary controls as described below in Section 2.7.

2.7 Temporary Facilities and Controls

Temporary facilities for use during the remedial work may include a construction field trailer and portable toilet(s). Temporary controls, as necessary, will be employed for protection against off-site migration of soil/fill and safety hazards during remedial action and redevelopment, including excavation safety fencing, dust suppression, erosion control, and decontamination procedures, as further described below.2.7.1 Access Controls

Entrance to the Site will be limited to Site workers and designated representatives of Roux, North Aud Owner LLC, and the NYSDEC/NYSDOH. A chain link fence surrounds the majority of the Site (excluding the southern portion associated with the adjacent ice rink), which restricts access. Temporary fencing will be installed along the southern Site boundary. Daily work areas will be identified with construction cones and/or snow fencing, if necessary, to distinguish the work zone. Work areas will be determined daily based on the planned remedial activities and may be changed throughout the workday to ensure safe operations. Access control will consider Site workers and general public safety.

2.7.2 Dust Monitoring and Controls

A Community Air Monitoring Plan (CAMP), as more fully described in Section 4.2 and provided in Appendix C, will be implemented during Site work that will disturb subsurface soil/fill materials. If community air monitoring indicates the need for dust suppression or if dust is visually observed leaving the Site, the contractor will apply a water spray across the excavation and surrounding areas, and on-Site haul roads as necessary to mitigate airborne dust formation and migration. Potable water will either be obtained from a public hydrant or provided by the on-Site water service, if available.

If CAMP data indicates exceedance of VOC thresholds the contractor will be required to adjust work practices to minimize the area of soil disturbance. Based on the previous investigation and RI data, VOCs are not expected to be a concern in the soil/fill present at the Site.

2.7.3 Sediment and Erosion Control

A Master Erosion Control Plan (MECP) for the Site is included in Appendix D. Sediment and erosion control measures (i.e., stabilized construction entrance silt sock, silt fence) will be put in place to ensure no potentially contaminated stormwater is discharged from the Site.

Haul roads may be installed, as necessary, to allow truck access for remedial activities.

2.7.4 Decontamination Procedures

Hand equipment used to process and retrieve samples (i.e. trowels) will be cleaned between each use to prevent cross contamination. All surfaces in contact with samples will be washed thoroughly with Alconox or a non-phosphate detergent and potable quality water, using a brush where possible to remove any particulate matter or surface film. Decontamination will be completed over New York State Department of Transportation (NYSDOT) drums. Drums containing decontamination water will be properly disposed of after the completion of remedial activities.

To prevent exposure of dump truck tires with unremediated surface soils currently present on-site, during the remediation work, prior to and after being loaded with impacted soils, dump trucks will be required to traverse across a constructed access/haul road comprised of imported approved gravel or stone (crushed limestone or similar) that will act as a barrier between the surface soils and the tires. Prior to placement of imported approved material for the access/haul road, in areas that have yet to be excavated to native soil, a demarcation layer, consisting of orange mesh or similar material, will be placed on the ground surface to provide a visual reference to the top of remaining soil/fill. Prior to leaving the Site, each truck will be visually inspected for any soil/fill present on tires or truck components other than within the dump bed and if present, such will be physically removed using hand tools, such as a broom, a stiff-bristle brush, a wire brush, a hand scraper, or a shovel. Further, the street proximate the access road will continually be inspected throughout the remedial work and, if needed, swept of any debris.

2.8 Clearing and Demolition

The existing on-Site buildings, concrete sidewalks/stairs associated with the adjacent ice rink, the wooden/sheet pile retaining wall, and the smaller concrete wall near the western Site boundary will be demolished/removed either prior to or during the remedial excavation activities to the extent required to remove impacted fill from the Site. Building and demolition materials will be assessed and recycled or, if staining or other impacts are identified, characterized and properly disposed. Vegetation will also be cleared from the Site for recycling/disposal.

3. Remedial Action Activities

The NYSDEC will be notified at least 7 business days in advance of any planned remedial activities. ISS/stabilization activities, excavation, post-excavation confirmatory sampling, backfilling, and site grading activities will be performed in accordance with this work plan. Roux notes that characteristically hazardous lead delineation and bench scale testing, additional waste characterization sampling (if needed), and post-treatment groundwater sampling to facilitate obtaining a temporary groundwater discharge permit are addressed under a Work Plan provided under separate cover.

Remedial work will be documented by an experienced Roux professional. Remedial activities will include:

- ISS/stabilization of characteristically hazardous lead-impacted soil/fill in the RISB-2 Hazardous Lead Area;
- The removal and permitted Part-363 landfill disposal of stabilized soil/fill in the RISB-2 Hazardous Lead Area once the area has been rendered non-hazardous for lead; and
- Removal and permitted Part-363 landfill disposal of PAHs- and metals-impacted soil/fill (the Constituents of Concern identified for the Site) to meet NYSDEC Part 375 USCOs.

3.1 RISB-2 Lead Area Remediation

Based on the presence of characteristically hazardous lead in soil/fill at RISB-2, soi/fill in the RISB-2 area will be treated in-situ, then excavated and disposed off-site at a permitted, Part-363 landfill. Prior to remediation in the RISB-2 Lead Area, delineation and bench scale activities will be completed in accordance with the January 2026 Work Plan for BCP Remediation Support Activities to determine the vertical extent (target depth) and horizontal extent (target area) of the treatment area as well as the most effective amendment and dosage. A letter report detailing the results of the delineation and bench scale testing and the proposed target depth/area and amendment dosage will be provided to the NYSDEC and NYSDOH for approval prior to the start of remedial activities. Additional details regarding the primary tasks and ISS/stabilization are presented below:

RISB-2 Delineation Activities

- Using an excavator, additional test pits will be completed in the RISB-2 Characteristically Hazardous Lead Area to assess the horizontal and vertical extent of characteristically hazardous lead. Specifically, one additional test pit (TP-35) will be completed at previous sample location RISB-2; a fill sample will be collected from the same interval that was characteristically hazardous for lead, the 1- to 4-foot interval, for bench scale testing further discussed below. In addition, a native soil sample from beneath the impacted fill unit, anticipated to be from the 4.5- to 7-foot interval, will be analyzed for TCLP lead analysis for vertical delineation purposes. An additional native soil from the bottom of the test pit, anticipated to be from 8 fbgs, will be selected and placed on hold pending TCLP lead results for the shallower native soil sample interval.
- To assess the horizontal extent of characteristically hazardous lead, four step-out test pits will be completed approximately 15 feet laterally from RISB-2, 7.5 feet in all cardinal directions to the north, south, east, and west of RISB-2. One fill sample will be collected from each test pit, anticipated from the 1- to 4-foot intervals, and analyzed for TCLP lead (RISB-2-N1, RISB-2-S1, RISB-2-E1, RISB-2-W1). A second row of four step-out test pits, 7.5 feet in all cardinal directions will be completed approximately 30 feet out from RISB-2 (15 feet laterally from the first set of step-out test pits). One soil/fill sample will be collected from each test pit, anticipated from the 1- to 4-foot intervals, and placed on hold at the laboratory for TCLP lead analysis pending analytical results

from the first set of step-out test pit analytical results (RISB-2-N2, RISB-2-S2, RISB-2-E2, RISB-2-W2). Additional TCLP lead samples may be placed on hold or selected for laboratory analysis from additional depths at the step-out test pits, based on field observations and the laboratory analytical results from initial runs.

- Test pit spoils will be placed next to each test pit on polyethylene sheeting. Once sampling is completed, the spoils will then be used to backfill each test pit excavations and the removed soils will be placed back into the test pit excavations in the same depths that they were removed. Exposure to potential TCLP lead soils will be mitigated through the proper use of personal protective equipment (PPE), in accordance with the Health and Safety Plan (HASP) included in the approved Remedial Investigation Work Plan (RIWP). Further regarding mitigation of exposure to TCLP soils, Site access is currently limited to authorized personnel only and following TCLP lead delineation activities, upon the horizontal extent of TCLP lead soils being determined, a snow fence will be installed surrounding the extents of the TCLP lead area to prevent access.

RISB-2 Bench Scale Testing

Bench-scale soil/fill treatability testing will be completed to evaluate potential amendments that will treat the soil/fill to TCLP lead concentrations below 5 mg/L and consequently render the material non-hazardous. The scope of work associated with the bench-scale lead assessment to be completed by Roux will consist of the following:

- One five-gallon bucket of soil/fill from TP-35 (to be advanced in the RISB-2 Characteristically Hazardous Lead Area as discussed above) will be collected by Roux between 1 and 4 fbgs using an excavator.
- The collected soil/fill will be homogenized and separated into two piles. One soil/fill sample will be collected from each pile and analyzed for TCLP lead to establish a baseline.
- The soil/fill pile with the higher of the two TCLP lead results will be selected for treatment.
- The selected soil/fill pile will be separated into four homogenized samples and will be placed and weighed in disposable aluminum containers.
- Amendments will be weighed into aliquots, based on the weight of the soil/fill samples, and mixed into the soil/fill samples. Each of samples will be mixed with one of the following amendment mixtures:
    - Sample 1: Phosphoric acid at 0.5% by weight
    - Sample 2: Phosphoric acid at 1% by weight
    - Sample 3: Portland cement at 5% by weight and 3.25% by weight of water
    - Sample 4: Portland cement at 10% by weight and 3.25% by weight of water
- The four treated soil/fill samples (two treated with phosphoric acid and two treated with Portland cement) will be tested for TCLP lead to determine the most cost-effective amendment and dosing to treat soil/fill in the RISB-2 Characteristically Hazardous Lead Area.

RISB-2 ISS/Stabilization Activities

- The Remedial Contractor will excavate the designated area to the target depth. Depending on the target area, treatment may be completed in sub-areas to control amendment mixing operations. These sub-areas will be determined at the start of field activities.
- The Remedial Contractor will blend soils from ground surface to the target depth, with the selected amendment and dosage, as determined by bench-scale testing. The Remedial Contractor will mix the soil and amendment material as necessary to adequately homogenize the amendment material

within the impacted soil. After blending, the soil/amendment mixture will be allowed to stabilize for approximately 24 hours.

- Post-treatment soil samples will be collected by the Engineer no less than every 500 cubic yards and analyzed for TCLP lead. Each composite sample will consist of four individual grab samples from within the treatment area.
- In the event TCLP lead results exceed 5 mg/L, the Remedial Contractor will mix additional amendment material into the soil at the direction of the Engineer, and the Engineer will collect an additional sample to retest the soils.
- Once soils are deemed to contain less than 5 mg/L TCLP lead, the Remedial Contractor will excavate these soils for disposal at a permitted, Part-363 landfill.

3.2 Remedial Excavation

All impacted soil/fill present at the Site exceeding USCOs will be excavated and transported off-site for proper permitted Part-363 landfill disposal as further discussed in the sections below.

3.2.1 Removal of Impacted Soil/Fill

Remedial excavation work will be directed by an experienced Roux professional to remove impacted soil/fill material. The Roux professional will report directly to the Professional Engineer (P.E.) who will certify the work in the Final Engineering Report (FER). The Roux professional will be in correspondence with the P.E. throughout duration of work. Visual observations and collection of post-excavation samples will be used to screen soil/fill materials and assist in verifying removal of impacted soil/fill. Vertical excavation will continue until the impacted soil/fill is removed and Part 375 USCOs are achieved. The horizontal extent of the remedial excavation will be the BCP Site boundary. The planned excavation will include removal of fill from beneath the existing building footprints (to be demolished/removed prior to remedial activities) and areas beyond the wood/sheet pile retaining walls. During remedial activities, monitoring wells will be decommissioned in accordance with NYSDEC CP-43 Groundwater Monitoring Well Decommissioning Policy.

Based on subsurface information obtained during intrusive studies, Roux estimates that a volume of approximately 29,760 tons of soil/fill will be required to achieve a Track 1 Unrestricted Cleanup. The approximate extents of the excavation, and estimated volume, are provided on Figure 5. Based on the known fill depths across the Site and resulting expected depths of the excavation, additional shoring may be required to successfully remove fill materials to ensure that USCOs are achieved for the entire Site. Monitoring wells previously installed on-site will be decommissioned during the remedial excavation activities.

Final excavation limits will be surveyed with a handheld Trimble GeoXH GPS unit and average excavation depths will be manually measured in the field. Horizontal limits and locations of final remedial excavations will be presented on the Site Map in the FER.

3.2.3 Soil/Fill Disposal

Five waste characterization samples (WC-1 through WC-5) were collected from soil/fill across the Site during the RI. To meet analytical disposal requirements for the permitted Part-363 landfill, additional waste characterization samples will be collected in accordance with the Work Plan for BCP Remediation Support Activities, provided under a separate cover. Pre-characterization of the soil/fill will allow for direct loading and off-site transportation at the time of the impacted soil/fill excavation. Investigation derived waste (IDW)

generated during the RI currently stored on-site will be disposed of along with soil/fill generated during remedial excavation activities. Loaded trucks leaving the Site with impacted fill materials will be appropriately lined, tarped, manifested, and placarded in accordance with appropriate Federal, State, local, and NYSDOT requirements (and all other applicable transportation requirements). Trucks transporting contaminated soil must have either tight-fitting opaque covers that are secured on the sides and/or back, or opaque covers that are locked on all sides.

3.2.4 Excavation Confirmation Sampling

Post-excavation confirmatory sample locations from the excavated areas will include samples from excavation bottom and all sidewalls in accordance with DER-10. Post-excavation sidewall samples will be collected at a frequency of 1 per 30 linear feet of excavation sidewall and post-excavation bottom samples will be collected at a frequency of 1 per 900 square feet of excavation bottom. Sidewall confirmation samples will be taken from the bottom of the sidewall in accordance with DER-10 Section 5.4(b)5ii(2).

End point confirmatory samples from the excavations will be analyzed for the constituents of concern (PAHs and RCRA metals) in accordance with USEPA Methodology with an equivalent Category B deliverables package to facilitate data evaluation by a third-party validation expert. Select post-excavation samples will also be analyzed for pesticides, in areas where low level pesticides (4,4-DDT) were identified exceeding USCOs during the RI (specifically, in the areas of RISB-6, TP-32, TP-33, and MW-6). Expedited turnaround times may be requested for the analytical results from any additional bottom samples to minimize the time that the excavation(s) remains open. Validated data generated during remedial activities will be reported to NYSDEC electronically via EQuIS software for storage in NYSDEC's Environmental Information Management System (EIMS).

3.3 Groundwater Management

Water present within excavations and any rainwater that may run into excavations during the impacted soil/fill removal will be handled on-site prior to discharge to the municipal sewer. In general, water removed from excavations will be stored/settled in a portable storage tank(s), and if deemed necessary, will be pumped through a bag or cartridge filter prior to treatment using granular activated carbon (GAC). Groundwater generated during the RI (IDW) will also be handled in this manner. Roux or the Applicant will coordinate with the Buffalo Sewer Authority to obtain any necessary temporary sewer discharge permits. A treated water sample may be collected prior to the start of remedial activities in accordance with the BCP Remediation Support Work Plan to obtain the BSA permit.

Following completion of excavation work, settled solids remaining in the tank and any spent treatment materials will be characterized and disposed of off-site at a permitted disposal facility in accordance with applicable federal and state regulations. The storage tank will be decontaminated via pressure washing.

3.4 Excavation Backfill

The excavation will be backfilled with material meeting the requirements of 6 NYCRR Part 375-6.7(d), in accordance with DER-10 requirements. Prior to backfilling with imported material, a Request for Import of Backfill Material form will be submitted to the NYSDEC for approval. Backfill of excavations will begin after NYSDEC is notified and approval is received. It is estimated that approximately 50,000 cubic yards of material will be imported to bring the site to design elevations established at approximately 580 to 598 feet above mean sea level (fmsl).

Backfill material may consist of the following materials:

- Gravel, rock, or stone, consisting of virgin material, from a permitted mine or quarry may be imported without chemical testing if it contains less than 10% by weight material which would pass through a size 100 sieve and is approved by NYSDEC.
- Imported soil/fill originating from known off-site sources having no evidence of disposal or releases of hazardous substances, hazardous, toxic, or radioactive wastes, or petroleum that meets the chemical criteria established in DER-10 Appendix 5, Subdivision 5.4(e). No off-site materials meeting the definition of a solid waste as defined in 6 NYCRR Part 360-1.2(a) shall be used as backfill.

Imported soil/fill material will be subject to characterization requirements in accordance with DER-10 Table 5.4(e)10, or as otherwise approved by NYSDEC prior to import to the Site. Characterization testing will be performed by an independent, NYSDOH ELAP-approved laboratory. An equivalent Category B deliverables package will be furnished with the data to allow data evaluation and preparation of a DUSR by an independent, third-party data validation expert. QA samples will be collected to support the data evaluation. The QA samples will include a minimum of one matrix spike, one matrix spike duplicate, and one blind duplicate per 20 samples.

4. Remedial Activities Support Documents

4.1 Health and Safety Protocols

Roux has prepared a HASP for use by our employees in accordance with 40 CFR 300.150 of the NCP and 29 CFR 1910.120. The HASP, provided in Appendix B, includes the following site-specific information:

- A hazard assessment.
- Training requirements.
- Definition of exclusion, contaminant reduction, and other work zones.
- Monitoring procedures for Site operations.
- Safety procedures.
- Personal protective clothing and equipment requirements for various field operations.
- Disposal and decontamination procedures.
- A contingency plan that addresses potential site-specific emergencies.

Health and safety activities will be monitored throughout the remedial field activities. A member of the field team will be designated to serve as the Site Safety and Health Officer (SSHO). The SSHO will report directly to the Project Manager and the Corporate Health and Safety Coordinator. The HASP will be subject to revision as necessary, based on new information that is discovered during field investigation and/or remedial activities.

4.2 Community Air Monitoring

Real-time community air monitoring will be performed during the remedial action activities at the Site. A generic NYSDOH CAMP is included in Appendix C. Particulate and VOC monitoring will be performed along the upwind and downwind perimeters of the work area during intrusive remedial action activities in accordance with this plan. The CAMP is consistent with the requirements for community air monitoring at remediation sites as established by the NYSDOH and NYSDEC. Accordingly, it follows procedures and practices outlined under NYSDEC's DER-10 (May 2010) Appendix 1A (NYSDOH's Generic Community Air Monitoring Plan) and Appendix 1B (Fugitive Dust and Particulate Monitoring).

NYSDEC and NYSDOH will be notified within 24 hours of any CAMP action level exceedances observed during remedial action activities. Otherwise, CAMP data will be provided to NYSDEC and NYSDOH on a weekly basis. CAMP exceedances and corrective measures will be also reported in daily field logs.

4.3 Citizen Participation Activities and Fact Sheets

NYSDEC will coordinate and lead community relations throughout the course of the project with support from Roux as requested. A Citizen Participation (CP) Plan has previously been prepared as a separate document and submitted to the NYSDEC. A copy of the approved CP Plan was placed at the designated document repository. The NYSDEC, with input from Roux and North Aud Owner LLC, will issue project-related fact sheets to keep the public informed of BCP activities.

5. Remedial Activities Reporting

5.1 Construction Monitoring

A Roux scientist or engineer will be on-site on a full-time basis to document remedial activities. Such documentation will include, at minimum, daily reports detailing remedial activities, community air monitoring results, photographs, and sketches. Appendix E contains sample project documentation forms. The NYSDEC and NYSDOH will be notified within 24-hours of any sustained CAMP action level exceedances observed during remedial action activities. Otherwise, CAMP data/reports will be provided to NYSDEC and NYSDOH by the end of the following day in accordance with 6 NYCRR Part 375-1.6. Additionally, the completed reports will be available on-site and submitted to the NYSDEC as part of the FER. The NYSDEC will be promptly notified of problems requiring modifications to this RAWP prior to proceeding or completion of the construction item.

Photo documentation of the remedial activities will be prepared by a field representative throughout the duration of the project as necessary to convey typical work activities, changed conditions, and/or special circumstances. If determined to be necessary, periodic on-site construction progress meetings will be held to which NYSDEC will receive an invitation.

5.2 Final Engineering Report

A FER will be prepared at the conclusion of remedial activities. The FER will include the following information and documentation, consistent with the NYSDEC's DER-10 Technical Guidance for Site Remediation:

- Introduction and background.
- Planimetric map showing the areas remediated, including significant site features.
- Map showing the lateral limits of any excavations and/or treatment areas.
- Tabular summaries of unit quantities including: volume of soil excavated and/or treated and disposition of excavated/treated soil; and, origin and volume of imported soil.
- Planimetric map showing location of all verification and other sampling locations with sample identification labels/codes.
- Tabular comparison of verification and other sample analytical results to SCOs. An explanation shall be provided for any results exceeding acceptance criteria.
- Documentation on the disposition of impacted soil removed.
- Copies of daily inspection reports and, if applicable, problem identification and corrective measure reports.
- Photo documentation of remedial activities.
- Text describing the remedial activities performed, a description of any deviations from the Work Plan and associated corrective measures taken, and other pertinent information necessary to document that the Site activities were carried out in accordance with this Work Plan.

In addition, North Aud Owner LLC will subcontract for third-party data review of post-excavation verification data by a qualified, independent data validation expert. Specifically, a Data Usability Summary Report (DUSR) will be prepared, with appropriate data qualifiers added to the results. The DUSR format will follow

the NYSDEC's September 1997 DUSR guidelines and draft DER-10 guidance. The DUSR and any necessary qualifications to the data will be appended to the FER.

6. Project Schedule

The anticipated project schedule for the major tasks to be performed during implementation of the RAWP is summarized in Figure 6 and as follows:

- Hazardous Lead Area Delineation Sampling & Bench Scale Assessment – March 2026
- Remedial Excavation & Backfill – April 2026 through August 2026
- Submit Draft FER – October 2026
- Submit Final FER – November 2026
- Receive COC – December 2026

7. References

Hillman Consulting. Phase I Environmental Site Assessment, North Aud Block, Buffalo, New York 14202. April 2023.

New York State Department of Environmental Conservation Division of Water. *Technical and Operational Guidance Series (1.1.1) Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations*. Reissued June 1998.

New York State Department of Environmental Conservation. *6 NYCRR Part 375 Environmental Remediation Programs Subparts 375-1 to 375-4 and 375-6*. Effective December 14, 2006.

New York State Department of Environmental Conservation. *DER-10 Technical Guidance for Site Investigation and Remediation*. May 2010.

Roux Environmental Engineering and Geology, D.P.C. Phase II Environmental Investigation, North Aud Block Site, a Portion of 130 Main Street, Buffalo, New York. March 2024.

Roux Environmental Engineering and Geology, D.P.C. Remedial Investigation Work Plan, North Aud Block Portion of 130 Main Street, Buffalo, New York. November 2024.

Roux Environmental Engineering and Geology, D.P.C. *Draft Remedial Investigation/Alternatives Analysis Report North Aud Block Site, portion of 130 Main Street, Buffalo, New York*. October 2025.

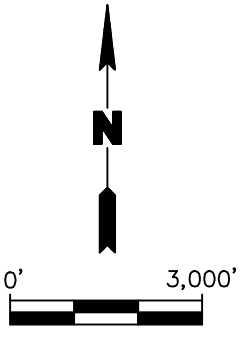
Sienna Environmental Technologies. Environmental Site Review Addendum, North Aud Block Project, Buffalo, New York. July 2020.

FIGURES

1. Site Location and Vicinity Map
2. Site Plan (Aerial)
3. Historic & Remedial Investigation Locations
4. Historic & Remedial Investigation Locations and Soil/Fill Exceedances
5. Planned Excavation Depths
6. Anticipated Project Schedule

QUADRANGLE LOCATION

SOURCE:
BUFFALO, NY, 2023
USGS 7.5 MINUTE TOPOGRAPHIC MAP



Title:

SITE LOCATION AND VICINITY MAP

REMEDIAL ACTION WORK PLAN

NORTH AUD BLOCK (C915406)
P/O 130 MAIN STREET, BUFFALO, NEW YORK

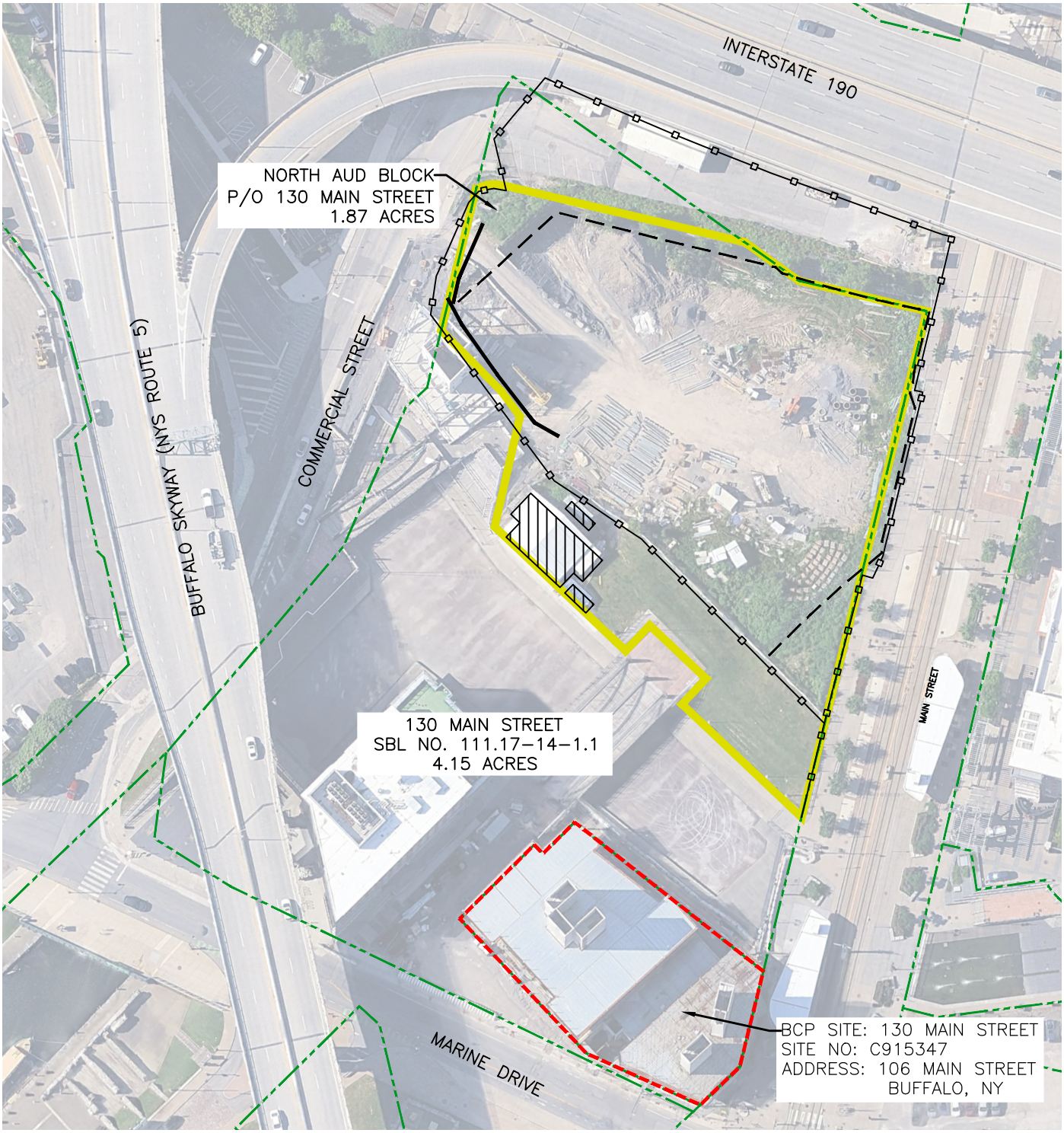
Prepared for:

NORTH AUD OWNER LLC

ROUX

Compiled by: CNK	Date: SEPTEMBER 2025	FIGURE
Prepared by: CNK	Scale: AS SHOWN	1
Project Mgr: BWM	Project: 4375.0002B000	
File: FIGURE 1; SITE LOCATION AND VICINITY MAP.DWG		

F:\CAD\0-ROUX\PENNROSE\NORTH AUD BLOCK\RAW\P\FIGURE 1; SITE LOCATION AND VICINITY MAP.DWG



100' 0 100'

LEGEND

- BCP SITE BOUNDARY
- PARCEL BOUNDARY
- WOODEN/SHEET PILE RETAINING WALL
- CONCRETE WALL
- EXISTING STRUCTURES (TO BE REMOVED)
- EXISTING FENCE
- ADJACENT BCP SITE BOUNDARIES

N

NOTES

1. AERIAL IMAGE SOURCE GOOGLE EARTH 2024.

Title:

SITE PLAN (AERIAL)

REMEDIAL ACTION WORK PLAN

NORTH AUD BLOCK (C915406)
P/O 130 MAIN STREET, BUFFALO, NEW YORK

Prepared for:

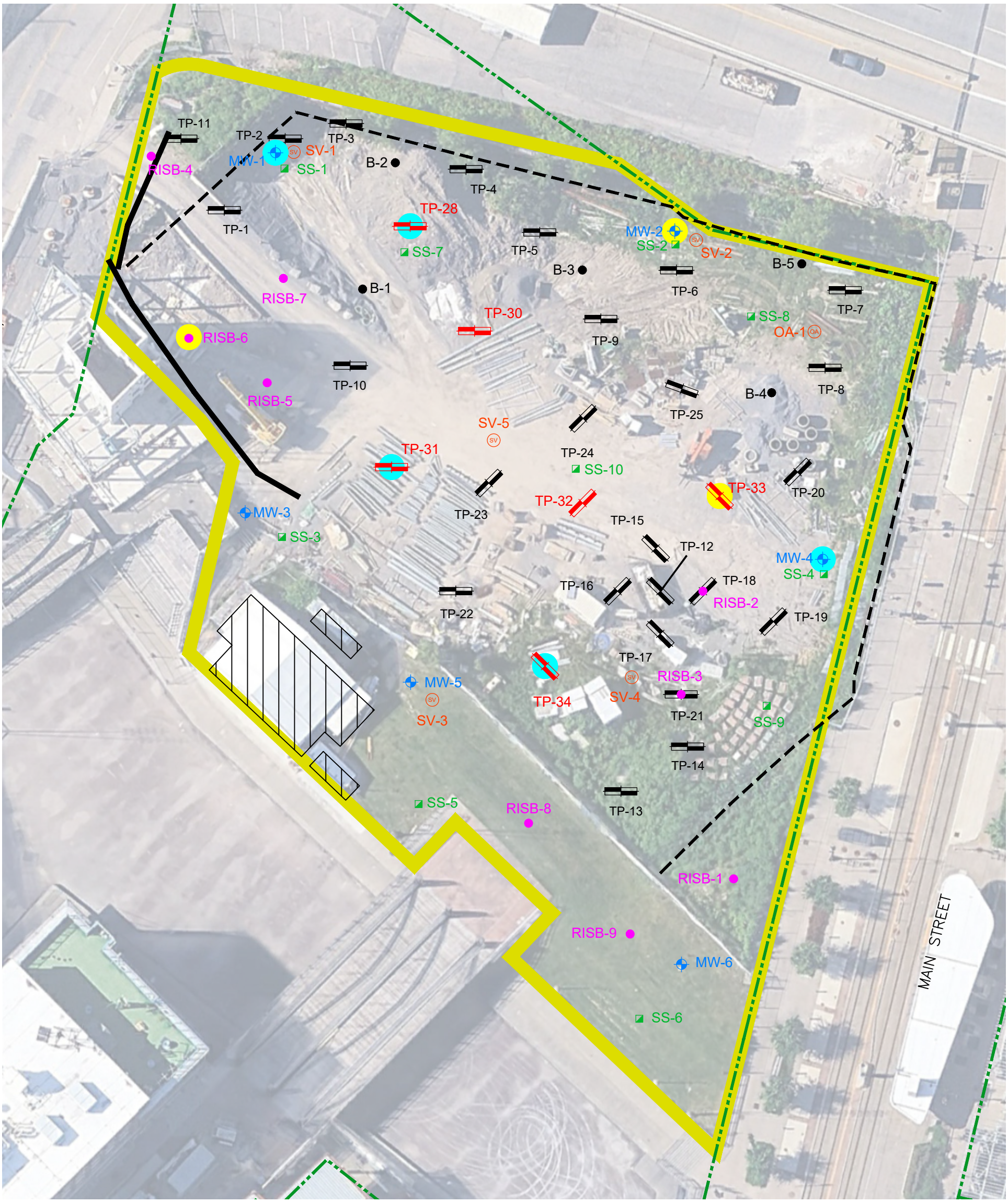
NORTH AUD OWNER LLC

ROUX

Compiled by: CNK	Date: OCTOBER 2025	FIGURE
Prepared by: CNK	Scale: AS SHOWN	2
Project Mgr: BWM	Project: 4375.0001B000	
File: FIGURE 2; SITE PLAN (AERIAL).DWG		

F:\CAD\0-ROUX\PENNROSE\NORTH AUD BLOCK\RAWP\FIGURE 2; SITE PLAN (AERIAL).DWG

F:\CAD\0-ROUX\PENNROSE\NORTH AUD BLOCK\RAWP\FIGURE 3-4; HISTORIC AND RI LOCATIONS.DWG



LEGEND

- BCP SITE BOUNDARY
- PARCEL BOUNDARY
- WOODEN/SHEET PILE RETAINING WALL
- CONCRETE WALL
- EXISTING STRUCTURES (TO BE DEMOLISHED OR REMOVED)
- B-1 PREVIOUS BORING LOCATION (SJB)
- TP-1 PREVIOUS TEST PIT LOCATION (ROUX)
- SS-1 RI SURFACE SOIL LOCATION
- TP-26 RI TEST PIT LOCATION
- RISB-1 RI SOIL BORING LOCATION
- MW-1 RI SOIL BORING/MONITORING WELL LOCATION
- SV-1 RI SOIL VAPOR LOCATION
- OA-1 RI OUTDOOR AIR LOCATION
- NATIVE SOIL SAMPLE LOCATION – FULL SUITE
- NATIVE SOIL SAMPLE LOCATION – SVOCs, METALS, AND PESTICIDES ONLY

NOTES

1. AERIAL IMAGE SOURCE GOOGLE EARTH 2024.

N

40' 0 40'

Title:

HISTORIC & REMEDIAL INVESTIGATION LOCATIONS

REMEDIAL ACTION WORK PLAN

NORTH AUD BLOCK (C915406)
P/O 130 MAIN STREET, BUFFALO, NEW YORK

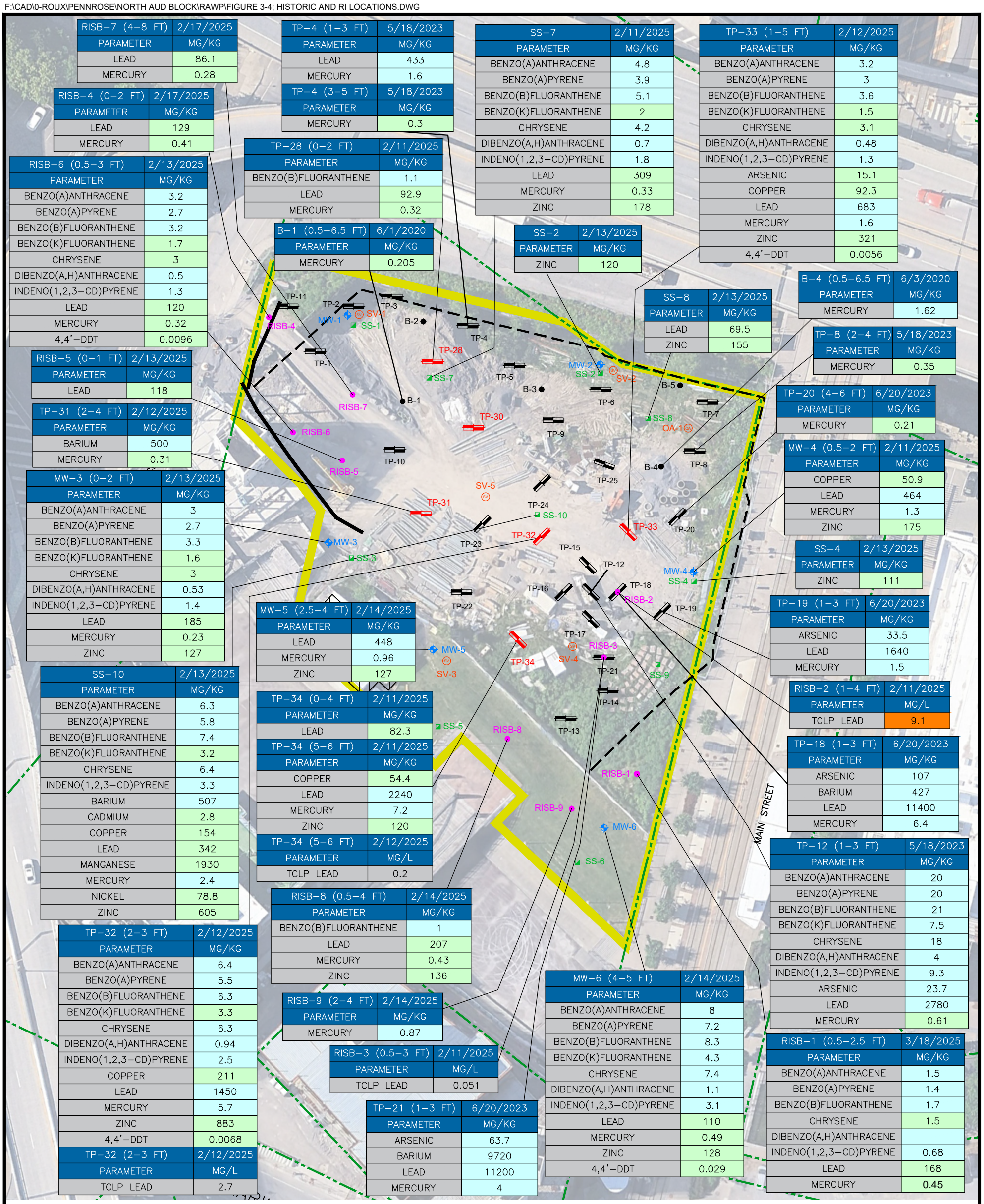
Prepared for

NORTH AUD OWNER LLC

ROUX

Compiled by: CNK	Date: OCTOBER 2025	FIGURE 3
Prepared by: CNK	Scale: AS SHOWN	
Project Mgr: BWM	Project: 4375.0001B000	
File: FIGURE 3-4; HISTORIC AND RI LOCATIONS.DWG		

F:\CAD\0-ROUX\PENNROSE\NORTH AUD BLOCK\RAWP\FIGURE 3-4; HISTORIC AND RI LOCATIONS.DWG



RISB-7 (4-8 FT)	2/17/2025
PARAMETER	MG/KG
LEAD	86.1
MERCURY	0.28

RISB-4 (0-2 FT)	2/17/2025
PARAMETER	MG/KG
LEAD	129
MERCURY	0.41

RISB-6 (0.5-3 FT)	2/13/2025
PARAMETER	MG/KG
BENZO(A)ANTHRACENE	3.2
BENZO(A)PYRENE	2.7
BENZO(B)FLUORANTHENE	3.2
BENZO(K)FLUORANTHENE	1.7
CHRYSENE	3
DIBENZO(A,H)ANTHRACENE	0.5
INDENO(1,2,3-CD)PYRENE	1.3
LEAD	120
MERCURY	0.32
4,4'-DDT	0.0096

RISB-5 (0-1 FT)	2/13/2025
PARAMETER	MG/KG
LEAD	118

TP-31 (2-4 FT)	2/12/2025
PARAMETER	MG/KG
BARIUM	500
MERCURY	0.31

MW-3 (0-2 FT)	2/13/2025
PARAMETER	MG/KG
BENZO(A)ANTHRACENE	3
BENZO(A)PYRENE	2.7
BENZO(B)FLUORANTHENE	3.3
BENZO(K)FLUORANTHENE	1.6
CHRYSENE	3
DIBENZO(A,H)ANTHRACENE	0.53
INDENO(1,2,3-CD)PYRENE	1.4
LEAD	185
MERCURY	0.23
ZINC	127

SS-10	2/13/2025
PARAMETER	MG/KG
BENZO(A)ANTHRACENE	6.3
BENZO(A)PYRENE	5.8
BENZO(B)FLUORANTHENE	7.4
BENZO(K)FLUORANTHENE	3.2
CHRYSENE	6.4
INDENO(1,2,3-CD)PYRENE	3.3
BARIUM	507
CADMIUM	2.8
COPPER	154
LEAD	342
MANGANESE	1930
MERCURY	2.4
NICKEL	78.8
ZINC	605

TP-32 (2-3 FT)	2/12/2025
PARAMETER	MG/KG
BENZO(A)ANTHRACENE	6.4
BENZO(A)PYRENE	5.5
BENZO(B)FLUORANTHENE	6.3
BENZO(K)FLUORANTHENE	3.3
CHRYSENE	6.3
DIBENZO(A,H)ANTHRACENE	0.94
INDENO(1,2,3-CD)PYRENE	2.5
COPPER	211
LEAD	1450
MERCURY	5.7
ZINC	883
4,4'-DDT	0.0068
TP-32 (2-3 FT)	2/12/2025
PARAMETER	MG/L
TCLP LEAD	2.7

TP-4 (1-3 FT)	5/18/2023
PARAMETER	MG/KG
LEAD	433
MERCURY	1.6
TP-4 (3-5 FT)	5/18/2023
PARAMETER	MG/KG
MERCURY	0.3

TP-28 (0-2 FT)	2/11/2025
PARAMETER	MG/KG
BENZO(B)FLUORANTHENE	1.1
LEAD	92.9
MERCURY	0.32

B-1 (0.5-6.5 FT)	6/1/2020
PARAMETER	MG/KG
MERCURY	0.205

MW-5 (2.5-4 FT)	2/14/2025
PARAMETER	MG/KG
LEAD	448
MERCURY	0.96
ZINC	127

TP-34 (0-4 FT)	2/11/2025
PARAMETER	MG/KG
LEAD	82.3
TP-34 (5-6 FT)	2/11/2025
PARAMETER	MG/KG
COPPER	54.4
LEAD	2240
MERCURY	7.2
ZINC	120
TP-34 (5-6 FT)	2/12/2025
PARAMETER	MG/L
TCLP LEAD	0.2

RISB-8 (0.5-4 FT)	2/14/2025
PARAMETER	MG/KG
BENZO(B)FLUORANTHENE	1
LEAD	207
MERCURY	0.43
ZINC	136

RISB-9 (2-4 FT)	2/14/2025
PARAMETER	MG/KG
MERCURY	0.87

RISB-3 (0.5-3 FT)	2/11/2025
PARAMETER	MG/L
TCLP LEAD	0.051

TP-21 (1-3 FT)	6/20/2023
PARAMETER	MG/KG
ARSENIC	63.7
BARIUM	9720
LEAD	11200
MERCURY	4

SS-7	2/11/2025
PARAMETER	MG/KG
BENZO(A)ANTHRACENE	4.8
BENZO(A)PYRENE	3.9
BENZO(B)FLUORANTHENE	5.1
BENZO(K)FLUORANTHENE	2
CHRYSENE	4.2
DIBENZO(A,H)ANTHRACENE	0.7
INDENO(1,2,3-CD)PYRENE	1.8
LEAD	309
MERCURY	0.33
ZINC	178

SS-2	2/13/2025
PARAMETER	MG/KG
ZINC	120

SS-8	2/13/2025
PARAMETER	MG/KG
LEAD	69.5
ZINC	155

MW-6 (4-5 FT)	2/14/2025
PARAMETER	MG/KG
BENZO(A)ANTHRACENE	8
BENZO(A)PYRENE	7.2
BENZO(B)FLUORANTHENE	8.3
BENZO(K)FLUORANTHENE	4.3
CHRYSENE	7.4
DIBENZO(A,H)ANTHRACENE	1.1
INDENO(1,2,3-CD)PYRENE	3.1
LEAD	110
MERCURY	0.49
ZINC	128
4,4'-DDT	0.029

TP-33 (1-5 FT)	2/12/2025
PARAMETER	MG/KG
BENZO(A)ANTHRACENE	3.2
BENZO(A)PYRENE	3
BENZO(B)FLUORANTHENE	3.6
BENZO(K)FLUORANTHENE	1.5
CHRYSENE	3.1
DIBENZO(A,H)ANTHRACENE	0.48
INDENO(1,2,3-CD)PYRENE	1.3
ARSENIC	15.1
COPPER	92.3
LEAD	683
MERCURY	1.6
ZINC	321
4,4'-DDT	0.0056

B-4 (0.5-6.5 FT)	6/3/2020
PARAMETER	MG/KG
MERCURY	1.62

TP-8 (2-4 FT)	5/18/2023
PARAMETER	MG/KG
MERCURY	0.35

TP-20 (4-6 FT)	6/20/2023
PARAMETER	MG/KG
MERCURY	0.21

MW-4 (0.5-2 FT)	2/11/2025
PARAMETER	MG/KG
COPPER	50.9
LEAD	464
MERCURY	1.3
ZINC	175

SS-4	2/13/2025
PARAMETER	MG/KG
ZINC	111

TP-19 (1-3 FT)	6/20/2023
PARAMETER	MG/KG
ARSENIC	33.5
LEAD	1640
MERCURY	1.5

RISB-2 (1-4 FT)	2/11/2025
PARAMETER	MG/L
TCLP LEAD	9.1

TP-18 (1-3 FT)	6/20/2023
PARAMETER	MG/KG
ARSENIC	107
BARIUM	427
LEAD	11400
MERCURY	6.4

TP-12 (1-3 FT)	5/18/2023
PARAMETER	MG/KG
BENZO(A)ANTHRACENE	20
BENZO(A)PYRENE	20
BENZO(B)FLUORANTHENE	21
BENZO(K)FLUORANTHENE	7.5
CHRYSENE	18
DIBENZO(A,H)ANTHRACENE	4
INDENO(1,2,3-CD)PYRENE	9.3
ARSENIC	23.7
LEAD	2780
MERCURY	0.61

RISB-1 (0.5-2.5 FT)	3/18/2025
PARAMETER	MG/KG
BENZO(A)ANTHRACENE	1.5
BENZO(A)PYRENE	1.4
BENZO(B)FLUORANTHENE	1.7
CHRYSENE	1.5
DIBENZO(A,H)ANTHRACENE	
INDENO(1,2,3-CD)PYRENE	0.68
LEAD	168
MERCURY	0.45

LEGEND

- BCP SITE BOUNDARY
- PARCEL BOUNDARY
- WOODEN/SHEET PILE RETAINING WALL
- CONCRETE WALL
- EXISTING STRUCTURES (TO BE DEMOLISHED OR REMOVED)
- B-1 PREVIOUS BORING LOCATION (SJB)
- TP-1 PREVIOUS TEST PIT LOCATION (ROUX)
- SS-1 RI SURFACE SOIL LOCATION
- TP-26 RI TEST PIT LOCATION
- RI-SB-1 RI SOIL BORING LOCATION
- MW-1 RI SOIL BORING/MONITORING WELL LOCATION
- SV-1 RI SOIL VAPOR LOCATION
- OA-1 RI OUTDOOR AIR LOCATION
- EXCEEDS UNRESTRICTED SCOs
- EXCEEDS RESTRICTED-RESIDENTIAL SCOs
- EXCEEDS CHARACTERISTIC HAZARDOUS WASTE THRESHOLD FOR LEAD

N

60' 0 60'

NOTES

1. AERIAL IMAGE SOURCE GOOGLE EARTH 2024.
2. SOIL/FILL ANALYTICAL RESULTS COMPARED TO 6 NYCRR PART 375 SOIL CLEANUP OBJECTIVES (SCOs).
3. FOUR SAMPLES WERE ANALYZED FOR TCLP LEAD: RISB-2 (1-4 FT), RISB-3 (0.5-3 FT), TP-32 (2-3 FT), AND TP-34 (5-6 FT).

Title:
HISTORIC & REMEDIAL INVESTIGATION LOCATIONS AND SOIL/FILL EXCEEDANCES REMEDIAL ACTION WORK PLAN

NORTH AUD BLOCK (C915406)
P/O 130 MAIN STREET, BUFFALO, NEW YORK

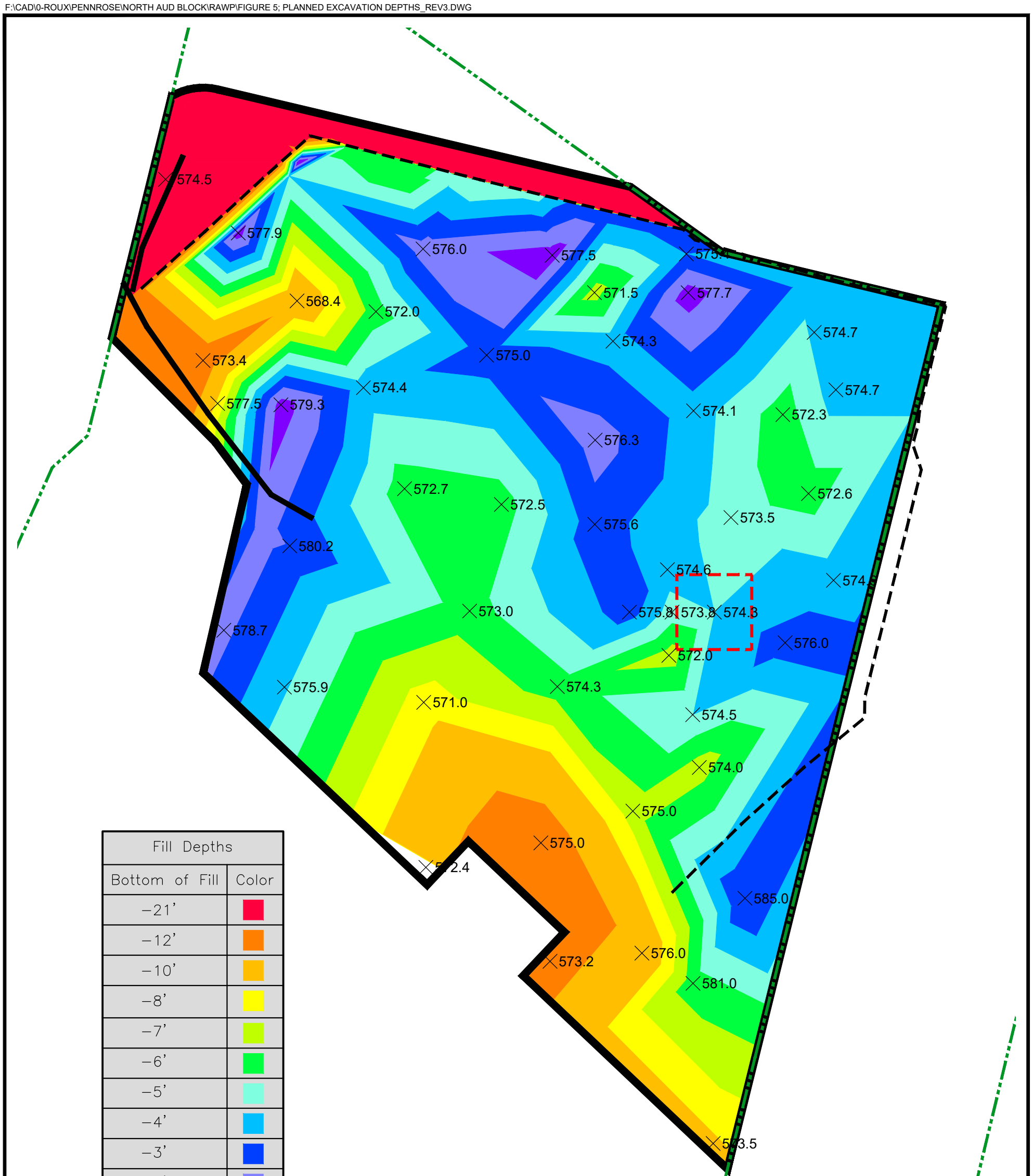
Prepared for
NORTH AUD OWNER LLC

ROUX

Compiled by: CNK	Date: OCTOBER 2025
Prepared by: CNK	Scale: AS SHOWN
Project Mgr: BWM	Project: 4375.0001B000
File: FIGURE 3-4; HISTORIC AND RI LOCATIONS.DWG	

FIGURE 4

F:\CAD\0-ROUX\PENNROSE\NORTH AUD BLOCK\RAWP\FIGURE 5; PLANNED EXCAVATION DEPTHS_REV3.DWG



Fill Depths	
Bottom of Fill	Color
−21’	
−12’	
−10’	
−8’	
−7’	
−6’	
−5’	
−4’	
−3’	
−2’	
−1’	

REMEDIAL EXCAVATION VOLUME ANALYSIS:
AVERAGE DEPTH TO BOTTOM OF FILL: 6.2 FT
APPROXIMATE FILL VOLUME: 18,600 CY (29,760 TONS)

LEGEND

- BCP SITE BOUNDARY
- PARCEL BOUNDARY
- WOODEN/SHEET PILE RETAINING WALL
- CONCRETE WALL
- 576.0 APPROXIMATE BOTTOM OF FILL ELEVATION (FT)
- AREA TO BE EXCAVATED UNDER TRACK 1 CLEANUP
- APPROXIMATE EXTENT OF RISB−2 CHARACTERISTICALLY HAZARDOUS LEAD AREA

NOTES

1. ELEVATION BASED ON ALTA/NSPS LAND TITLE SURVEY COMPLETED JULY 2023 BY FRANDINA ENGINEERING AND LAND SURVEYING, PC.

N

40’ 0 40’

Title: **PLANNED EXCAVATION DEPTHS**

REMEDIAL ACTION WORK PLAN

NORTH AUD BLOCK (C915406)
P/O 130 MAIN STREET, BUFFALO, NEW YORK

Prepared for
NORTH AUD OWNER LLC

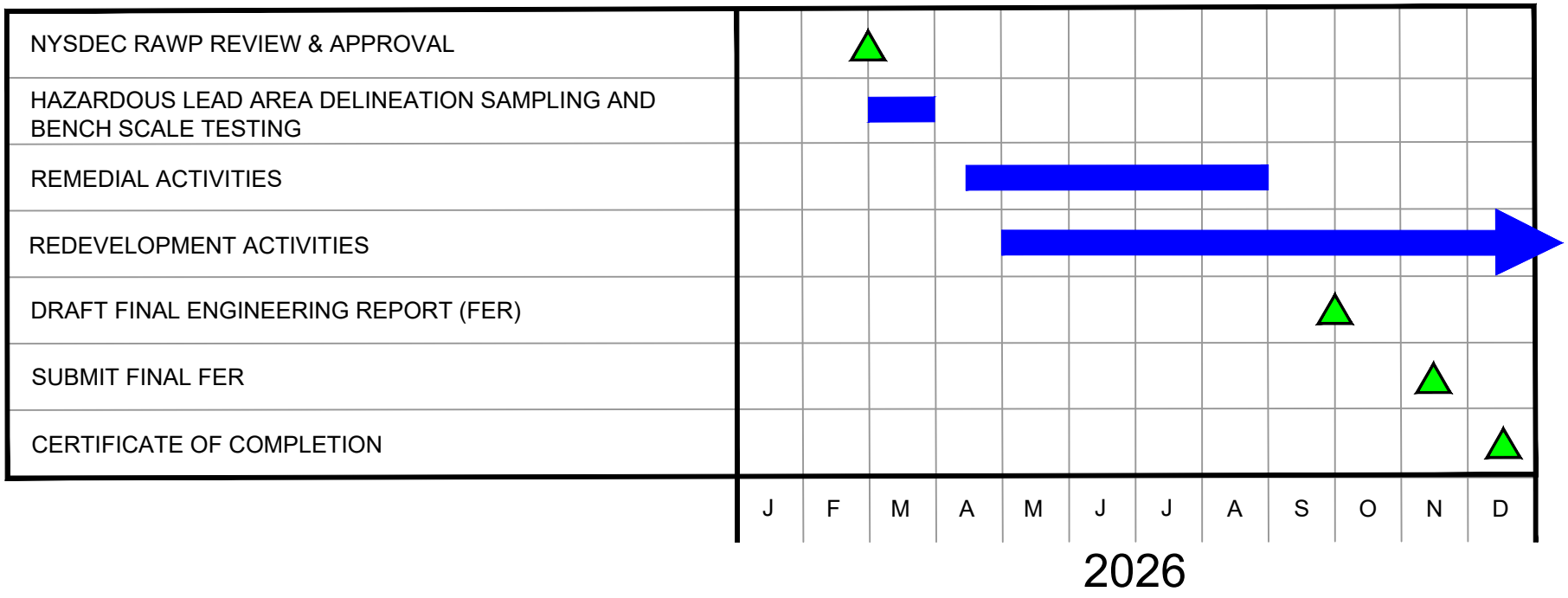
ROUX

Compiled by: CNK	Date: OCTOBER 2025
Prepared by: CNK	Scale: AS SHOWN
Project Mgr: BWM	Project: 4375.0001B000
File: FIGURE 5; PLANNED EXCAVATION DEPTHS_REV3.DWG	

FIGURE 5

F:\CAD\0-ROUX\PENNROSE\NORTH AUD BLOCK\RAWP\FIGURE 6; ANTICIPATED PROJECT SCHEDULE.DWG

PROJECT TASKS:



Title:

ANTICIPATED PROJECT SCHEDULE

REMEDIAL ACTION WORK PLAN

NORTH AUD BLOCK (C915406)
P/O 130 MAIN STREET, BUFFALO, NEW YORK

Prepared for:
NORTH AUD OWNER LLC

ROUX

Compiled by: CNK	Date: FEBRUARY 2026
Prepared by: CNK	Scale: AS SHOWN
Project Mgr: BWM	Project: 4375.0002B000
File: FIGURE 6; ANTICIPATED PROJECT SCHEDULE.DWG	

FIGURE
6

APPENDICES

A. Historic and Remedial Investigation Analytical Tables
B. Health and Safety Plan (HASP)
C. Community Air Monitoring Plan (CAMP)
D. Master Erosion Control Plan
E. Project Documentation Forms

APPENDIX A

Historic and Remedial Investigation Analytical Tables

ROUX

TABLE 3
SUMMARY OF RI SURFACE SOIL/FILL ANALYTICAL DATA
REMEDIAL INVESTIGATION/ALTERNATIVES ANALYSIS REPORT
NORTH AUD BLOCK (C915406)
BUFFALO, NEW YORK

PARAMETER[1]	Unrestricted Use SCOs [2]	Restricted Residential Use SCOs [2]	2025 Remedial Investigation [3]									
			SS-1	SS-2	SS-3	SS-4	SS-5	SS-6	SS-7	SS-8	SS-9	SS-10
			2/13/2025				2/14/2025		2/11/2025	2/13/2025		
Semi Volatile Organic Compounds (SVOCs) - mg/Kg [4]												
2-Methylnaphthalene	--	--	ND	ND	ND	ND	ND	ND	1.2 J	ND	ND	ND
Acenaphthene	**20**	**100**	ND	ND	ND	ND	ND	ND	1.2 J	ND	ND	ND
Anthracene	**100**	**100**	ND	ND	ND	0.081 J	ND	ND	3.9	0.066 J	ND	2.3 J
Benzo(a)anthracene	**1**	**1**	0.038 J	0.066 J	0.065 J	0.21 J	ND	ND	**4.8**	0.17 J	0.059 J	**6.3 J**
Benzo(a)pyrene	**1**	**1**	0.043 J	0.057 J	0.058 J	0.2 J	ND	ND	**3.9**	0.18 J	0.06 J	**5.8 J**
Benzo(b)fluoranthene	**1**	**1**	0.054 J	0.077 J	0.073 J	0.24 J	ND	ND	**5.1**	0.21 J	0.082 J	**7.4 J**
Benzo(ghi)perylene	**100**	**100**	0.03 J	0.035 J	0.033 J	0.12 J	ND	ND	1.9 J	0.098 J	0.042 J	3.4 J
Benzo(k)fluoranthene	**0.8**	**3.9**	ND	0.03 J	0.029 J	0.11 J	ND	ND	**2 J**	0.097 J	0.035 J	**3.2 J**
Carbazole	--	--	ND	ND	ND	0.029 J	ND	ND	1 J	0.033 J	ND	ND
Chrysene	**1**	**3.9**	ND	0.067 J	0.061 J	0.21 J	ND	ND	**4.2**	0.18 J	0.063 J	**6.4 J**
Dibenzo(a,h)anthracene	**0.33**	**0.33**	ND	ND	ND	ND	ND	ND	**0.7 J**	ND	ND	ND
Dibenzofuran	**7**	**59**	ND	ND	ND	ND	ND	ND	1.9 J	ND	ND	ND
Fluoranthene	**100**	**100**	0.095 J	0.14 J	0.14 J	0.48	ND	0.021 J	12	0.35	0.12 J	14
Fluorene	**30**	**100**	ND	ND	ND	0.033 J	ND	ND	3.5 J	ND	ND	ND
Indeno(1,2,3-cd)pyrene	**0.5**	**0.5**	ND	0.033 J	0.029 J	0.1 J	ND	ND	**1.8 J**	0.087 J	0.038 J	**3.3 J**
Naphthalene	**12**	**100**	ND	ND	ND	ND	ND	ND	1.4 J	ND	ND	ND
Phenanthrene	**100**	**100**	0.063 J	0.065 J	0.087 J	0.34	ND	ND	14	0.27	0.055 J	9.1 J
Pyrene	**100**	**100**	0.075 J	0.1 J	0.1 J	0.37	ND	ND	7.8	0.27	0.097 J	9.9
Total PAHs	--	--	0.398 J	0.67 J	0.675 J	2.494 J	0 J	0.021 J	68.2 J	1.978 J	0.651 J	71.1 J
TICS	--	--	ND	4.04 TJN	ND	3.95 TJN	0.16 TJN	0.19 TJ	3.8 TJ	ND	ND	214.1 TJN
Metals - mg/Kg												
Aluminum	--	--	15500	19400	5250	17500 F2	13500	12800	7350	18200	17500	56300
Arsenic	**13**	**16**	3.5	3.9	ND	4.3	3.4	2.9	4.8	11.5	4	ND
Barium	**350**	**400**	82.5	111	30.6	103	73.7	72.5	157	119	186	**507**
Beryllium	**7.2**	**72**	0.6	0.74	0.21 J	0.78	0.55	0.52	0.35	0.77	0.69	2.7 J
Cadmium	**2.5**	**4.3**	0.46	0.51	0.11 J	0.7	0.26	0.22 J	0.37	0.99	0.38	**2.8 J**
Calcium	--	--	18000	8020	54000	72700 F2	45800	55300	71700	16500	24700	1170000
Chromium	**30**	**180**	17.4 B	23.4 B	6.9 B	19 B	16.4	15.5	12	21.3 B	20 B	113 B
Cobalt	--	--	7.4	8.7	2.4	8	7.8	6.9	4.1	12.6	8	19.5
Copper	**50**	**270**	15.4	18.8	8.1	18.5	15.1	15.2	27.9	17.7	18.4	**154**
Iron	--	--	17900	22300	6590	18500 F2	16000	15500	11500	25600	19100	78100
Lead	**63**	**400**	46.3	37	9.5	55.2	16.4	12.4	**309**	**69.5**	53.3	**342**
Magnesium	--	--	7640	5300	27300	11000 J	14300	18400	13200	6270	7900	83300
Manganese	**1600**	**2000**	518	653	159	788 F2	391	372	244	1260	495	**1930**
Mercury	**0.18**	**0.81**	0.1	0.056	0.017	0.071	0.034	0.087	**0.33**	0.061	0.13	**2.4**
Nickel	**30**	**310**	14.7	20.5	6.7	17.3	18	17.6	12.1	18.8	18.3	**78.8 J**
Potassium	--	--	2610	3310	1590	3460 F1	2950	2890	1990	3150	3060	16700
Selenium	**3.9**	**180**	ND	ND	ND	ND	ND	ND	1 J	1.1 J	ND	ND
Sodium	--	--	245	208	245	263	258	237	306	176 J	193 J	32300
Vanadium	--	--	30.1	36.9	10.6	32.1	26.8	25	18	38.9	33.2	123
Zinc	**109**	**10000**	101	**120**	35.7	**111**	57.2	53.3	**178**	**155**	109	**605**
Polychlorinated biphenyls (PCBs) - mg/Kg [4]												
Total PCBs	**0.1**	**1**	ND	ND	ND	ND	--	ND	--	ND	ND	--
Pesticides - mg/Kg [4]												
4,4'-DDT	**0.0033**	**7.9**	ND	ND	ND	ND	ND	ND	ND	0.0026 J	ND	ND
beta-BHC	**0.036**	**0.036**	ND	ND	ND	ND	ND	ND	ND	0.012 NJ	0.0018 J	ND
Herbicides - mg/Kg [4]												
Total Herbicides	--	--	ND	ND	ND	ND	--	ND	--	ND	ND	--
Per- and polyfluoroalkyl substances (PFAS) - ug/Kg												
Perfluoropentanoic acid (PFPeA)	--	--	ND	ND	ND	ND	--	ND	--	0.12 J	ND	--
Perfluorohexanoic acid (PFHxA)	--	--	ND	ND	ND	ND	--	ND	--	0.092 J	0.077 J	--
Perfluoroheptanoic acid (PFHpA)	--	--	ND	ND	ND	ND	--	ND	--	0.066 J	0.057 J	--
Perfluorooctanoic acid (PFOA)	**0.66**	**33**	0.18	0.15 J	ND	0.1 J	--	ND	--	0.23	0.28	--
Perfluorononanoic acid (PFNA)	--	--	0.067 J	0.074 J	ND	ND	--	ND	--	0.088 J	0.076 J	--
Perfluoroundecanoic acid (PFUnA)	--	--	ND	ND	ND	ND	--	ND	--	0.041 J	ND	--
Perfluorodecanoic acid (PFDA)	--	--	ND	0.045 J	ND	ND	--	ND	--	0.087 J	0.059 J	--
Perfluorobutanesulfonic acid (PFBS)	--	--	ND	ND	ND	ND	--	ND	--	ND	0.084 J	--
Perfluorooctanesulfonic acid (PFOS)	**0.88**	**44**	0.23	0.22	ND	0.2	--	ND	--	0.47	0.37	--

Notes:
1. Only those parameters detected at a minimum of one sample location are presented in this table; other compounds were reported as non-detect.
2. Values per 6NYCRR Part 375 Soil Cleanup Objectives (SCOs).
3. 2025 Remedial Investigation results from samples collected by Roux.
4. Sample results were reported by the laboratory in ug/kg and converted to mg/kg for comparisons to SCOs.

Definitions:
ND = Parameter not detected above laboratory detection limit.
"--" = No value available for the parameter; Parameter not analyzed for.
J = Estimated value; result is less than the sample quantitation limit but greater than zero.
B = Compound was found in the blank and sample.
F1 = MS and/or MSD recovery exceeds control limits.
F2 = MS/ MSD RPD exceeds control limits.
T = Result is a tentatively identified compound (TIC) and an estimated value.
N = Presumptive evidence of material.

Bold	= Result exceeds Unrestricted Use SCOs.
Bold	= Result exceeds Restricted Residential Use SCOs.

TABLE 4
SUMMARY OF PHASE II AND RI SUBSURFACE SOIL/FILL ANALYTICAL DATA
REMEDIAL INVESTIGATION/ALTERNATIVES ANALYSIS REPORT
NORTH AUD BLOCK (C915406)
BUFFALO, NEW YORK

ROUX

PARAMETER[1]	Unrestricted Use SCOs [2]	Restricted Residential Use SCOs [2]	2020 Subsurface Investigation [3]														Roux 2025 Remedial Investigation [5]									
			B-1 0.5-6.5 FT	B-2 0.5-6.5 FT	B-3 0.5-6 FT	B-4 0.5-6.5 FT	TP-4 1-3 FT	TP-4 3-5 FT	TP-7 2-4 FT	TP-8 2-4 FT	TP-10 2-4 FT	TP-12 1-3 FT	TP-18 1-3 FT	TP-19 1-3 FT	TP-20 4-6 FT	TP-21 1-3 FT	RISB-1 0.5-2.5 FT	RISB-4 0-2 FT	RISB-5 0-1 FT	RISB-6 0.5-3 FT	RISB-6 17-18 FT	RISB-7 4-8 FT	RISB-8 0.5-4 FT	RISB-9 2-4 FT	TP-28 0-2 FT	TP-28 5-7 FT
			FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	NATIVE	FILL	FILL	FILL	FILL	NATIVE
			6/1/2020		6/2/2020	6/3/2020	5/18/2023						6/20/2023				3/18/2025	2/17/2025	2/13/2025		2/17/2025		2/14/2025		2/11/2025	
Volatile Organic Compounds (VOCs) - mg/Kg [4]																										
2-Butanone (MEK)	**0.12**	**100**	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--	ND	--	--	--	0.0035 J	ND	--	--	0.0037 J	--
Acetone	**0.05**	**100**	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--	ND	--	--	--	0.018 J	0.033 J	--	--	0.018 J	--
Benzene	**0.06**	**4.8**	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--	ND	--	--	--	ND	ND	--	--	ND	--
Chloroform	**0.37**	**49**	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--	ND	--	--	--	ND	ND	--	--	ND	--
Methylcyclohexane	--	--	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--	ND	--	--	--	ND	ND	--	--	ND	--
Naphthalene	**12**	**100**	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--	ND	--	--	--	ND	0.0026 J	--	--	ND	--
Toluene	**0.7**	**100**	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--	ND	--	--	--	ND	ND	--	--	ND	--
m&p-Xylene	**0.26**	--	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--	ND	--	--	--	ND	ND	--	--	ND	--
Total Xylenes	**0.26**	**100**	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--	ND	--	--	--	ND	ND	--	--	ND	--
Total Tentatively Identified Compounds	--	--	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--	ND	--	--	--	ND	ND	--	--	ND	--
Total VOCs	--	--	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--	ND	--	--	--	0.0215 J	0.0356 J	--	--	0.0217 J	--
Semi Volatile Organic Compounds (SVOCs) - mg/Kg [4]																										
2-Methylnaphthalene	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.18 J	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthene	**20**	**100**	ND	ND	ND	ND	0.058 J	ND	ND	ND	ND	1.2 J	ND	ND	ND	0.049 J	ND	ND	ND	0.19 J	ND	0.041	ND	ND	0.11 J	ND
Acenaphthylene	**100**	**100**	ND	ND	ND	ND	0.032 J	ND	ND	ND	ND	7.1	ND	ND	ND	ND	ND	ND	ND	0.19 J	ND	0.037	ND	ND	ND	ND
Anthracene	**100**	**100**	ND	ND	ND	ND	0.15 J	ND	ND	ND	ND	5.6	ND	ND	ND	0.11 J	0.42 J	0.27 J F1F2	ND	1.1	ND	0.14 J	0.29 J	ND	0.31 J	ND
Benzo(a)anthracene	**1**	**1**	0.344	ND	ND	ND	0.33	ND	ND	ND	ND	**20**	0.18 J	0.94 J	ND	0.27	**1.5**	0.85 J F1F2	0.33 J	**3.2**	ND	0.44	0.87 J	0.52 J	0.8 J	ND
Benzo(a)pyrene	**1**	**1**	0.306	ND	ND	ND	0.33	ND	ND	ND	ND	**20**	ND	0.71 J	ND	0.27	**1.4**	0.82 J F1F2	0.29 J	**2.7**	ND	0.43	0.89	0.4 J	0.77 J	ND
Benzo(b)fluoranthene	**1**	**1**	ND	ND	ND	ND	0.34	ND	ND	ND	ND	**21**	0.18 J	0.81 J	ND	0.29	**1.7**	0.92 F1F2	0.38 J	**3.2**	ND	0.48	**1**	0.56 J	**1.1**	ND
Benzo(ghi)perylene	**100**	**100**	ND	ND	ND	ND	0.17 J	ND	ND	ND	ND	9.6	0.12 J	0.34 J	ND	0.18 J	0.83 J	0.57 J F1F2	0.18 J	1.3	ND	0.22	0.5 J	0.21 J	0.56 J	ND
Benzo(k)fluoranthene	**0.8**	**3.9**	ND	ND	ND	ND	0.21	ND	ND	ND	ND	**7.5**	ND	0.4 J	ND	0.14 J	0.76 J	0.44 J F1F2	0.17 J	**1.7**	ND	0.25	0.53 J	0.26 J	0.44 J	ND
Biphenyl	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Butyl benzyl phthalate	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbazole	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.12 J	0.16 J	ND	0.16 J	ND	0.052 J	0.1 J	ND	ND	ND
Chrysene	**1**	**3.9**	0.334	ND	ND	ND	0.32	ND	ND	ND	ND	**18**	ND	0.81 J	ND	0.28	**1.5**	0.93 F1F2	0.33 J	**3**	ND	0.44	0.98	0.55 J	0.82 J	ND
Dibenzo(a,h)anthracene	**0.33**	**0.33**	ND	ND	ND	ND	0.063 J	ND	ND	ND	ND	**4 J**	ND	ND	ND	0.05 J	0.22 J	0.16 J F1F2	ND	**0.5 J**	ND	0.079 J	ND	ND	0.19 J	ND
Diethyl phthalate	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibenzofuran	**7**	**59**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.18 J	ND	0.037 J	ND	ND	0.11 J	ND
Fluoranthene	**100**	**100**	0.644	ND	ND	0.528	0.75	ND	0.028 J	ND	ND	29	0.34 J	1.5 J	ND	0.63	3.4	1.7 F1F2	0.74 J	7.2	ND	1	2	1.2	1.9	ND
Fluorene	**30**	**100**	ND	ND	ND	ND	0.053 J	ND	ND	ND	ND	2.2 J	ND	ND	ND	0.037 J	0.13 J	0.11 J	ND	0.37 J	ND	0.052 J	0.1 J	ND	0.16 J	ND
Indeno(1,2,3-cd)pyrene	**0.5**	**0.5**	ND	ND	ND	ND	0.16 J	ND	ND	ND	ND	**9.3**	ND	0.37 J	ND	0.15 J	**0.68 J**	0.44 J F1F2	0.15 J	**1.3**	ND	0.19 J	0.42 J	0.18 J	0.48 J	ND
Naphthalene	**12**	**100**	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.5 J	ND	ND	ND	ND	ND	0.17 J	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	**100**	**100**	0.353	ND	ND	0.652	0.64	ND	ND	ND	ND	11	0.25 J	0.69 J	ND	0.52	1.8	1.3 F1F2	0.48 J	3.5	ND	0.67 J	1.2	0.5 J	1.3	ND
Pyrene	**100**	**100**	0.565	ND	ND	0.445	0.55	ND	0.024 J	ND	ND	24	0.27 J	1.1 J	ND	0.55	3	1.5 F1F2	0.53 J	5	ND	0.83 J	1.6	0.99	1.4	ND
Total PAHs	--	--	2.546 J	0 J	0 J	1.625 J	4.156 J	0 J	0.052 J	0 J	0 J	191 J	1.34 J	7.67 J	0 J	3.526 J	17.34 J	10.18 J	3.58 J	34.45 J	0 J	5.299 J	10.38 J	5.37 J	10.34 J	0 J
TICS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.94 TJN	ND	ND	3.8 TJN	4.07 TJN	0.44 TJN	0.94 TJN	0.91 TJN	ND	ND
Metals - mg/Kg																										
Aluminum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	9280	9910	12900	7640	6840	6880	10300	10100	5430	4670
Antimony	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic	**13**	**16**	2.64	2.41	1.7	2.67	3.7	1.6 J	1.1 J	1.4 J	3.4	**23.7**	**107**	**33.5**	2.2 J	**63.7**	4.9	8.8	4.3	3.5	ND	8	5.2	7.3	2.5	1.8 J
Barium	**350**	**400**	66.2	47.9	36.1	205	124	36.3	41.7	82.2	95.9	262	**427**	96.7	71.7	**9720**	83.6	51.2	97.5	70.8	107	49.8	95.9	57	41.7	13.1
Beryllium	**7.2**	**72**	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--	0.44	0.43	0.53	0.38	0.25 J	0.43	0.5	0.49	0.25	0.19 J
Cadmium	**2.5**	**4.3**	0.317	ND	ND	0.311	0.17 J	0.14 J	0.2 J	0.35 J	0.33	0.59	0.61	0.43	0.22 J	0.39	0.39 B	0.3	0.33	0.29	0.15 J	0.21 J	0.33	0.22	0.22	0.13 J
Calcium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	42000	18100 J	65700	71200	31200	159000 J	40100	24000	53600	154000
Chromium	**30**	**180**	10.2	11.7	8.45	8.06	7.7	8.6	6.7	15.7	14.5	17.8	14	13.4	11.9	15	16	11.2	18.1 B	11.9 B	8.4 B	12.5	16.3	12.8	7.3	8.4
Cobalt	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.5	5	6.4	4	2	4.1	6	7.1	2.8	2.2
Copper	**50**	**270**	11.9	9.09	6.47	19.6	--	--	--	--	--	--	--	--	--	--	38.2	19 J	31.7	30.7	5.4	23.4	43.9	31	25	8.3
Iron	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	15000	11900 J-	14900	11100	5930	11800	18700	20200 J-	7280	8050
Lead	**63**	**400**	33.9	21.1	9.17	44.2	**433**	28.9	33.1	20	12.9	**2780**	**11400**	**1640**	24.8	**11200**	**168**	**129 J**	**118**	**120**	7.9	**86.1**	**207**	27	**92.9**	6.9
Magnesium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	14000 J	8930 J	20000	12900	3630	12200	10700	6290 F1	7280	88000
Manganese	**1600**	**2000**	114	145	128	155	--	--	--	--	--	--	--	--	--	--	349 F1	259 J	400	258	77.7	310	321	368 J	188	237
Mercury	**0.18**	**0.81**	**0.205**	0.143	0.126	**1.62**	**1.6**	**0.3**	0.17	**0.35**	0.15	**0.61**	**6.4 F2**	**1.5**	**0.21**	**4**	**0.45**	**0.41 F1**	0.13	**0.32**	0.032	**0.28 J**	**0.43**	**0.87**	**0.32 J-**	0.016 J
Nickel	**30**	**310**	9.25	7.62	7.12	6.97	--	--	--	--	--	--	--	--	--	--	16.6	12.7	15.7	12.2	6.7 J	13.8	17.4	21	7.8	6.2
Potassium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2270	1790	2960	2100	1240	1880	2580	2120 J	1240	1880
Selenium	**3.9**	**180**	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.54 J	2.4 J	ND	ND	1.2 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver	**2**	**180**	ND	ND	ND	ND	ND	ND	0.41 J	ND	ND	ND	0.89	ND	ND	0.26 J	ND	ND	ND	ND	ND	ND	0.31 J	ND	ND	ND
Sodium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	173	151 J	284	365	224	268	0.22	104 J	212	220
Vanadium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	18.8	20.3	26.1	17.1	12.3	14.2	22.4	17.3	11.5	8.8
Zinc	**109**	**10000**	64.8	103	52.2	63	--	--	--	--	--	--	--	--	--	--	**125**	92.7 F1	101	93.4	37.3	65.5	**136**	97	73.4	29.2
Polychlorinated biphenyls (PCBs) - mg/Kg [4]																										
Total PCBs	**0.1**	**1**	ND	ND	ND	ND	ND	--	--	ND	--	ND	--	--	--	--	ND	--	--	--	ND	ND	--	--	ND	--
Pesticides - mg/Kg [4]																										
4,4'-DDD	**0.0033**	**13**	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDE	**0.0033**	**8.9**	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDT	**0.0033**	**7.9**	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--	ND	ND	ND	**0.0096 J**	ND	ND	ND	ND	ND	ND
Endosulfan I	**2.4**	**24**	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan II	**2.4**	**24**	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan sulfate	**2.4**	**24**	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--	0.0035 J	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin	**0.014**	**11**	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--	ND	ND	ND	ND	ND	ND	ND	0.0042 J	ND	ND
Methoxychlor	--	--	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Herbicides - mg/Kg [4]																										
Total Herbicides	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND	--	--	--	ND	ND	--	--	ND	--
Per - and Polyfluoroalkyl Substances (PFAS) - ug/Kg																										
Perfluorobutanoic acid (PFBA)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.22 J	--	--	--	ND	ND	--	--	ND	--
Perfluoropentanoic acid (PFPeA)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND	--	--	--	ND	0.1 J	--	--	ND	--
Perfluorohexanoic acid (PFHxA)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND	--	--	--	ND	0.057 J	--	--	ND	--
Perfluorooctanoic acid (PFOA)	**0.66**	**33**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.05 J	--	--	--	ND	0.057 J	--	--	0.052 J	--
Perfluoroundecanoic acid (PFUnA)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND		--	--	ND	0.041 J	--	--	ND	--
Perfluorodecanoic acid (PFDA)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND	--	--	--	ND	ND	--	--	0.039 J	--
Perfluorooctanesulfonic acid (PFOS)	**0.88**	**44**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.097 J	--	--	--	ND	0.16	--	--	0.086 J	--
PFOA+PFOS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.147 J	--	--	--	ND	0.217 J	--	--	0.138 J	--
Total PFAS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.367 J	--	--	--	ND	0.415 J	--	--	0.177 J	--

Notes:

1. Only those parameters detected at a minimum of one sample location are presented in this table; other compounds were reported as non-detect.
2. Values per 6NYCRR Part 375 Soil Cleanup Objectives (SCOs).
3. 2020 Subsurface Investigation results from Sienna Environmental Technologies Environmental Review Addendum (July 2020); 2023 Subsurface Investigation results from samples collected by Roux.
4. Sample results were reported by the laboratory in ug/kg and converted to mg/kg for comparisons to SCOs.
5. 2025 Subsurface Investigation results from samples collected by Roux.

Definitions:

ND = Parameter not detected above laboratory detection limit.
"--" = No value available for the parameter; Parameter not analyzed for.
J = Estimated value; result is less than the sample quantitation limit but greater than zero.
J+ = Estimated value, biased high.
J- = Estimated value; biased low.
F1 = MS and/or MSD recovery exceeds control limits.
F2 = MS/ MSD RPD exceeds control limits.
T = Result is a tentatively identified compound (TIC) and an estimated value.
N = Presumptive evidence of material.

Bold	= Result exceeds Unrestricted SCOs.
Bold	= Result exceeds Restricted Residential SCOs.

TABLE 4
SUMMARY OF PHASE II AND RI SUBSURFACE SOIL/FILL ANALYTICAL DATA
REMEDIAL INVESTIGATION/ALTERNATIVES ANALYSIS REPORT
NORTH AUD BLOCK (C915406)
BUFFALO, NEW YORK

ROUX

PARAMETER[1]	Unrestricted Use SCOs [2]	Restricted Residential Use SCOs [2]	Roux 2025 Remedial Investigation 5																							
			TP-30 2-3 FT	TP-31 2-4 FT	TP-31 7-8 FT	TP-31 10-11 FT	TP-32 2-3 FT	TP-33 1-5 FT	TP-33 5-9 FT	TP-33 10-11 FT	TP-34 0-4 FT	TP-34 5-6 FT	TP-34 6-8 FT	TP-34 13-15 FT	MW-1 1.5-4.25 FT	MW-1 5-7 FT	MW-1 12-15 FT	MW-2 0.5-3 FT	MW-2 5-8 FT	MW-2 12-15 FT	MW-3 0-2 FT	MW-4 0.5-2 FT	MW-4 5-8 FT	MW-4 12-15 FT	MW-5 2.5-4 FT	MW-6 4-5 FT
			FILL	FILL	NATIVE	NATIVE	FILL	FILL	NATIVE	NATIVE	FILL	FILL	NATIVE	NATIVE	FILL	NATIVE	NATIVE	FILL	NATIVE	NATIVE	FILL	FILL	NATIVE	NATIVE	FILL	FILL
			2/11/2025	2/11/2025			2/12/2025				2/12/2025					2/11/2025			2/12/2025		2/13/2025		2/11/2025			2/14/2025	
Volatile Organic Compounds (VOCs) - mg/Kg [4]																										
2-Butanone (MEK)	**0.12**	**100**	--	ND	--	--	ND	0.0048 J	ND	ND	ND	ND	--	--	--	--	--	ND	ND	0.004 J	--	ND	--	--	0.0054 J	--
Acetone	**0.05**	**100**	--	ND	--	--	ND	0.029 J+	0.021 J	ND	ND	0.0076 J	--	--	--	--	--	ND	0.011 J	0.014 J	--	ND	--	--	0.028 J	--
Benzene	**0.06**	**4.8**	--	ND	--	--	ND	ND	ND	ND	ND	ND	--	--	--	--	--	ND	0.00043 J	ND	--	ND	--	--	ND	--
Chloroform	**0.37**	**49**	--	ND	--	--	ND	ND	ND	ND	ND	ND	--	--	--	--	--	ND	ND	ND	--	ND	--	--	ND	--
Methylcyclohexane	--	--	--	ND	--	--	ND	ND	ND	ND	ND	ND	--	--	--	--	--	ND	0.00094 J	ND	--	ND	--	--	ND	--
Naphthalene	**12**	**100**	--	ND	--	--	ND	ND	ND	ND	ND	ND	--	--	--	--	--	ND	ND	ND	--	ND	--	--	ND	--
Toluene	**0.7**	**100**	--	ND	--	--	ND	ND	0.00074 J	ND	ND	ND	--	--	--	--	--	ND	0.0011 J	0.00071 J	--	ND	--	--	ND	--
m&p-Xylene	**0.26**	--	--	ND	--	--	ND	ND	ND	ND	ND	ND	--	--	--	--	--	ND	0.00086 J	ND	--	ND	--	--	ND	--
Total Xylenes	**0.26**	**100**	--	ND	--	--	ND	ND	ND	ND	ND	ND	--	--	--	--	--	ND	0.00086 J	ND	--	ND	--	--	ND	--
Total Tentatively Identified Compounds	--	--	--	ND	--	--	ND	ND	ND	ND	ND	ND	--	--	--	--	--	0.0057 TJ	ND	ND	--	ND	--	--	ND	--
Total VOCs	--	--	--	0 J	--	--	0 J	0.0338 J	0.02174 J	0 J	0 J	0.0076 J	--	--	--	--	--	0.0057 J	0.01519 J	0.01871 J	--	0 J	--	--	0.0334 J	--
Semi Volatile Organic Compounds (SVOCs) - mg/Kg [4]																										
2-Methylnaphthalene	--	--	ND	ND	ND	ND	0.57 J	0.19 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthene	**20**	**100**	ND	ND	ND	ND	1.4	0.47 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.31 J	0.092 J	ND	ND	ND	1.4 J
Acenaphthylene	**100**	**100**	ND	ND	ND	ND	0.42 J	0.21 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.25 J	0.027 J	ND	ND	ND	0.71 J
Anthracene	**100**	**100**	ND	ND	ND	ND	3.7	1.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.059 J	ND	ND	1.1	0.25	ND	ND	ND	3.3 J
Benzo(a)anthracene	**1**	**1**	ND	0.4 J	ND	ND	**6.4**	**3.2**	ND	ND	0.1 J	0.12 J	ND	ND	ND	ND	ND	0.17 J	ND	ND	**3**	0.5	ND	ND	0.61 J	**8**
Benzo(a)pyrene	**1**	**1**	ND	0.39 J	ND	ND	**5.5**	**3**	ND	ND	0.11 J	ND	ND	ND	ND	ND	ND	0.16 J	ND	ND	**2.7**	0.46	0.27	ND	0.53 J	**7.2**
Benzo(b)fluoranthene	**1**	**1**	ND	0.48 J	ND	ND	**6.3**	**3.6**	ND	ND	0.14 J	ND	ND	ND	ND	ND	ND	0.19	ND	ND	**3.3**	0.57	ND	ND	0.69 J	**8.3**
Benzo(ghi)perylene	**100**	**100**	ND	0.26 J	ND	ND	2.9	1.5	ND	ND	0.077 J	ND	ND	ND	ND	ND	ND	0.094	ND	ND	1.5	0.31 F2	ND	ND	0.29 J	3.8
Benzo(k)fluoranthene	**0.8**	**3.9**	ND	0.23 J	ND	ND	**3.3**	**1.5**	ND	ND	0.066 J	ND	ND	ND	ND	ND	ND	0.1	ND	ND	**1.6**	0.24	ND	ND	0.34 J	**4.3**
Biphenyl	--	--	ND	ND	ND	ND	0.18 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Butyl benzyl phthalate	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.033 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbazole	--	--	ND	ND	ND	ND	1.2	0.38 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.025 J	ND	ND	0.36 J	0.096 J	ND	ND	ND	1.4 J
Chrysene	**1**	**3.9**	ND	0.4 J	ND	ND	**6.3**	**3.1**	ND	ND	0.12 J	ND	ND	ND	ND	ND	ND	0.18	ND	ND	**3**	0.52	ND	ND	0.67 J	**7.4**
Dibenzo(a,h)anthracene	**0.33**	**0.33**	ND	ND	ND	ND	**0.94 J**	**0.48 J**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**0.53 J**	0.11 J	ND	ND	ND	**1.1 J**
Diethyl phthalate	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibenzofuran	**7**	**59**	ND	ND	ND	ND	1.4	0.32 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.24 J	0.057 J	ND	ND	ND	1.1 J
Fluoranthene	**100**	**100**	ND	0.9 J	ND	ND	15	6.2	ND	ND	0.2 J	0.22	ND	ND	ND	ND	ND	0.38	ND	ND	6.8	1.1	ND	ND	1.5	20
Fluorene	**30**	**100**	ND	ND	ND	ND	1.9 J	0.45 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.024 J	ND	ND	0.4 J	0.1 J	ND	ND	ND	1.6 J
Indeno(1,2,3-cd)pyrene	**0.5**	**0.5**	ND	0.21 J	ND	ND	**2.5 J**	**1.3**	ND	ND	0.066 J	ND	ND	ND	ND	ND	ND	0.074 J	ND	ND	**1.4**	0.27 J	ND	ND	0.23 J	**3.1 J**
Naphthalene	**12**	**100**	ND	ND	ND	ND	0.55	0.18 J	ND	ND	0.17 J	0.17 J	ND	ND	ND	ND	ND	0.32	ND	ND	0.18 J	ND	ND	ND	ND	0.88 J
Phenanthrene	**100**	**100**	ND	0.56 J	ND	ND	15	4.7	ND	ND	0.11 J	0.15 J	ND	ND	ND	ND	ND	0.26	ND	ND	4.1	1 F2	ND	ND	1.4	16
Pyrene	**100**	**100**	ND	0.71 J	ND	ND	12	5.8	ND	ND	0.17 J	0.17 J	ND	ND	ND	ND	ND	0.32	ND	ND	5.2	1.1 J	ND	ND	1.1 J	16
Total PAHs	--	--	0 J	4.54 J	0 J	0 J	84.11 J	30.39 J	0 J	0 J	1.159 J	0.66 J	0 J	0 J	0 J	0 J	0 J	2.011 J	0 J	0 J	35.37 J	6.649 J	0.27 J	0 J	7.36 J	103.09 J
TICS	--	--	10.34 TJN	4.2 TJ	0.32 TJN	2.83 TJ	24.53 TJN	6.55 TJ	ND	0.29 TJN	2.71 TJN	ND	0.38 TJ	0.26 TJ	7.78 TJN	0.44 TJN	ND	1.38 TJN	ND	ND	2.8	12.05 TJN	1.77 TJN	ND	1.2 TJN	11.2 TJN
Metals - mg/Kg																										
Aluminum	--	--	9740	5330	7180	3680	9460	7030	6910	4330	19400	5100	11000	7550	8480	8390	3740	5620	5020	3790	9250	6400	4380	5700	13400	11900
Antimony	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	1 J	ND	ND	ND	ND	ND	ND	ND	ND	3.3 J	ND	ND	ND	ND	ND
Arsenic	**13**	**16**	1.3 J	2.3	ND	1.4 J	12.9	**15.1**	ND	2.1 J	4.4	7.7	1.2 J	ND	ND	1.2 J	ND	ND	1.1 J	2.9	4.7	5.6	ND	ND	10.1	4
Barium	**350**	**400**	49.4	**500**	28.6	9.9	157	144	18	11.4	124	102	57.8 J	28.3	29.7	53.5	13.7	31.6	15.4	14.9	83.8	101	17.3	16.1	135	93.5
Beryllium	**7.2**	**72**	0.37	0.22	0.25	0.17 J	0.49	0.39	0.32	0.2 J	0.84	0.25	0.38 J	0.32	0.33	0.39	0.17 J	0.2 J	0.22 J	0.19 J	0.45	0.33	0.17 J	0.25	0.61	0.72
Cadmium	**2.5**	**4.3**	0.24	0.16 J	ND	0.18 J	0.9	0.47	ND	0.16 J	0.29	0.24 J	0.1 J	0.28	0.23 J	0.24	0.2 J	0.14 J	0.11 J	0.12 J	0.62	0.32	0.13 J	0.2 J	0.29 J	0.42
Calcium	--	--	11600	43600	1160	87800	36700	42200	101000	82800	28700	79900	1040 J	1360	24800	945	55900	28000	99800	88200	34300	280000	5100	82600	66100	26200
Chromium	**30**	**180**	10.9	7	6.6	4.4	16.4	12.2	9.1	5.3	22.9	9.4	12.4 J	9	18.1	9.7	5	6.6	6.7	4.9	16.6 B	13.4	5.9	8	17.7	15.3
Cobalt	--	--	4.2	2.8	2.2	1.8	8	5.3	3.1	1.9	10.3	4.3	4.4 J	3.1	3.2	4.1	2.1	2.2	2.5	4.3	5.1	3.8	1.5	2.5	5	4.9
Copper	**50**	**270**	7.6	14.9	3.8	6.5	**211**	**92.3**	10.8	6.3	36.7	**54.4**	3.8 J	9	7.8	12.4	8.5	5.9	9.9	9.7	49	**50.9**	1.9	8.9	40.8	29.1
Iron	--	--	8570	7100	4680	5540	21200	13400 J	6980	5990	22900	10800	11500 J	4940	10100	6580	5540	8400	6410	6250	15400	11700	3780	6330	21100	15100
Lead	**63**	**400**	13.7	54.7	6.8	5.9	**1450**	**683**	9.4	6.3	**82.3**	**2240**	6.7 J	10.2	10	11.4	6	15.8	6.4	5.3	**185**	**464**	5.8	7.6	**448**	**110**
Magnesium	--	--	6600	8710	1580	42700	9310	11300	61700	44300	11700	19200	2090 J	1710	11500	2240	31600	10700	49600	40400	11300	6260	1760	55300	7370	5240
Manganese	**1600**	**2000**	114	446	39.8	244	303	277 J	156	241	382	254	63.9 J	43.9	255	41.7	162	138	226	234	280	192	41.2	182	279	313
Mercury	**0.18**	**0.81**	0.12	**0.31**	0.0079 J	0.062	**5.7**	**1.6**	0.065	0.056	0.12	**7.2**	0.0078 J	0.015 J	0.035	0.034	0.0091 J	0.031	0.014 J	0.011 J	**0.23**	**1.3**	ND	0.016 J	**0.96**	**0.49**
Nickel	**30**	**310**	10.2	7.9	7.3	5.2 J	18.6	13.3	8.8	5.8 J	23.3	8.9	11.7 J	8.8	7.7	8.6	5.1 J	5 J	6.5	7.4	16.6	10.6	4.9 J	7.3	11.7	15.7
Potassium	--	--	1900	1160	1050	1410	2150	1530	2680	1630	4100	1250	1420 J	1500	1600	1700	1300	963	1880	1490	2390	1350	747	2120	2380	2320
Selenium	**3.9**	**180**	ND	ND	ND	0.94 J	ND	ND	ND	ND	ND	ND	ND	ND	1.2 J	ND	ND	ND	ND	ND	ND	1 J	1 J	ND	ND	ND
Silver	**2**	**180**	ND	ND	ND	ND	0.55 J	0.42 J	ND	ND	0.44 J	0.26 J	0.26 J	ND	ND	ND	ND	ND	ND	ND	0.24 J	ND	ND	ND	0.45 J	ND
Sodium	--	--	166	244	123 J	246	307	216	209	289	169 J	217	97.7 J	114 J	189	167	224	125 J	200	290	273	179	99.8 J	244	1360	184
Vanadium	--	--	19.5	10.5	9.4	7.4	21.5	16.9	13.4	8.2	34.7	13	20.3 J	14	14.7	16.7	8.1	11.5	9.9	8.7	19.5	13.9	9	11	33.4	21.6
Zinc	**109**	**10000**	67.4	84.9	47.4	24.9	**883**	**321**	29.7	27.3	84.1	**120**	45.5 J	74.7	43.8	92.1	34	39.6	31.9	42.5	**127**	**175**	30.4	36.6	**127**	**128**
Polychlorinated biphenyls (PCBs) - mg/Kg [4]																										
Total PCBs	**0.1**	**1**	--	ND	--	--	ND	ND	ND	ND	ND	ND	--	--	--	--	--	ND	ND	ND	--	ND	--	--	ND	--
Pesticides - mg/Kg [4]																										
4,4'-DDD	**0.0033**	**13**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0029 J	ND	ND	ND	ND
4,4'-DDE	**0.0033**	**8.9**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDT	**0.0033**	**7.9**	ND	ND	ND	ND	**0.0068 J**	**0.0056 J**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**0.029 J**
Endosulfan I	**2.4**	**24**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan II	**2.4**	**24**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan sulfate	**2.4**	**24**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin	**0.014**	**11**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.02 J
Methoxychlor	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Herbicides - mg/Kg [4]																										
Total Herbicides	--	--	--	ND	--	--	ND	ND	ND	ND	ND	ND	--	--	--	--	--	ND	ND	ND	--	ND	--	--	ND	--
Per - and Polyfluoroalkyl Substances (PFAS) - ug/Kg																										
Perfluorobutanoic acid (PFBA)	--	--	--	ND	--	--	ND	ND	ND	ND	ND	ND	--	--	--	--	--	ND	ND	ND	--	ND	--	--	ND	--
Perfluoropentanoic acid (PFPeA)	--	--	--	ND	--	--	ND	ND	ND	ND	ND	ND	--	--	--	--	--	ND	ND	ND	--	ND	--	--	ND	--
Perfluorohexanoic acid (PFHxA)	--	--	--	0.065 J	--	--	ND	ND	ND	ND	ND	ND	--	--	--	--	--	ND	ND	ND	--	ND	--	--	ND	--
Perfluorooctanoic acid (PFOA)	**0.66**	**33**	--	0.057 J	--	--	0.044 J	ND	ND	ND	ND	0.038 J	--	--	--	--	--	ND	ND	ND	--	ND	--	--	0.062 J	--
Perfluoroundecanoic acid (PFUnA)	--	--	--	ND	--	--	ND	ND	ND	ND	ND	ND	--	--	--	--	--	ND	ND	ND	--	ND	--	--	ND	--
Perfluorodecanoic acid (PFDA)	--	--	--	ND	--	--	ND	ND	ND	ND	ND	ND	--	--	--	--	--	ND	ND	ND	--	ND	--	--	ND	--
Perfluorooctanesulfonic acid (PFOS)	**0.88**	**44**	--	0.12 J	--	--	0.1 J	0.13 J	ND	0.051 J	0.051 J	0.056 J	--	--	--	--	--	0.037 J	0.044 J	ND	--	0.076 J	--	--	0.11 J	--
PFOA+PFOS	--	--	--	0.177	--	--	0.144	0.13 J	ND	0.051 J	0.051 J	0.094 J	--	--	--	--	--	0.037 J	0.044 J	ND	--	0.076 J	--	--	0.172	--
Total PFAS	--	--	--	0.242 J	--	--	0.144 J	0.13 J	ND	0.051 J	0.051 J	0.094 J	--	--	--	--	--	0.037 J	0.044 J	ND	--	0.076 J	--	--	0.172 J	--

Notes:

1. Only those parameters detected at a minimum of one sample location are presented in this table; other compounds were reported as non-detect.
2. Values per 6NYCRR Part 375 Soil Cleanup Objectives (SCOs).
3. 2020 Subsurface Investigation results from Sienna Environmental Technologies Environmental Review Addendum (July 2020); 2023 Subsurface Investigation results from samples collected by Roux.
4. Sample results were reported by the laboratory in ug/kg and converted to mg/kg for comparisons to SCOs.
5. 2025 Subsurface Investigation results from samples collected by Roux.

Definitions:

ND = Parameter not detected above laboratory detection limit.
"--" = No value available for the parameter; Parameter not analyzed for.
J = Estimated value; result is less than the sample quantitation limit but greater than zero.
J+ = Estimated value, biased high.
J- = Estimated value; biased low.
F1 = MS and/or MSD recovery exceeds control limits.
F2 = MS/ MSD RPD exceeds control limits.
T = Result is a tentatively identified compound (TIC) and an estimated value.
N = Presumptive evidence of material.

Bold	= Result exceeds Unrestricted SCOs.
Bold	= Result exceeds Restricted Residential SCOs.

TABLE 5
SUMMARY OF RI TCLP ANALYTICAL DATA
REMEDIAL INVESTIGATION/ALTERNATIVES ANALYSIS REPORT
NORTH AUD BLOCK (C915406)
BUFFALO, NEW YORK

PARAMETER	Characteristic Hazardous Waste Threshold[1] (mg/L)	RISB-2 (1-4 ft)	RISB-3 (0.5-3 ft)	TP-34 (5-6 ft)	TP-32 (2-3 ft)	WC-1	WC-2	WC-3	WC-4	WC-5
		2/11/2025		2/12/2025		2/18/2025				
TCLP Lead - mg/L										
Lead	**5**	**9.1**	0.051	0.2	2.7	0.66 ^+	2.2 ^+	0.046	0.049	1.4

Notes:

1. TCLP/Haz Waste Regulatory Levels per 40 CFR 261, Appendix II, 1993 ed., as amended by 58 FR 46040, August 31, 1993.

Definitions:

^+ = Continuing Calibration Verification (CCV) is outside acceptance limits, high biased.

Exceeds Haz Waste Threshold

ROUX

TABLE 6
SUMMARY OF RI GROUNDWATER ANALYTICAL DATA
REMEDIAL INVESTIGATION/ALTERNATIVES ANALYSIS REPORT
NORTH AUD BLOCK (C915406)
BUFFALO, NEW YORK

PARAMETER [1]	NYSDEC Class GA GWQS [2]	Monitoring Well Location					
		MW-1	MW-2	MW-3	MW-4	MW-5	MW-6
		2/27/2025					
TCL Volatile Organic Compounds (VOCs) - ug/L							
Methylcyclohexane	--	ND	ND	0.3 J	ND	ND	ND
Trichloroethene	**5**	0.54 J	ND	ND	ND	ND	ND
Total VOC TICs	--	ND	ND	ND	ND	ND	ND
TCL Semi-Volatile Organic Compounds (SVOCs) - ug/L							
Acetophenone	-	0.9 J	ND	ND	ND	ND	0.55 J
Total SVOC TICs	--	ND	ND	180 T J N	ND	ND	ND
Semi-Volatile Organic Compounds 8270 (SIM) [3] - ug/L							
1,4 - Dioxane	**0.35**	0.22 J+	ND	0.22 J+	ND	0.27 J+	ND
TAL Metals - ug/L [4] (Total)							
Aluminum	--	7200	480 J	3100	220	3800	1600
Barium	**1,000**	190	150	340	130	100	78
Beryllium	**3**	0.34 J	ND	0.3 J	ND	ND	ND
Calcium	--	122000	143000	166000	157000	148000	215000
Chromium	**50**	8.2	ND	4	ND	5.1	2.4 J
Cobalt	--	18	3.3 J	11	2.9 J	3.7 J	1.5 J
Copper	**200**	23	4.1 J	17	2.6 J	19	5.3 J
Iron	**300**	**9400**	**1000 J**	**4500**	300	**4600**	**1800**
Lead	**25**	23	4 J	21	ND	**36**	5.5 J
Magnesium	**35,000**	**39300**	**47400**	**59700**	**44600**	34600	**38700**
Manganese	**300**	**1000**	210 F1	**1200**	**540**	260	270
Nickel	**100**	20	5.6 J	12	3.3 J	6.6 J	3.2 J
Potassium	--	16000	36600	15700 ^+^2	42600 ^+^2	6200 ^+	22200 ^+^2
Sodium	**20,000**	**347000**	**530000**	**413000**	**450000**	**72500**	**106000**
Vanadium	--	12	ND	7.9	ND	10	5.7
Zinc	**5,000**	82	ND	36	ND	100	20
Mercury	**0.7**	ND	ND	ND	ND	0.045 J	ND
TAL Metals - ug/L [4] (Dissolved)							
Barium	**1,000**	110	140	310	130	65	72
Calcium	--	88000 ^5-	140000 ^5-	124000	156000	122000	206000
Cobalt	--	4.2	2.5 J	3.1 J	2.7 J	1.3 J	0.74 J
Copper	**200**	ND	ND	ND	ND	3.3 J^5+	2.3 J^5+
Iron	**300**	ND	ND	ND	ND	29 J^5-	29 J^5-
Lead	**25**	3.6 J	4.8 J	3.4 J	3.2 J	3.9 J	ND
Magnesium	**35,000**	25300	**45800**	**35200**	**44000**	21500	**36200**
Manganese	**300**	**500 B**	170 B	**720 B**	**520 B**	100 B	250 B
Nickel	**100**	3 J	3.8 J	3.1 J	2.4 J	2 J	ND
Potassium	--	11800	36200	15600	41800	5300	21700
Sodium	**20,000**	**324000**	**538000**	**451000**	**452000**	**75500**	**107000**
Vanadium	--	ND	ND	ND	ND	ND	2.3 J
Zinc	**5,000**	ND	6.3 J^5-B	ND	ND	20 ^5-B	2.3 J^5-B
Organochlorine Pesticides ug/L							
delta-BHC	**0.04**	ND	ND	ND	0.011 J	ND	ND
Herbicides ug/L							
Herbicides	--	ND	ND	ND	ND	ND	ND
Polychlorinated Biphenyls (PCBs) ug/L							
Total PCBs	**0.09**	ND	ND	ND	ND	ND	ND
Perfluorinated Alkyl Acids - ng/L							
Perfluorobutanoic Acid (PFBA)	--	13	12	17 J	15	10	6.4 J
Perfluoropentanoic Acid (PFPeA)	--	9.1	15	8.8 J	14	10	4.4
Perfluorohexanoic Acid (PFHxA)	--	4.3	8.2	4.2 J	6.3	8.5	5.5
Perfluoroheptanoic Acid (PFHpA)	--	1.3 J	2.4	1.3 J	1.5 J	1.5 J	3.1
Perfluorooctanoic Acid (PFOA)	**6.7**	3.7	6.6	4.1 J	5.4	3.1	**12**
Perfluorononanoic Acid (PFNA)	--	1 EMPC	ND	ND	ND	ND	ND
Perfluorodecanoic Acid (PFDA)	--	0.99 J	ND	ND	ND	ND	ND
Perfluorobutanesulfonic Acid (PFBS)	--	1.6 J	2	1.8 J	2.4	24	2.3
Perfluorohexanesulfonic Acid (PFHxS)	--	1.2 J	1.8	1.4 J	1.9	0.51 J	2.5
Perfluorooctanesulfonic Acid (PFOS)	**2.7**	1.7 J	0.95 J	1.7 J	1.2 J	1.7 J	2.4 EMPC
1H, 1H, 2H, 2H-Perfluorodecanesulfonic Acid (8:2FTS)	--	2.3 J	ND	ND	ND	ND	ND

Notes:
1. Only those parameters detected at a minimum of one sample location are presented in this table; all other compounds were reported as non-detect.
2. Values per NYSDEC TOGS 1.1.1 Class GA Groundwater Quality Standards (GWQS).
3. Extraction methodology of Selective Ion Monitoring (SIM) was used for 1,4-dioxane.
4. Sample results were reported by the laboratory in milligrams per liter (mg/L) and converted to micrograms per liter (ug/L) for comparison to GWQS.

Definitions:
ND = Parameter not detected above laboratory detection limit.
-- = Sample not analyzed for parameter and/or no SCO available.
B = Compound was found in the blank and sample
F1 = MS and/or MSD recovery exceeds control limits.
F2 =MS/MSD RPD exceeds control limits
J = Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
J+ = Result is estimated, biased high.
EMPC = Result is estimated maximum possible concentration.
N = Presumptive evidence of analyte; result should be used with caution as a potential false positive and/or elevated quantitative value.
T = Result is a tentitively identified compound (TIC) and an estimated value.
^+ = Continuing Calibration Verification (CCV) is outside acceptance limits, high biased.
^2 = Calibration Blank (ICB and/or CCB) is outside acceptance limits.
^5- = Linear Range Check (LRC) is outside acceptance limits, low biased.
^5+ =Linear Range Check (LRC) is outside acceptance limits, high biased.

Exceeds NYSDEC Class GA GWQS

ROUX

TABLE 7
SUMMARY OF RI SOIL VAPOR AND OUTDOOR AIR ANALYTICAL DATA
REMEDIAL INVESTIGATION/ALTERNATIVES ANALYSIS REPORT
NORTH AUD BLOCK (C915406)
BUFFALO, NEW YORK

PARAMETER[1]	SV-1	SV-2	SV-3	SV-4	SV-5	OA-1
	4/2/2025	4/2/2025	2/26/2025	4/2/2025	4/2/2025	2/26/2025
Volatile Organic Compounds (VOCs, ug/m^3)						
1,1,1-Trichloroethane (Matrix B)	ND< 1.1	R	ND< 3.3	ND< 1.1	ND< 1.1	ND< 1.1
1,1,2-Trichlorotrifluoroethane	0.49 J-	R	ND< 4.6	ND< 1.5	ND< 1.5	0.46 J
1,1-Dichloroethene (Matrix A)	ND< 0.2	R	ND< 0.6	ND< 0.2	ND< 0.2	ND< 0.2
1,2,4-Trimethylbenzene (Matrix D)	ND< 0.98	R	13 D	ND< 0.98	0.42 J	7
1,3,5-Trimethylbenzene (Matrix D)	ND< 0.98	R	2.3 JD	ND< 0.98	ND< 0.98	2.1
1,3-Dichlorobenzene	ND< 1.2	R	2.1 JD	ND< 1.2	ND< 1.2	ND< 1.2
1,4-Dioxane	ND< 18	R	ND< 54	1.2 J	ND< 18	ND< 18
2,2,4-Trimethylpentane (Matrix D)	13 J-	R	3.2 D	ND< 0.93	ND< 0.93	0.54 J
4-Ethyltoluene	ND< 0.98	R	2.3 JD	ND< 0.98	ND< 0.98	1.7
4-Isopropyltoluene	ND< 1.1	R	ND< 0.33	ND< 1.1	ND< 1.1	1.3
Acetone	11 J-	R	150 D	10 J	13 D	28
Benzene (Matrix D)	0.48 J-	R	2 D	0.2 J	0.18 J	11
Carbon Disulfide	ND< 1.6	R	ND< 4.7	1.9	ND< 1.6	ND< 1.6
Carbon Tetrachloride (Matrix A)	0.41 J-	R	ND< 0.66	0.2 J	0.18 J	0.34
Chlorodifluoromethane	1.3 J-	R	2.3 JD	ND< 1.8	ND< 1.8	2.1
Chloroform	0.61 J-	R	0.72 D	1.4	0.7 J	0.6 J
Chloromethane	1.3 J-	R	ND< 3.1	ND< 1	ND< 1	3.7
cis-1,2-Dichloroethene (Matrix A)	ND< 0.2	R	ND< 0.6	ND< 0.2	ND< 0.2	ND< 0.2
Cyclohexane (Matrix D)	2.4 J-	R	40	ND< 0.69	ND< 0.69	0.29 J
Cumene	ND< 0.98	R	ND< 2.9	ND< 0.98	ND< 0.98	3
Dichlorodifluoromethane	2.2 J-	R	2.7 JD	2.3 J	2.4 J	2.3 J
Ethylbenzene (Matrix D)	ND< 0.87	R	4.2 D	ND< 0.87	ND< 0.87	11
Isopropyl alcohol	ND< 12	R	ND< 37	ND< 12	ND< 12	5.3 J
m&p-Xylene (Matrix E)	0.34 J-	R	16 JD	1.1 J	0.35 J	11
Methyl Ethyl Ketone	0.86 J-	R	26 D	0.85 J	1.7 D	7.9
Methylene chloride (Matrix B)	ND< 1.7	R	ND< 5.2	ND< 1.7	ND< 1.7	1.6 J
Naphthalene (Matrix D)	ND< 2	R	ND< 6	ND< 2	ND< 2	6.8
n-Butane	7.1 J-	R	33 JD	ND< 1.2	1.1 J	2.9
n-Heptane (Matrix E)	1.5 J-	R	18 D	ND< 0.82	ND< 0.82	0.78 J
n-Hexane (Matrix E)	8.5 J-	R	32 D	ND< 1.8	ND< 1.8	0.95 J
n-Propylbenzene	ND< 0.98	R	1.4 JD	ND< 0.98	ND< 0.98	1.5
o-Xylene (Matrix D)	ND< 0.87	R	6.9 JD	0.41 J	ND< 0.87	4.6
Styrene	0.38 J-	R	ND< 2.5	ND< 0.85	0.35 J	ND< 0.85
Tetrachloroethene (Matrix B)	ND< 1.4	R	ND< 4.1	0.27 J	ND< 1.4	ND< 1.4
Toluene (Matrix F)	0.43 J-	R	18 D	0.98	0.47 J	3.9
Trichlorofluoromethane	1.2 J-	R	2 D	6.8	1.1	2.4
Vinyl chloride (Matrix C)	ND< 0.2	R	ND< 0.6	ND< 0.2	ND< 0.2	ND< 0.2

Notes:

1. Only those parameters detected above the method detection limit, at a minimum of one location, are presented in this table.

Definitions:

ND = Parameter not detected above laboratory detection limit.
ug/m^3 = micrograms per cubic meter
J = The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte in the sample.
J- = Result is estimated, biased low.
D = Sample results are obtained from a dilution; the surrogate or matrix spike recoveries reported are calculated from diluted samples.
R = Result rejected by third-party validator.

blue	=one of 21 compounds regulated by the NYSDOH Guidance for Evaluating Soil Vapor Intrusio in the State of New York (May 2017, February 2024)

APPENDIX B

Health and Safety Plan (HASP)

Health and Safety Plan

North Aud Block
NYSDEC Site No. C915406
P/O 130 Main Street
Buffalo, New York 14202

February 2026

Prepared for:

North Aud Owner LLC

Prepared by:

Roux Environmental Engineering and Geology, D.P.C.
2558 Hamburg Turnpike
Suite 300
Buffalo, New York 14218

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Site-Specific Emergency Information

Emergency Phone Numbers

Most emergency services can be obtained by calling 911. Where 911 service is not available, use the telephone numbers provided in the below table. The following is a master emergency phone list for use by the project management personnel. A more condensed version of the emergency numbers listed below will be posted throughout project work areas. Emergencies encountered on the site will be responded to by a combination of off-site emergency services and on-site personnel.

Emergency Contact Information			
Site Personnel			
Title	**Contact**		**Telephone**
Operations Manager (OM)	Michael Lesakowski		716-818-3954
Project Principal (PP)	Michael Lesakowski		716-818-3954
Project Manager (PM)	Bryan Mayback		716-844-1699
Site Supervisor (SS)	TBD		TBD
Site Health and Site Safety Officer (SHSO)	TBD		TBD
Office Health and Safety Manager (OHSM)	Paul Werthman		716-997-9584
Corporate Health and Safety Director (CHSD)	Brian Hobbs, CIH, CSP		631-807-0193
WorkCare, Inc.	Occupational Health Care Management Provider		888-449-7787
Client Emergency Contact	Dylan Salmons		865-371-1857
Outside Assistance			
Agency	**Contact**	**Telephone**	**Address/Location**
Ambulance/emergency medical services (EMS)	Buffalo General Hospital ER	716-859-5600	100 High St Buffalo, NY 14203
Police	Buffalo Police Headquarters	911/ 716-851-4444	68 Court St Buffalo, NY 14202
Fire	Buffalo Fire Department Engine 1/Ladder 2	911	132 Ellicott St Buffalo, NY 14203
Site Address	130 Main Street Buffalo, NY 14202		

Route to Buffalo General Hospital Emergency Room:

- Head south on Main Street
- Turn left onto Scott Street
- Turn left onto Michigan Avenue
- Turn left onto E North Street
- Turn left into Emergency Room drop-off area

1. Introduction

This Site-specific Health and Safety Plan (HASP) has been prepared by Roux Environmental Engineering and Geology, D.P.C. (Roux) for use during the remedial activities being performed by Roux at the North Aud Block site (Site), located at a portion of 130 Main Street, Buffalo, New York (Site; **Figure 1**). This HASP was prepared in general accordance with the requirements of the Occupational Safety and Health Administration (OSHA) standards promulgated at 29 CFR 1910.120 and 29 CFR 1926.65, both commonly referred to as the Hazardous Waste Operations and Emergency Response (HAZWOPER) Standard. In accordance with the HAZWOPER Standard, this Site-specific HASP was prepared to address the safety and health hazards associated with the remedial activities being performed at the Site by Roux and to provide requirements and procedures for the protection of Roux employees, subcontractor personnel, government oversight personnel, Site personnel, and the general public. It also addresses client- and Site-specific requirements for health and safety. Additionally, subcontractors may be required to submit their own HASP as it relates to their specific work activities and will be kept onsite during such work.

Implementation of this HASP is the joint responsibility of the Project Manager (PM), the Site Health and Safety Officer (SHSO), and all field staff, with assistance from the Project Principal (PP), Office Health and Safety Manager (OHSM), and Corporate Health and Safety Director (CHSD). The PM for this project is Bryan Mayback. The Site Supervisor (SS) and Site Health and Safety Officer (SHSO) will be identified at the start of field activities.

This HASP will be introduced to, reviewed, and signed off on by all Roux personnel through a formal training session prior to commencing work. A copy of the HASP will be kept at the Site at all times. The Roux SHSO or PM will be responsible for posting any changes, amendments, memos, etc. to the HASP. Any revisions to this HASP will be signed by appropriate personnel, which can include Roux's PP, CHSD, and SS. Any changes will be announced to all workers at the next safety meeting.

1.1 Roles and Responsibilities

Overall Roles and Responsibilities (R&Rs) of Roux personnel are provided in Roux's Policies and Procedures Manual. Only those R&Rs specific to HASP requirements are listed below.

Project Manager (PM)

The PM has responsibility and authority to direct all work operations. The PM coordinates safety and health functions with the Site Health and Safety Officer (SHSO), has the authority to oversee and monitor the performance of the SHSO, and bears ultimate responsibility for the proper implementation of this HASP. The specific duties of the PM are:

- Preparing and coordinating the Site work plan;
- Providing Site supervisor(s) with work assignments and overseeing their performance; Coordinating safety and health efforts with the SSHO;
- Ensuring effective emergency response through coordination with the Emergency Response Coordinator (ERC); and
- Serving as primary Site liaison with public agencies and officials and Site contractors.

Site Health and Safety Officer (SHSO)

The SHSO has the full responsibility and authority to develop and implement this HASP and to verify compliance. The SHSO reports to the Project Manager. The SHSO is on Site or readily accessible to the Site during all work operations and has the authority to halt Site work if unsafe conditions are detected. The specific responsibilities of the SHSO include:

- Managing the safety and health functions on this Site;
- Serving as the Site's point of contact for safety and health matters;
- Ensuring Site monitoring, worker training, and effective selection and use of PPE;
- Assessing Site conditions for unsafe acts and conditions and providing corrective action;
- Assisting the preparation and review of this HASP;
- Maintaining effective safety and health records as described in this HASP; and
- Coordinating with the SS and others as necessary for safety and health efforts.

Site Supervisor (SS)

The Site Supervisor (SS) is responsible for field operations and reports to the Project Manager (PM). The SS ensures the implementation of the HASP requirements and procedures in the field. The specific responsibilities of the Site Supervisor include:

- Executing the work plan and schedule as detailed by the PM;
- Coordination with the SHSO on safety and health; and
- Ensuring Site work compliance with the requirements of this HASP.

Employees

All Roux employees are responsible for reading and following all provisions of the Corporate Health and Safety Manual, including this HASP. Employees report to the SS at the project Site. Each employee is also responsible for the following:

- Wearing all appropriate PPE as outlined within this HASP;
- Attending all safety meetings;
- Inspecting tools and equipment prior to use, and taking any defective tools or equipment out of service;
- Appropriately documenting field events as they occur within a logbook or equivalent;
- Properly operating machinery and/or equipment only if trained to do so;
- Stopping work operations if unsafe conditions exist;
- Identifying and mitigating hazards when observed;
- Reporting all incidents and near misses to the Roux SHSO and SS immediately; and
- Knowing where emergency equipment is located (e.g., first aid kit, fire extinguisher).

Subcontractors and Visitors

Subcontractors and visitors are responsible for complying with the same health and safety requirements. It is the responsibility of all to make sure subcontractors and visitors comply and uphold the HASP. Subcontractors and visitors have the following additional responsibilities:

- Designating a qualified safety representative for the project that can make the necessary changes in work practices, as necessary;
- Attending all safety meetings while participating in Roux Site work activities;
- Reporting all incidents and near misses to Roux SHSO and SS immediately;
- Conducting initial and periodic equipment inspections in accordance with manufacturer and regulatory guidelines; and
- Providing copies of all Safety Data Sheets (SDS) to Roux SHSO for materials brought to the Site.

2. Background

Relevant background information is provided below, including a general description of the Site; a brief review of the Site's history with respect to hazardous material use, handling, and/or storage; and a review of known and potential releases of hazardous substances at the Site.

2.1 Site Description

The Site consists of a 1.87-acre portion of a greater parcel addressed at 130 Main Street (SBL No. 111.17-14-11), Buffalo, Erie County, New York. The Site sits within a highly developed mixed-use residential, commercial, and recreational area of the City of Buffalo. To the north, the Site is bordered by a vacant portion of 130 Main Street, Seneca One (consisting of commercial space and residential apartments), a parking lot, Upper Terrace Street, and Interstate-190 (elevated). To the South of the Site sits the remaining portion of 130 Main Street, which includes an ice rink/recreational area/canal (The Ice at Canalside) and a commercial structure (Explore & More Museum), a vacant commercial property, and a portion of the former Erie Canal. East of the Site is a commercial property (hotel), a recreational area with a portion of the former Erie Canal, a vacant commercial property, and Main Street (including the above-ground portion of the Buffalo Metro Rail). On the west, the Site is bordered by parking lots, Commercial Street, and the Buffalo Skyway/New York State Route 5 (elevated).

The Site is mostly vacant and covered with grass, light vegetation, and stone. The southern portion of the Site is developed with three structures associated with the Ice at Canalside, including a 2,012-square-foot (SF) metal & fabric building used as a ticketing office, a 143-SF metal outbuilding used as restrooms and a 156-SF metal outbuilding used as a snack shack. Small areas of the Site are covered with concrete sidewalks/stairs associated with the adjacent ice rink. A wooden/sheet pile retaining wall is located proximate to the north, east, and west boundaries of the Site and a smaller concrete wall is located near the western Site boundary. A chain link fence surrounds the majority of the Site (excluding the southern portion associated with the adjacent ice rink), which restricts access.

2.2 Site History

The Site was used in residential, commercial, and industrial capacities between at least 1889 and 1939. The Site was developed with numerous commercial buildings and former sections of existing streets including Pearl, Commercial, and Lloyd Streets. Noteworthy commercial and industrial uses during this time included a glue factory, a ship chandlers (including a machine shop and a rigging and sail facility), a dental manufacturer, and a paint company on the north/central portion of the Site; a tin shop, machine shop, and another paint company on the western portion of the Site, and a shoe factory on the southeastern portion of the Site. In addition, as further discussed below, portions of the Erie Canal and adjoining slips were located proximate to the Site, which have since been backfilled.

In 1939, existing buildings, streets, and portions of the former Erie Canal between Lower Terrace Street, Marine Drive, Commercial Street, and Main Street were demolished and backfilled for construction of the Buffalo Memorial Auditorium ("The Aud"). The Site was developed with the northern portion of the Aud. The Aud was used as an indoor athletic arena/concert venue until 1996. The Aud remained unused between 1996 and 2009, when the building was demolished.

The Site has remained mostly vacant since the Aud's demolition in 2009. Aerial photos indicate the Site has been used as a storage/contractor parking area for at least the last decade. Also, records indicate that in 2014, portions of the Erie Canal were excavated/widened immediately south of the Site. The re-established canals were used as an ice rink (The Ice at Canalside) during the winter months since 2014. In 2015, three small former temporary structures, likely associated with the ice rink, were constructed in the southern portion of the proposed BCP Site. By 2016, the former structures were replaced by the three existing structures associated with the ice rink.

2.3 Known and Potential Releases of Hazardous Substances at the Site

Historic Site uses and the presence of fill material remaining at the Site from unknown origins have resulted in environmental impacts at the Site, representing a source of contamination. Specifically, historic and remedial investigation activities indicated the presence of impacted urban fill material, as evidenced by the widespread presence of black sand, cinders, ash, and an unknown black material intermingled with the fill across the Site. The investigations also noted significantly elevated concentrations of polycyclic aromatic hydrocarbons (PAHs) and metals in fill samples, and to a much lesser extent, pesticides. Fill materials are considered non-hazardous except for one area, RISB-2, where characteristically hazardous lead in fill was identified.

3. Scope of Work

The following activities are included in the scope of work for RA activities:

1. Demolition/relocation of existing buildings and Site features and characterization/disposal of building and demolition materials.
2. Bench-scale testing and delineation sampling to characterize and delineate the RISB-2 Hazardous Lead Area.
3. In-situ stabilization (ISS) or solidification, and excavation of soil/fill within the RISB-2 Hazardous Lead Area to render the fill non-hazardous.
4. Excavation of soil/fill exceeding USCOs: Soil/fill exceeding USCOs will be excavated, characterized, and properly disposed off-site. The fill in the RISB-2 area will be excavated once rendered non-hazardous.
5. Post excavation samples will be collected from sidewalls and the bottom of the excavations to determine excavation extents.
6. Water management: if necessary, a mobile groundwater treatment system will be on-site during excavation activities to manage groundwater generated during RA activities.
7. Backfilling: the excavation will be backfilled and compacted in accordance with DER-10 requirements.

If there are any changes with the scope a revision of the HASP will be required to address any new hazards.

4. Site Control

This Site control program is designed to reduce the spread of hazardous substances from contaminated areas to clean areas, to identify and isolate contaminated areas of the Site, to facilitate emergency evacuation and medical care, to prevent unauthorized entry to the Site, and to deter vandalism and theft.

4.1 Site Map

A map of this Site, showing Site boundaries, designated work zones, and points of entry and exit is provided in Figure 2.

4.2 Site Access

Access to the work areas at the Site is restricted to reduce the potential for exposure to its safety and health hazards. Entry and exit at these points is controlled by the following: A chain link fence surrounds the majority of the Site (excluding the southern portion associated with the adjacent ice rink), which restricts access. Temporary fencing will be installed along the southern Site boundary. Daily work areas will be identified with construction cones and/or snow fencing, if necessary, to distinguish the work zone. When the Site is not operating, access to the Site is controlled by the following: The existing chain link fence and temporary fencing to be installed will restrict access when the Site is not operating.

4.3 Buddy System

While working in the Exclusion Zone, Site workers use the buddy system. The buddy system means that personnel work in pairs and stay in close visual contact to be able to observe one another and summon rapid assistance in case of an emergency. The responsibilities of workers using the buddy system include:

- Remaining in close visual contact with partner;
- Providing partner with assistance as needed or requested;
- Observing partner for signs of heat stress, chemical overexposure or other difficulties;
- Periodically checking the integrity of partner's PPE; and
- Notifying the SS or other Site personnel if emergency assistance is needed.

4.4 Site Communications

The following communication equipment is used to support on-site communication: cell phones, visual hand signals.

As applicable, hand signals will be used according to the following:

Hand Signals

SIGNAL	MEANING
Hand gripping throat	Out of air; I cannot breathe
Grip partner's wrist	Leave area immediately
Hands on top of head	Need assistance

Hand Signals

SIGNAL	MEANING
Thumbs up	I am all right; okay
Thumbs down	No; negative

A current list of emergency contact numbers is included in the Site-Specific Emergency Information at the beginning of this HASP.

4.5 Site Work Zones

This Site is divided into three (3) major zones, described below. These zones are characterized by the likely presence or absence of biological, chemical, or physical hazards and the activities performed within them. Zone boundaries are clearly marked at all times and the flow of personnel among the zones is controlled. The Site is monitored for changing conditions that may warrant adjustment of zone boundaries. Zone boundaries are adjusted as necessary to protect personnel and clean areas. Whenever boundaries are adjusted, zone markings are also changed and workers are immediately notified of the change.

Exclusion Zone

The area where contamination exists is the Exclusion Zone (EZ). All areas where excavation and handling of contaminated materials take place are considered part of the EZ. This zone will be clearly delineated by chain link fencing, caution tape, cones or other effective barriers, as necessary. Safety tape may be used as a secondary delineation within the EZ. The zone delineation markings may be opened in areas for varying lengths of time to accommodate equipment operation or specific construction activities. The SHSO may establish more than one EZ where different levels of protection may be employed or where different hazards exist. Personnel are not allowed in the EZ without:

- A buddy (co-worker);
- Required minimum level PPE;
- Medical authorization;
- Training certification; and
- Requirement to be in the zone.

Contamination Reduction Zone

A Contamination Reduction Zone (CRZ) is established between the exclusion zone and the support zone. The CRZ contains the Contamination Reduction Corridor (CRC) and provides an area for decontamination of personnel and equipment. The CRZ will be used for general Site entry and egress in addition to access for heavy equipment and emergency support services. Personnel are not allowed in the CRZ without:

- A buddy (co-worker);
- Appropriate PPE;
- Medical authorization;
- Training certification; and
- Requirement to be in the zone.

Support Zone

The Support Zone (SZ) is an uncontaminated area that will be the field support area for the Site operations. The SZ will contain the temporary project trailers and provides for field team communications and staging for emergency response. Appropriate sanitary facilities and safety equipment will be located in this zone. Potentially contaminated personnel or materials are not allowed in this zone. The only exception will be appropriately packaged/decontaminated and labeled samples.

5. Job Hazard Evaluation

Roux's work at the Site is expected to entail a variety of physical, chemical, and biological hazards, all of which must be sufficiently managed to allow the work to be performed safely. Some of the hazards are Site-specific (i.e., they are associated with the nature, physical characteristics, and/or routine operation of the Site itself), while others are activity-specific (i.e., they are associated with [or arise from] the particular activity being performed). The various hazards can be grouped into the following categories:

- **Caught/Crushed** – the potential to become caught in, under, between, or by an object or parts of an object, such as equipment with parts that open and close or move up and down ("pinch points") or equipment that rotates, and the accompanying potential to have body parts cut, mangled, or crushed thereby.
- **Contact** – the potential to be struck by or against moving or stationary objects that can cause physical injury, such as heavy machinery, overhead piping, moving vehicles, falling objects, and equipment (including tools and hand-held equipment) or infrastructure with the ability to cut or impale.
- **Energy Sources** – the potential for bodily harm associated with energy sources, most notably electricity, but also including latent energy sources such as compressed air and equipment under tension (which when released could cause injurious contact or a fall).
- **Ergonomics** – the potential for musculoskeletal injury associated with lifting/carrying, pushing/pulling, bending, reaching, and other physical activity attributable to poor body position/mechanics, repetitive motion, and/or vibration.
- **Exposure** – the potential for injury/illness due to physical, chemical, or biological exposures in the work environment, including, but not limited to, temperature extremes, solar radiation, and noise (physical), chemical splashes and hazardous atmospheres (chemical), and animal/insect bites and poisonous plants (biological).
- **Falls** – the potential to slip or trip and thus fall or drop a load, resulting in bodily injury to oneself or others.

The foregoing is intended to provide Roux employees with a general awareness of the hazards involved with Site work. A more detailed review of the potential hazards associated with each specific activity planned for the Site (or on-going activity, as the case may be) is provided in the activity-specific Job Safety Analysis (JSA) forms in **Appendix A**. As can be seen in the JSA forms, the hazards are identified by category per the above, and specific measures designed to mitigate/manage those hazards are also identified. In preparing the JSA forms, all categories of hazards were considered, and all anticipated potential hazards were identified to the extent possible based on the experience of the personnel preparing and reviewing the JSA forms. However, there is always the possibility for an unanticipated hazard to arise, potentially as condition change over the course of the workday. Roux personnel must maintain a continual awareness of potential hazards in the work zone, regardless of whether the hazard is identified in the JSA form. Particular attention should be paid to hazards associated with exposure to hazardous substances (see **Table 1** for a listing of the hazardous substances most likely to be encountered in environmental media at the Site) and to Site personnel being located "in the line of fire" with respect to moving equipment, pinch points, and latent energy (e.g., being located or having body parts located within the swing radius of an excavator, between two sections of pipe being connected, below a piece of suspended equipment, or adjacent to a compressed air line).

5.1 Hazard Communication and Overall Site Information Program

The information in the JSAs and SDSs is made available to all employees and subcontractors who could be affected by it prior to the time they begin their work activities.

Modifications to JSAs are communicated during routine pre-work briefings, and periodically updated as needed in the HASP. SDSs will be maintained by the SHSO/SS for new chemicals brought on-site as needed. Copies of SDSs can be found in **Appendix B**.

5.2 Noise

Noise is associated with the operation of heavy equipment, power tools, pumps, and generators. Noise is also a potential hazard when working near operating equipment such as excavators, drill rigs or pole drivers. High noise (i.e., < 85 dBA) operations may be evaluated by the SHSO utilizing a type 2 handheld sound level meter (SLM) operating on the "A"-weighted scale with slow response because this scale most closely resembles human response to noise and complies with OSHA 29 CFR 1910.95. Hearing protection is required in areas with noise exposure greater than 85 dBA. Double hearing protection (ear plugs and earmuffs) should be donned in areas where the noise exposure is more than 95 dBA. Noise exposure will be controlled by hearing protection as described above or by maintaining set-backs from high-noise equipment, as warranted. Personnel handling heavy equipment and using power tools that produce noise levels exceeding those described levels above are required by OSHA 29 CFR 1910.95 to wear the appropriate Noise Reduction Rating (NRR) level of hearing protection. Appropriate hearing protection will be evaluated by the SHSO as necessary in consultation with the OHSM and CHSD.

5.3 Slip, Trip, and Fall Hazards

Slip, trip, and fall hazards may include, but are not limited to, general slip and trip hazards associated with uneven ground, possible debris, wet grass, and equipment. Prior to work, walking paths will be assessed for solid footings, any ground penetrations that may cause a tripping hazard will be appropriately marked, and other areas will be noted and discussed with the field team.

Personnel shall be aware of their surroundings and footings at all time, and all accommodations should be made for proper housekeeping and organized equipment placement at the Site, where possible, to help prevent any slip, trip, and fall-related incidents. All tools and materials should be appropriately stored when not in use and placed in appropriate storage containers.

5.4 Biological Hazards

Biological hazards that may potentially be present at a Site, include poisonous plants, insects (ticks, spiders, bees), animals (snakes, dogs), etc. Information on biological hazards can be found within Roux's Biological Hazard Awareness Management Program located within Roux's Corporate Health and Safety Manual. There is also potential for transmission and/or exposure to SARS-CoV-2, the virus that causes COVID-19. Prior to beginning work, on-Site protocols shall be established by the project team, including subcontractors, in accordance with federal, state, county, city, and/or other guidance, as applicable.

6. Emergency Response Plan

This emergency response plan details actions to be taken in the event of Site emergencies. The PM and SHSO is responsible for the implementation of emergency response procedures onsite. The SHSO/PM provides specific direction for emergency action based upon information available regarding the incident and response capabilities and initiates emergency procedures and notification of appropriate authorities. In the event of an emergency, Site personnel are evacuated and do not participate in emergency response activities, response is facilitated through external emergency services.

6.1 Emergency Response

The SHSO, after investigating the incident and relevant information, shall determine the level of response required for containment, rescue and medical care. Limited on-site emergency response activities could occur therefore the SHSO is responsible for notifying external emergency response agencies. The SHSO provides relevant information to the responding organizations, including, but not limited to, the hazards associated with the emergency incident, potential containment problems, and missing Site personnel.

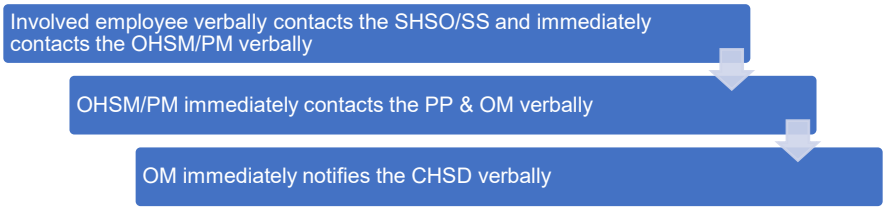
6.2 Emergency Alerting and Evacuation

If evacuation notice is given, Site workers leave the worksite, if possible, by way of the nearest exit. Appropriate primary and alternate evacuation routes and assembly areas have been identified and are shown on the Site Plan with Emergency Muster Area (**Figure 2**). The routes and assembly area will be determined by conditions at the time of the evacuation based on wind direction, the location of the hazard source, and other factors as determined by SHSO/PM.

Personnel exiting the Site gather at a designated assembly point. To determine that everyone has successfully exited the Site, personnel will be accounted for at the assembly point. If any worker cannot be accounted for, notification is given to the SHSO, PM, and any arriving response authorities so that appropriate action can be initiated. Subcontractors on this Site have coordinated their emergency response plans to ensure that these plans are compatible and potential emergencies are recognized, alarm systems are clearly understood, and evacuation routes are accessible to all personnel relying upon them.

6.3 Emergency Medical Treatment and First Aid

In the event of a work-related injury or illness, employees are required to follow the procedures outlined below. All work-place injury and illness situations require Roux's Project and Corporate Management Team to be notified when an injury/illness incident occurs, and communication with the contracted Occupational Health Care Management Provider, WorkCare, Inc., is initiated, as necessary. The Injury/Illness Notification Flowchart is provided below and within Roux's Incident Investigation and Reporting program included within Roux's Corporate Health and Safety Manual.



If on-Site personnel require any medical treatment, the following steps will be taken:

a. Notify Roux's Project and Corporate Management Team for any work-related injury and/or illness occurrence, and communicate with the contracted Occupational Health Care Management Provider, WorkCare, immediately following the notifications provided above.

b. Based on discussions with the Project Team, Corporate Management and the WorkCare evaluation, if medical attention beyond onsite first aid is warranted, transport the injured / ill person (IP) to the Urgent Care Center, or notify the Fire Department or Ambulance Emergency service and request an ambulance or transport the victim to the hospital, and continue communications with Corporate Management Team. A Hospital Route map with location to Buffalo General Medical Center is included as **Figure 3**.

c. Decontaminate to the extent possible prior to administration of first aid or movement to medical or emergency facilities.

d. First aid medical support will be provided by onsite personnel trained and certified in First Aid, Cardio Pulmonary Resuscitation (CPR), Automatic External Defibrillation (AED), and Blood-Borne Pathogens (BBP) Awareness, until relieved by emergency medical services (EMS).

e. The SHSO and PM will perform a Loss Investigation (LI) and the Project Team will complete the final Loss Report. If a Roux employee is involved in a vehicular incident, the employee must also complete the Acord Automobile Loss Notice.

7. Environmental Conditions and Response

7.1 Adverse Weather Conditions

In the event of adverse weather conditions, the SHSO or project principal will determine if work can continue without jeopardizing the health and safety of field workers. Some of the items related to adverse weather conditions to be considered prior to determining if work should continue include:

- Potential for heat stress and heat-related injuries;
- Potential for cold stress and cold-related injuries;
- Treacherous weather-related conditions. If wind speed is greater than 15 mph averaged over a 15-minute period or wind gusts over 25 mph, earthmoving operations will be ceased
- Limited visibility; and
- Electrical storm potential.

Site activities will be limited to daylight hours and acceptable weather conditions. Inclement working conditions may include heavy rain, fog, high winds, and lightning. The SHSO and/or PM shall observe daily weather reports and evacuate, if necessary, in case of inclement weather conditions.

7.2 Electrical Storm Guidelines

In the event that lightning and/or thunder are observed while working onsite, all onsite activities shall stop and personnel shall seek proper shelter (e.g., substantial building, enclosed vehicle, etc.). Work shall not resume until the threat of lighting has subsided and no lightning or thunder has been observed for 30 minutes. If the possibility of lightning is forecast for the day, advise the onsite personnel on the risks and proper procedure at the pre-work safety briefing. Continuously monitor for changing weather conditions and allow enough time to properly stop work if lightning is forecast.

7.3 Environmental Stressors, Heat Stress, Heat Exhaustion, and Heat Stroke

It is the employer's responsibility to monitor weather forecasts and ambient air temperatures, both prior to the work shift and during the shift. The National Oceanic and Atmospheric Administration records average minimum/maximum temperatures of 21/78 degrees Fahrenheit during the year in Buffalo, New York.

To prevent potential heat illness, the following strategies will be implemented:

- Adjusting personnel work/rest intervals;
- Monitoring for symptoms of heat illness;
- Providing shaded rest areas;
- Providing cool potable water so that each employee has access to at least one quart per hour for the entire shift, free of charge;
- Allowing for employees to acclimatize to the weather conditions and work demands;
- Observe workers during a heat wave (i.e., when the temperature is at least 80oF, and 10 degrees hotter than the average temperature of the five preceding days); and
- Implementing high heat procedures when the temperature reaches 95oF.

Roux's Heat Illness Prevention Plan is implemented when the when ambient temperatures exceed 80oF. Roux's Heat Illness Prevention Program can be found within **Appendix C**. Additional information regarding heat illnesses is provided below. This can include, but is not limited to, access to shade that is sufficient in size to fit all workers who are on break; a car with air conditioning is acceptable, too. Preventative cool-down breaks shall be allowed at any time, and anyone taking such a break will be monitored for heat illness symptoms and not required to return to work until all symptoms (if present) of heat illness have disappeared. If necessary, first aid will be offered, but if symptoms are severe, emergency response procedures will be implemented per Section 6.3. Anyone who has shown symptoms of severe heat illness will not be sent home without being offered first aid or medical treatment.

High heat procedures must be implemented when temperatures reach 95oF. These procedures include:

- Ensuring that effective communication by voice, observation, or electronic means is maintained so that employees at the work site can contact a supervisor when necessary. An electronic device, such as a cell phone or text messaging device, may be used for this purpose only if the reception in the area is reliable.
- Observing employees for alertness and signs or symptoms of heat illness. The employer shall ensure effective employee observation/monitoring by implementing one or more of the following:
    - Supervisor or designee observation of 20 or fewer employees;
    - Mandatory buddy system; and
    - Regular communication with sole employee such as by radio or cellular phone, or other effective means of observation.
- Designating one or more employees on each worksite as authorized to call for emergency medical services and allowing other employees to call for emergency services when no designated employee is available.
- Encouraging employees throughout the work shift to drink plenty of water.
- A review of the high heat procedures during the daily tailgate meeting and remind employees of their right to take a cool-down rest when necessary.

7.3.1 Heat Stress

Heat stress is the body's response to excessive heat and can be a significant potential hazard. The risk of heat stress can be increased with heavy physical activity and/or the use of personal protective equipment in hot, humid weather environments. There are also personal risk factors that can contribute to the risk of suffering from heat stress, such as obesity, water intake, alcohol and caffeine consumption, pregnancy, age, medication, etc. Heat illness includes heat cramps, heat exhaustion, heat syncope, and heat stroke.

7.3.2 Heat Cramps

Heat cramps may be brought on by prolonged exposure to heat. As an individual sweats, water and salts are lost by the body resulting in painful muscle cramps, typically in the legs.

First aid treatment includes, but is not limited to, shade, rest, and fluid replacement. Typically, the individual should recover within one-half hour while being monitored constantly. If the individual has not improved substantially within 30 minutes and the body temperature has not decreased, the individual should be transported to a hospital for medical attention.

Per Roux's Heat Illness Prevention Plan, employees shall have access to potable drinking water that is fresh, pure, suitably cool, free of charge and in sufficient quantities. Access to shade shall be present when temperatures exceed 80 degrees Fahrenheit and shall be available when temperatures do not exceed 80 degrees Fahrenheit.

7.3.3 Heat Exhaustion

Heat exhaustion may occur in an individual who has been exposed to excessive heat while working or exercising. The circulatory system of the individual fails as blood collects near the skin to rid the body of excess heat through transference. The signs and symptoms of heat exhaustion are as follows:

- Rapid and shallow breathing;
- Weak pulse;
- Cold and clammy skin with heavy perspiration;
- Skin appears pale;
- Fatigue and weakness;
- Dizziness; and
- Elevated body temperature.

First aid treatment includes, but is not limited to, cooling the victim, elevating the feet, and replacing fluids.

If the individual is not substantially improved within 30 minutes and the body temperature has not decreased, the individual should be transported to the hospital for medical attention.

7.3.4 Heat Stroke

Heat stroke occurs when an individual is exposed to excessive heat and stops sweating. This condition is classified as a MEDICAL EMERGENCY requiring immediate cooling of the victim and transport to a medical facility. The signs and symptoms of heat stroke are as follows:

- Dry, hot, red skin;
- Body temperature approaching or above 105oF;
- Confusion, altered mental state, slurred speech;
- Seizures;
- Large (dilated) pupils; and
- Loss of consciousness – the individual may go into a coma.

First aid treatment requires immediate cooling and transportation to a medical facility. Heat stress is a significant hazard if any type of protective equipment (semi-permeable or impermeable) that prevents evaporative cooling when worn in hot weather environments.

7.4 Cold Stress

Cold stress is a danger at low temperatures and when the wind-chill factor is low. Prevention of cold-related illnesses is a function of whole-body protection. Adequate insulating clothing must be used when the air temperature is below 60°F. A work/rest regimen will be initiated when ambient temperatures and protective

clothing cause a stressful situation. In addition, reduced work periods followed by rest in a warm area may be necessary in extreme conditions. The signs and symptoms of cold stress include the following:

- Severe shivering;
- Abnormal behavior;
- Slowing;
- Weakness;
- Stumbling or repeated falling;
- Inability to walk;
- Collapse; and/or
- Unconsciousness.

First aid requires removing the victim from the cold environment and seeking medical attention immediately. Also, prevent further body heat loss by covering the victim lightly with blankets. Do not cover the victim's face. If the victim is still conscious, administer hot drinks and encourage activity such as walking, wrapped in a blanket.

8. Safety Procedures

This section of the HASP presents the specific safety procedures to be implemented during Roux's activities at the Site in order to protect the health and safety of various on-site personnel. Minimum OSHA-mandated procedures are presented first, followed by client- and Site-specific procedures. Lastly, activity-specific procedures are discussed. These Site and activity-specific procedures supplement the general safety procedures included in Roux's Corporate Health and Safety Manual, which also must be followed in their entirely.

8.1 Training

At a minimum, Site personnel who will perform work in areas where there exists the potential for toxic exposure will be health and safety-trained prior to performing work onsite per OSHA 29 CFR 1910.120(e) and 29 CFR 1926.65(e). More specifically, all Roux, subcontractor, and other personnel engaged in sampling and remedial activities at the Site and who are exposed or potentially exposed to hazardous substances, health hazards, or safety hazards must have received at a minimum the 40 hour initial HAZWOPER training consistent with the requirements of 29CFR 1910.120(e)(3)(i) training and a minimum of 3 days' actual field experience under the direct supervision of a trained experienced supervisor, plus 8 hours of refresher training on an annual basis. Depending on tasks performed, less training may be permitted. Evidence of such training must be maintained at the Site at all times. Furthermore, all on-Site management and supervisory personnel directly responsible for or who supervise the employees engaged in Site remedial operations, must have received an additional 8 hours of specialized training at the time of job assignment on topics including, but not limited to, the employer's safety and health program and the associated employee training program, personal protective equipment program, spill containment program, and health hazard monitoring procedure and techniques, plus 8 hours of refresher training on an annual basis. Additionally, all workers who will be required to don a respirator will be properly trained on their employer's Respiratory Protection Program, which also includes being medically cleared to wear a respirator and passed a fit test, at least initially prior to use, and then annually thereafter in accordance with 29 CFR 1910.134, Respiratory Protection.

Roux personnel training records are maintained in a corporate database with records available upon request from either the OHSM/SHSO/CHSD or Human Resources Department.

8.2 Site-Specific Safety Briefings for Visitors

A site-specific briefing is provided to all site visitors who enter this site beyond the site entry point. For visitors, the site-specific briefing provides information about site hazards, the site lay-out including work zones and places of refuge, the emergency alarm system and emergency evacuation procedures, and other pertinent safety and health requirements as appropriate.

8.3 HASP Information and Site-Specific Briefings for Workers

Site personnel review this HASP and are provided a Site-specific tailgate briefing prior to the commencement of work to ensure employees are familiar with this HASP and the information and requirements it contains, as well as the relevant JSAs included in **Appendix A**. Additional briefings are provided as necessary to notify employees of any changes to this HASP as a result of information gathered during on-going Site characterization and analysis of changing conditions. Conditions for which we

schedule additional briefings include, but are not limited to: changes in site conditions, changes in the work schedule/plan, newly discovered hazards, and incidents occurring during Site work.

8.4 Medical Surveillance

The medical surveillance section of the Health and Safety Plan describes how worker health status is monitored at this site. Medical surveillance is used when there is the potential for worker exposure to hazardous substance at levels above OSHA Permissible Exposure Limits (PEL) or other published limits. The purpose of a medical surveillance program is to medically monitor worker health to ensure that personnel are not adversely affected by site hazards. The provisions for medical surveillance at this site are based on the site characterization and job hazard analysis found in Section 4 of this HASP and are consistent with OSHA requirements in 29 CFR 1910.120(f) as applicable.

8.4.1 Site Medical Surveillance Program

Medical surveillance requirements are based on a worker's potential for exposure as determined by the site characterization and job hazard analysis documented in Section 4 and JSAs within **Appendix A** of this HASP and in compliance with the requirements of 29 CFR 1910.120(f)(2). Based on site information and use of direct reading instruments, limited use of respirators (less than 30 days per year), and the absence of an employee-staffed HAZMAT team, a limited medical surveillance program is required and implemented at this site. The medical surveillance program provides that:

1. Workers assigned to tasks requiring the use of respirators receive medical examinations in accordance with 29 CFR 1910.134(e) to ensure they are physically capable to perform the work and use the equipment, and
2. If a worker is injured, becomes ill, or develops signs or symptoms of possible over-exposure to hazardous substance or health hazards, medical examinations are provided to that worker as soon as possible after the occurrence and as required by the attending physician.
3. These medical examinations and procedures are performed by or under the supervision of a licensed physician and are provided to workers free of cost, without loss of pay, and at a reasonable time and place. In addition, the need to implement a more comprehensive medical surveillance program will be re-evaluated after any apparent over-exposure.

8.4.2 Medical Recordkeeping Procedures

Medical recordkeeping procedures are consistent with the requirements of 29 CFR 1910.1020 and are described in the company's overall safety and health program. A copy of that program is available at our Islandia, New York office.

The following items are maintained in worker medical records:

- Respirator fit test and selection;
- Physician's medical opinion of fitness for duty (pre-placement, periodic, termination);
- Physician's medical opinion of fitness for respirator protection (pre-placement, periodic); and
- Exposure monitoring results.

8.4.3 Program Review

The medical program is reviewed to ensure its effectiveness. The Corporate Health and Safety Manager, in coordination with the Human Resources Director, is responsible for this review. At minimum, this review consists of:

- Review of accident and injury records and medical records to determine whether the causes of accidents and illness were promptly investigated and whether corrective measures were taken wherever possible;
- Evaluation of the appropriateness of required medical tests based on site exposures; and
- Review of emergency treatment procedures and emergency contacts list to ensure they were site specific, effective, and current.

8.5 Personnel Protection

Site safety and health hazards are eliminated or reduced to the greatest extent possible through engineering controls and work practices. Where hazards are still present, a combination of engineering controls, work practices and PPE are used to protect employees. Appropriate personal protective equipment (PPE) shall be worn by Site personnel when there is a potential exposure to chemical, biological or physical hazards (e.g., falling objects, flying particles, sharp edges, electricity, and noise), as determined by the SHSO. The level of personal protection, type and kind of equipment selected will depend on the hazardous conditions and in some cases cost, availability, compatibility with other equipment, and performance. An accurate assessment of all these factors will be made before work can be safely executed.

Roux maintains a comprehensive written PPE program that addresses proper PPE selection, use, maintenance, storage, fit and inspection. Roux's PPE program can be found within **Appendix D**. PPE to be used at the Site will meet the appropriate American National Standards Institute (ANSI) standards and the following OSHA (General/Construction Industry) standards for minimum PPE requirements.

The minimum level of PPE for entry onto the Site is Level D. The following equipment shall be worn:

- Work uniform (long pants, sleeved shirt);
- Hard hat;
- Steel or composite toe work boots (must comply with American Society for Testing and Materials [ASTM]) F 2412-05, Standard Test Methods for Foot Protection and ASTM F 2413-05, Standard Specification for Performance Requirements for Foot Protection);
- Safety Glasses (must comply with one of the following ANSI/ISEA Z87.1-2010, ANSI Z87.1-2003, ANSI Z87.1-2003);
- Boot Covers (as needed);
- Hearing protection (as needed);
- High visibility clothing (shirt/vest); and
- Hand protection (e.g., minimum cut resistance meeting ANSI 105-2000 Level 2).

Note that jewelry shall be removed or appropriately secured to prevent it from becoming caught in rotating equipment or unexpectedly snagged on a fixed object (e.g., wrist watches, bracelets, rings, chains and necklaces, open earrings). Do not wear loose clothing and all shoulder-length hair should be tied back.

Site specific PPE ensembles and materials are identified within task specific JSAs located within **Appendix A**, and any upgrades or downgrades of the level of protection (i.e., not specified in the JSA) must be approved by the PP and immediately communicated to all Roux personnel and subcontractors as applicable. PPE is used in accordance with manufacturer's recommendations.

8.5.1 Hearing Conservation

Hearing protection is made available when noise exposures equal or exceed an 8-hour time-weighted average sound level of 85 dBA. Hearing protection is required when the 8-hour time weighted average sound level > 85 dBA, or when noise levels exceed 140 dBA at any point or exceeds 115 dBA for at least 15 minutes. Where noise exposure meets or exceeds this level, noise is listed as a physical hazard in the JSA for the tasks/operation, and hearing protection is included as one of the control measures (PPE).

8.6 Monitoring

An air monitoring program is important to the safety of on- and off-Site personnel, and the surrounding area. A preliminary survey, to establish background conditions in the immediate sampling area, may be made prior to the initiation of Site work including, but not limited to, monitoring wind direction (e.g., wind socks) and approximate temperature during all invasive Site activities. This survey will be conducted with the appropriate pre-calibrated air monitoring instrument(s), as warranted by the field activity. Once this survey has been complete, any changes in the type of PPE will be determined and relayed to those working on Site.

Work zone air monitoring will be performed to verify that the proper level of PPE is used, and to determine if increased protection or work stoppage is required. The following equipment shall be used to monitor conditions:

- A Photoionization Detector (PID) with a lamp energy of 10.6 eV will be used to provide direct readings of organic vapor concentrations during intrusive activities to determine that personnel protection is adequate. Concentrations shall be recorded during intrusive activities with the potential to encounter contaminant vapors.

Personal exposure monitoring utilizing activated charcoal tubes may be considered based on whether or not the area sample results are at or above half of the PEL. The decision to perform the monitoring will be made by, and under the control of, the CHSD.

Below are monitoring action levels for Site-specific chemicals of concern. In the event PID readings above the thresholds identified below are sustained for 5 minutes in the breathing zone, worker protection will require upgrading following notification to the OHSM and applicable parties.

8.6.1 Action Levels for Air Monitoring

PPE can remain at Level D if breathing zone VOC concentrations are less than 5 ppm and benzene is non detect. Personnel are required to evacuate the Site when breathing zone VOC readings exceed 25 ppm.

The following tables include summaries of the air monitoring, work practices, and action levels for the expected contaminants. The action levels to initiate testing with colorimetric tubes for airborne volatiles is 1 ppm (PID reading) and is based on the Permissible Exposure Limit (PEL) for benzene (1 ppm). The colorimetric tubes are used to confirm the presence or absence of specific constituents, and they do not provide a measured concentration.

PPE can remain at Level D if breathing zone VOC concentrations are less than 5 ppm, is non-detect. Personnel are required to evacuate the Site when breathing zone VOC readings exceed 25 ppm.

The following tables include summaries of the air monitoring, work practices, and action levels for the expected contaminants.

Air Monitoring Summary and Action Levels Organic Vapors	
PID Reading in Breathing Zone (ppm)	**Action**
0-1 ppm above background	Continue monitoring
>1-5 ppm sustained 60 seconds	Continue monitoring
<5 ppm	Continue Monitoring
≥ 5 ppm - ≤ 25 ppm	Ventilate space until PID reads < 5 ppm. If < 5 ppm cannot be achieved, upgrade to Level C[1].
≥ 25 ppm	Ventilate space and evacuate area. Consult with CHSD.

Background concentrations should be established at the beginning of each work day. It may be necessary to re-establish background concentrations and ambient conditions vary through the day.

1 Measured air concentrations of known organic vapors will be reduced by the respirator to one half of the PEL or lower, and the individual and combined compound concentrations shall be within the service limit of the respirator cartridge.

Air Monitoring Summary and Action Levels Oxygen	
O_2 Reading in Breathing Zone (%)[1]	**Action**
20.9% O_2	Oxygen level normal
< 19.5% O_2	Oxygen deficient Interrupt task/Evacuate area
>23.5% O_2	Oxygen enriched Interrupt task/Evacuate area

1. Action levels based on USEPA Standard Operating Safety Guides; Table 5-1

Air Monitoring Summary and Action Levels Carbon Monoxide	
CO Reading in Breathing Zone (ppm)[1]	**Action**
<12.5 ppm	Inspect exhaust system for leaks or other sources of CO. Monitor initially and every 15 minutes during use of CO-generating equipment.
12.5-25 ppm	Ventilate area. Monitor continuously and record measurements. Contact PM.
>25 ppm	Cease Field Operations. Ventilate area.

1. Based upon the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV) of 25 ppm as an 8-hour time weighted average (TWA) and OSHA's Permissible Exposure Limit (PEL) of 50 ppm as an 8-hour TWA concentration.

Air Monitoring Summary and Action Levels Combustible Gases	
Lower Explosive Limit (LEL) Reading	**Action**
< 4% LEL	Site activities will continue with normal monitoring
4% – 20% LEL	Stop work until levels dissipate to <4% LEL
> 20% LEL	Potential explosion hazard. Halt all site activities, research source of release, aerate work area, suppress source.
Air Monitoring Summary and Action Levels Hydrogen Sulfide	
Hydrogen Sulfide (H_2S) Reading	**Action**
<10 ppm	Site activities will continue with normal monitoring
≥10 ppm	Stop work until levels dissipate to <10 ppm; use mechanical ventilation if possible. Consult with CHSD if unable to reduce concentrations below 10 ppm.

8.6.2 Air Monitoring Equipment and Calibration

A PID calibrated to an appropriate calibration mixture will be used to detect organic vapors in and around the work areas. Monitoring will be conducted in and around all work areas and at the workers breathing zone before activities commence to establish a background level, then at 15-minute intervals throughout the day. All equipment will be calibrated according to the manufacturer's recommendation. A calibration log will be maintained and will include the name of the person who performed the calibration, the date and time calibrated, and the instrument reading at the time of calibration. A manual bellows pump or equivalent with colorimetric tubes for specific compounds will be utilized to determine the course of action related to upgrading or downgrading the level of respiratory protection, as applicable. The monitoring data, including background readings and equipment calibration records, will also be included in the daily CAMP reports to NYSDEC and NYSDOH.

If air monitoring data indicate safe levels of potentially harmful constituents at consistent intervals (5-minute intervals), then monitoring can be conducted less frequently (every 30 minutes). This determination will be made by the onsite SHSO. Monitoring data, including background readings and calibration records, will be documented. Work to be performed on-Site will conform to Roux's Standard Operating Procedures (SOPs). Conformance with these guidelines as well as the guidelines described in this HASP will aid in mitigating the physical and chemical hazards mentioned throughout this HASP.

8.7 Tailgate Safety Meetings

A designated Site worker will provide daily safety briefings (e.g., tailgate meetings) including, but not limited to, the following scenarios:

- When new operations are to be conducted;
- Whenever changes in work practices must be implemented; and
- When new conditions are identified and/or information becomes available.

Daily safety briefings shall be recorded on the Roux Daily Tailgate Health and Safety Meeting Log/Daily Site Safety Checklist, and all completed forms will become a part of the project file.

8.8 Spill Containment

Spill containment equipment and procedures should, at a minimum, meet the requirements of the facility's Spill Prevention, Control and Countermeasure Plan, if applicable. Otherwise, spill containment equipment and procedures must be considered depending on the task, including, but not limited to, chemical/product transfer points and handling.

8.8.1 Initial Spill Notification and Response

Any worker who discovers a hazardous substance spill will immediately notify the SHSO. The worker will, to his/her best ability, report the hazardous substance involved, the location of the spill, the estimated quantity of material spilled, the direction/flow of the spill material, related fire/explosion incidents, and any associated injuries without compromising their own safety. Any spill of such will also be reported to the NYSDEC Project Manager as soon as possible. Additionally, the spill will be reported to the NYSDEC Spill Hotline if spill reporting criteria is met.

8.8.2 Spill Evaluation and Response

The SHSO is responsible for evaluating spills and determining the appropriate response. When this evaluation is being made, the spill area will be isolated and demarcated to the extent possible. If necessary to protect nearby community members, notification of the appropriate authorities is made by the PM as appropriate. On-Site response is limited to small spills (e.g., <5 gallons); large spills require external emergency responders who will be contacted by the SHSO. Small spills will be contained, cleaned, and disposed of appropriately.

8.9 Decontamination

The decontamination section of the HASP describes how personnel and equipment are decontaminated when they leave the Exclusion Zone. This section also describes how residual waste from decontamination processes is disposed. The site decontamination procedures are designed to achieve an orderly, controlled removal or neutralization of contaminants that may accumulate on personnel or equipment. These procedures minimize worker contact with contaminants and protect against the transfer of contaminants to clean areas of the site and off-site. They also extend the useful life of PPE by reducing the amount of time that contaminants contact and can permeate PPE surfaces. Decontamination is facilitated within the CRZ at this site, if applicable.

8.9.1 Decontamination Procedures for Personnel and PPE

The following are general decontamination procedures established and implemented at this site.

1. Decontamination is required for all workers exiting a contaminated area. Personnel may re-enter the SZ only after undergoing the decontamination procedures described below in the next section.
2. Protective clothing is decontaminated, cleaned, laundered, maintained and/or replaced as needed to ensure its effectiveness.
3. PPE used at this site that requires maintenance or parts replacement is decontaminated prior to repairs, or
4. PPE used at this site is decontaminated or prepared for disposal on the premises. Personnel who handle contaminated equipment have been trained in the proper means to do so to avoid hazardous exposure.

5. This site uses an off-site laundry for decontamination of PPE. The site has informed that facility of the hazards associated with contaminated PPE from this site.
6. The site requires and trains workers that if their permeable clothing is splashed or becomes wetted with a hazardous substance, they will immediately exit the work zone, perform applicable decontamination procedures, shower, and change into uncontaminated clothing.
7. Procedures for disposal of decontamination waste meet applicable local, State, and Federal regulations.

8.9.2 Decontamination Procedures for Equipment

All tools, equipment, and machinery from the EZ or CRZ are decontaminated in the CRZ prior to removal to the SZ. Equipment decontamination procedures are designed to minimize the potential for hazardous skin or inhalation exposure and to avoid cross-contamination and chemical incompatibilities.

General Equipment Decontamination Procedures:

1. Decontamination is required for all equipment exiting a contaminated area. Equipment may re-enter the SZ only after undergoing the equipment decontamination procedures.
2. Vehicles that travel regularly between the contaminated and clean areas of the site are carefully decontaminated each time they exit the EZ and the effectiveness of that decontamination is monitored to reduce the likelihood that contamination will be spread to other parts of the site.
3. Particular attention is given to decontaminating tires, scoops, and other parts of heavy equipment that are directly exposed to contaminants and contaminated soil.
4. Procedures for disposal of decontamination waste shall meet applicable local, State, and Federal regulations.

The following items may be used to decontaminate equipment:

- Fresh water rinse;
- Non-phosphorus detergent wash;
- Acetone rinse;
- Distilled water rinse; and
- A steam cleaner or pressure washer (heavy equipment only).

Specific information regarding planned decontamination procedures is provided below:

Hand equipment used to process and retrieve samples (i.e. trowels) will be cleaned between each use to prevent cross contamination. All surfaces in contact with samples will be washed thoroughly with Alconox or a non-phosphate detergent and potable quality water, using a brush where possible to remove any particulate matter or surface film. Decontamination will be completed over New York State Department of Transportation (NYSDOT) drums. Drums containing decontamination water will be properly disposed of after the completion of remedial activities.

To prevent exposure of dump truck tires with unremediated surface soils currently present on-site, during the remediation work, prior to and after being loaded with impacted soils, dump trucks will be required to traverse across a constructed access/haul road comprised of imported approved gravel or stone (crushed limestone or similar) that will act as a barrier between the surface soils and the tires. Prior to leaving the Site, each truck will be visually inspected for any soil/fill present on tires or truck components other than within the dump bed and if present, such will be physically removed using hand tools, such as a broom, a stiff-bristle brush, a wire brush, a hand scraper, or a shovel. Further, the street proximate the access road will continually be inspected throughout the remedial work and, if needed, swept of any debris.

8.9.3 Monitoring the Effectiveness of Decontamination Procedures

Visual examination and sampling are used to evaluate the effectiveness of decontamination procedures. Visual examination is used to ensure that procedures are implemented as described and that they appear to control the spread of contaminants under changing site conditions. Visual examination is also used to inspect for signs of residual contamination or for contaminant permeation of PPE.

Personnel who work in contaminated areas of the site, either the Contamination Reduction Zone (CRZ) or the Exclusion Zone, are trained in the principles and practices of decontamination described in this section of the HASP and in related SOPs. If site procedures are changed as a result of inspection and monitoring, all affected employees are notified of these changes.

8.10 Confined Space Entry

Confined space entry will not be performed during remedial activities.

The following is a list of the safety requirements for confined space entry at the Site:

- **ROUX PERSONNEL ARE NOT AUTHORIZED TO ENTER AN OSHA PERMIT REQUIRED CONFINED SPACE;**
- Currently the scope of work **DOES NOT** require personnel to enter permitted confined space for this project; and
- Any changes to the field activities that may necessitate confined space entry will be reported to the Project Principal and OHSM.

Confined space is defined as any space, depression, or enclosure that:

- Has limited opening for entry and egress;
- Is large enough for and employee to enter and perform assigned work; and
- Is not intended for continuous occupancy.

A permit required confined space is one that meets the definition of a confined space and has one or more of the following characteristics:

- May contain or produce life-threatening atmospheres due to oxygen deficiency the presence of toxic, flammable, or corrosive contaminants;
- Contains a material that has the potential for engulfment;
- Has an internal configuration that may cause an entrant to be trapped or asphyxiated by inwardly converging walls or by a floor that slopes downward and tapers to a smaller cross-section; and
- Contains any other serious safety or health hazards.

Although Roux personnel will not perform confined space entry, it is expected that subcontractors performing cleaning and mitigation and/or remedial measures activities may be required to enter structures that are considered to be a permit required confined space. Permitting of the confined space as well as hazard mitigation for entry will be completed by the subcontractor in accordance with 29 CFR 1910.146 or 1926.1201-1213 and/or applicable local/client requirements.

8.11 Client and Site-Specific

In addition to the OSHA-specific procedures discussed above, there may be client and site-specific safety procedures that must be adhered to during the performance of remedial activities at the Site.

8.12 Unusual or Significant Risks

Field activities that appear to have unusual or significant risks that cannot be adequately managed with existing risk tools such as LPS, HASPs, traffic safety plans, work permits, design and O&M practices, equipment HAZOPS or other safety tools must be referred to the CHSD to help with the assessment and management of the associated potential safety risks. Examples include the use of explosives for demolition, use of firearms to control wildlife, rappelling, demolition over water, diving, etc.

8.13 Activity-Specific Hazards

In addition to the general hazards discussed above, there are activity-specific hazards associated with each work activity planned for the Site. An activity-specific JSA has been completed for each of the activities planned for the Site. JSAs are provided in **Appendix A**. In the event that new work activities or tasks are planned, JSAs will be developed and implemented prior to performing the new activities. In the absence of a JSA, the personnel performing work must prepare a field JSA and receive clearance from a designated competent safety official prior to performing any task with significant risk. In emergency situations where time is critical SPSAs will be utilized to identify the task, associated hazards and mitigative actions to take. For lower risk activities (as deemed by the discretion of a Competent Person) where a JSA is determined to not be needed, the individual(s) conducting the activities must perform SPSAs prior to and during the work.

8.13.1 Electrical and Other Utility Assessment and Accommodations

Roux shall perform a site walk to identify any potential overhead electrical or utility lines. All applicable guidelines will be followed in the vicinity of overhead power and utility lines (see Section 8.13.3 below).

8.13.2 Subsurface Work

Subsurface work activities will require adherence to Roux's Corporate Subsurface Utility Clearance Management program found within Appendix E.

8.13.2.1 Excavations and Trenching

Trenching and excavation work activities carried out by Roux and their subcontractors shall comply with applicable OSHA standards (i.e., 29 CFR 1926.650-652). Regional Notification Centers (i.e., Underground Services Alert) shall be notified at least two working days prior to the start of any digging or excavation work per state requirements (i.e., 811-One Call). Personnel responsible for excavation activities will be trained in their job responsibilities. Additionally, for trenches 4 feet or deeper, where employees will enter, the trench needs to have a stairway, ladder or other safe means of egress, and located so that employees do not have to travel farther than 25 feet horizontally. Where employees will enter trenches greater than 5 feet deep, the trench must have some type of protective system or sloped sidewalls appropriately to prevent cave-ins.

The SHSO or other responsible Roux personnel will be present on-Site during all Roux contracted excavation and backfill operations and will supplement health and safety monitoring conducted by

Subcontractor air quality screening to ensure that appropriate levels of protection and safety procedures are utilized. The proximity of chemical, water, sewer, and electrical lines will be identified by Roux and/or their subcontractor before any subsurface activity or sampling is attempted. Prior to any excavation activities, trees, shrubbery, and other objects that can potentially pose as a hazard during excavation should be supported or removed from the excavation area. The following safe work practices will be implemented during this task.

- The proximity of chemical, water, sewer, and electrical lines will be identified by a facility representative prior to beginning any subsurface activity;
- At the start of every day, a competent person will inspect excavations to evaluate if the area is stable and safe to enter. Inspections will be conducted as needed throughout the excavation operations. If deemed necessary, a competent person may also conduct inspections after rainfall or any other event that can potentially affect the integrity of the excavation. Employees will not enter excavations where water has accumulated until protective measures have been implemented.
- Prior to entering excavations greater than 4 feet in depth, air monitoring for oxygen and hazardous atmospheres must be conducted to assure atmospheric conditions are within normal levels described in Section 8.6. Continuous air monitoring with a standard multi-gas detector (O2, LEL%, CO, H2S) shall be used during the course of work within an excavation; if action limits are reached workers shall safely exit the excavation. Upgrades to worker protection should be evaluated with the SHSO and PP in consultation with the CHSD. Emergency rescue equipment, such as breathing apparatuses and safety harnesses connected to an extraction device, will be readily available in the event of hazardous atmospheric conditions;
- While earthmoving, stay out of the excavator's delineated heavy equipment exclusion zone and away from the excavation sides where there is potential for cave in (within excavations that are 6 feet or more in depth, a delineated perimeter 6 feet away from the excavated edge is required);
- During loading and unloading operations, stand away from haul trucks and other vehicles to avoid contact with any falling loads; and
- Traffic cones, caution tape, or other barriers will be set up around the perimeter of the excavation when employees are working along the excavation edge and for any excavation that will be left open overnight or unattended for more than two days.

Maximum Allowable Slopes

Soil or Rock Type	Maximum Allowable Slopes (H:V)[1] for Excavations Less Than 20 Feet Deep[3]
Stable Rock	Vertical (90°)
Type A[2]	3/4 : 1 (53°)
Type B	1 : 1 (45°)
Type C	1 1/2 : 1 (34°)

29 CFR 1926 Subpart P Appendix B Sloping and Benching Table B-1

Notes:

[1] Numbers shown in parentheses next to maximum allowable slopes are angles expressed in degrees from the horizontal. Angles have been rounded off.

[2] A short-term maximum allowable slope of 1/2H : 1V (63°) is allowed in excavations in Type A soil that are 12 feet (3.67 meters) or less in depth. Short-term maximum allowable slopes for excavations greater than 12 feet (3.67 meters) in depth shall be 3/4H : 1V (53°).

[3] Sloping or benching for excavations greater than 20 feet deep shall be designed and stamped by a registered professional engineer.

Proper stockpiling (i.e., 2 feet minimum distance from the excavation edge), containment, transport, storage, and disposal practices will be utilized and is dependent upon the potential type and amount of waste generated during operations. The location of safety equipment and evacuation procedures will be established prior to initiation of operations according to this HASP.

8.13.3 Heavy Equipment

Use of heavy equipment at the Site will require adherence to Roux's Corporate Heavy Equipment Exclusion Zone Management Program found within Appendix F. Additionally, operation of the drill rig/other heavy equipment will maintain clearances from overhead power lines in accordance with 29 CFR 1926.1408 Table A Minimum Clearance Distances provided below.

Minimum Required Clearances for Energized Overhead Power Lines

Nominal System Voltage of Power Line (K V)	Minimum Required Clearance (feet)
0-50	10
51-100	12
101-200	15
201-300	20
301-500	25
501-750	35
751-1000	45

1 kilovolt (KV) = 1,000 volts

8.14 Traffic Control

If Site operations encroach upon public streets or highways and a hazard exists to Site personnel because of traffic conditions, a traffic control plan will be implemented in accordance with the United States Department of Transportation's (DOT's) "Manual on Uniform Traffic Control Devices."

8.15 Sanitation

Sanitation facilities will be provided in accordance with the sanitation standards (29 CFR 1910.141, 29 CFR 1926.51 and 29 CFR 1928.110). Sanitation facilities will be maintained and kept in good conditions at all times.

9. Field Team Review

Each person performing work at or visiting this site shall sign this section after site-specific training is completed and before being permitted to access the CRZ or Exclusion Zone.

I have read and understand this Site-Specific Health and Safety Plan. I will comply with the provision contained therein.

Site/Project: 130 Main Street, Buffalo, NY 14202

Name & Company	Signature	Date

10. Approvals

By their signature, the undersigned certify that this HASP is approved and will be utilized at the North Aud Block Site.

TBD – Site Health and Safety Officer	Date
Paul Werthman – Office Health and Safety Manager	Date
Bryan Mayback – Project Manager	Date
Michael Lesakowski – Project Principal	Date

TABLES

Table 1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at the Site.

Compound	CAS #	ACGIH TLV	NIOSH REL	OSHA PEL	IDLH	Routes of Exposure	Toxic Properties	Target Organs	Physical/Chemical Properties
ORGANOCHLORINE PESTICIDES (OCP)									
DDT	50-29-3	TWA 1 mg/m3	TWA 0.5 mg/m3	TWA 1 mg/m3	500 mg/m3	Inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin; paresthesia tongue, lips, face; tremor; anxiety, dizziness, confusion, malaise (vague feeling of discomfort), headache, lassitude (weakness, exhaustion); convulsions; paresis hands; vomiting; [potential occupational carcinogen]	Eyes, skin, central nervous system, kidneys, liver, peripheral nervous system	White, odorless and tasteless, very stable, water-insoluble, synthetic BP: 260°F Fl.Pt. = 162-171°F LEL: NA UEL: NA
SEMI-VOLATILE ORGANIC COMPOUNDS (SVOCs)									
Benzo[a]anthracene	56-55-3	https://cameochemicals.noaa.gov/chemical/16171				Inhalation, injestion, skin and/or eye contact			Colorless leaflets or plates or coarse gold powder with a greenish-yellow fluorescence. May reasonably be expected to be a carcinogen. BP: 815° F at 760 mm Hg Fl.Pt. = NA LEL: NA UEL: NA
Benzo[a]pyrene (as coal tar pitch volatiles)	50-32-8	TWA 0.2 mg/m3 (as Benzene solubles)	Ca TWA 0.1 mg/m3 (cyclohexane-extractable fraction)	TWA 0.2 mg/m3 (benzene-soluble fraction) [1910.1002]	Ca [80 mg/m3]	Inhalation, skin and/or eye contact	Dermatitis, bronchitis, [potential occupational carcinogen]	Respiratory system, skin, bladder, kidneys	Black or dark-brown amorphous residue BP: NA Fl.Pt. = NA LEL: NA UEL: NA Combustible Solids
Benzo[b]fluoranthene	205-99-2	None listed	https://cameochemicals.noaa.gov/chemical/16172			Inhalation, injestion, skin and/or eye contact			Needles or yellow fluffy powder BP: NA Fl.Pt. = NA LEL: NA UEL: NA
Benzo[k]fluoranthene	207-08-9	https://cameochemicals.noaa.gov/chemical/16173				Inhalation, injestion, skin and/or eye contact	When heated to decomposition this compound emits acrid smoke and irritating fumes.		Pale yellow needles or yellow crystalline solid BP: 896° F Fl.Pt. = NA LEL: NA UEL: NA
Chrysene (as coal tar pitch volatiles	218-01-9	TWA 0.2 mg/m3 (as Benzene solubles)	Ca TWA 0.1 mg/m3 (cyclohexane-extractable fraction)	TWA 0.2 mg/m3 (benzene-soluble fraction) [1910.1002]	Ca [80 mg/m3]	Inhalation, skin and/or eye contact	Dermatitis, bronchitis, [potential occupational carcinogen]	Respiratory system, skin, bladder, kidneys	Black or dark-brown amorphous residue BP: NA Fl.Pt. = NA LEL: NA UEL: NA Combustible Solids
Dibenzo(a,h)anthracene	53-70-3	https://cameochemicals.noaa.gov/chemical/16192				Inhalation, injestion, skin and/or eye contact	Symptoms of exposure to this compound may include irritation. This compound is harmful if swallowed or inhaled. It may cause irritation. When heated to decomposition it emits acrid smoke, irritating fumes and toxic fumes of carbon monoxide and carbon dioxide.	Lungs	White crystals or pale yellow solid. Sublimes BP: 975° F Fl.Pt. = NA LEL: NA UEL: NA
Indeno[1,2,3-cd]pyrene	193-39-5	https://cameochemicals.noaa.gov/chemical/16218				Inhalation, injestion, skin and/or eye contact			Yellow crystals BP: 997° F Fl.Pt. = NA LEL: NA UEL: NA
METALS									
Arsenic	7440-38-2	TWA 0.01 mg/m3	Ca C 0.002 mg/m3 [15-minute]	[1910.1018] TWA 0.010 mg/m3	Ca [5 mg/m3 (as As)]	Inhalation, skin absorption, skin and/or eye contact, ingestion	Ulceration of nasal septum, dermatitis, gastrointestinal disturbances, peripheral neuropathy, resp irritation, hyperpigmentation of skin, [potential occupational carcinogen]	Liver, kidneys, skin, lungs, lymphatic system	Metal: Silver-gray or tin-white, brittle, odorless solid BP: Sublimes Fl.Pt. = NA LEL: NA UEL: NA Metal: Noncombustible Solid in bulk form, but a slight explosion hazard in the form of dust when exposed to flame
Barium	7440-39-3	TWA 0.5 mg/m3	0.5 mg Ba/m3 TWA	0.5 mg Ba/m3 TWA	50 mg Ba/m3	Inhalation, ingestion, skin and/or eye contact	Inhalation or contact with vapors, substance or decomposition products may cause severe injury or death. Contact may cause burns to skin, eyes, and mucous membranes. May be toxic by ingestion, inhalation and skin absorption. Used to make other chemicals.	Lungs, skin, eyes, and mucous membrane	A silver to white metallic solid BP: 1337°F Fl.Pt. = NA LEL: NA UEL: NA

Table 1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at the Site.

Compound	CAS #	ACGIH TLV	NIOSH REL	OSHA PEL	IDLH	Routes of Exposure	Toxic Properties	Target Organs	Physical/Chemical Properties
Cadmium	7440-43-9	TWA 0.01 mg/m^3 total dust TWA 0.002 mg/m^3 (as Cd) respirable fraction	Ca	TWA 0.005 mg/m^3	Ca [9 mg/m3 (as Cd)]	Inhalation, ingestion	Pulmonary edema, dyspnea (breathing difficulty), cough, chest tightness, substernal (occurring beneath the sternum) pain; headache; chills, muscle aches; nausea, vomiting, diarrhea; anosmia (loss of the sense of smell), emphysema, proteinuria, mild anemia; [potential occupational carcinogen]	Respiratory system, kidneys, prostate, blood	Silver-white/blue tinged lustrous, odorless solid. BP: 1409°F Fl.Pt. = NA LEL: NA UEL: NA Noncombustible - will burn in powder form
Copper	7440-50-8	TWA 0.2 mg/m^3 (fume) TWA 1 mg/m3 (dusts and mists)	TWA 1 mg/m^3	TWA 1 mg/m^3	100 mg/m^3 (as Cu)	Inhalation, ingestion, skin and/or eye contact	Irritation eyes, nose, pharynx; nasal septum perforation; metallic taste; dermatitis; In Animals: lung, liver, kidney damage; anemia	Eyes, skin, respiratory system, liver, kidneys (increased risk with Wilson's disease)	Reddish, lustrous, malleable, odorless solid. BP: 4703°F Fl.Pt. = NA LEL: NA UEL: NA Noncombustible - powdered form may ignite
Lead	7439-92-1	TWA 0.05 mg/m3	TWA (8-hour) 0.050 mg/m3	[1910.1025] TWA 0.050 mg/m3	100 mg/m3 (as Pb)	Inhalation, ingestion, skin and/or eye contact	Lassitude (weakness, exhaustion), insomnia; facial pallor; anorexia, weight loss, malnutrition; constipation, abdominal pain, colic; anemia; gingival lead line; tremor; paralysis wrist, ankles; encephalopathy; kidney disease; irritation eyes; hypertension	Eyes, gastrointestinal tract, central nervous system, kidneys, blood, gingival tissue	A heavy, ductile, soft, gray solid BP: 3164°F Fl.Pt. = NA LEL: NA UEL: NA Noncombustible Solid in bulk form
Manganese	7439-96-5	TWA 0.02 mg/m3 [R] TWA 0.1 mg/m3 [I]	TWA 1 mg/m3 ST 3 mg/m3	C 5 mg/m3	500 mg/m3 (as Mn)	inhalation, ingestion	Manganism; asthenia, insomnia, mental confusion; metal fume fever: dry throat, cough, chest tightness, dyspnea (breathing difficulty), rales, flu-like fever; low-back pain; vomiting; malaise (vague feeling of discomfort); lassitude (weakness, exhaustion); kidney damage	respiratory system, central nervous system, blood, kidneys	A lustrous, brittle, silvery solid BP: 3564°F Fl.Pt. = NA LEL: NA UEL: NA Metal: Combustible Solid
Mercury	7439-97-6	TWA 0.1 mg/m3, as Hg Aryl compounds TWA 0.025 mg/m3 as Hg, inorganic forms including metallic mercury	Hg Vapor: TWA 0.05 mg/m3 [skin] Other: C 0.1 mg/m3 [skin]	TWA 0.1 mg/m3	10 mg/m3 (as Hg)	Inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin; cough, chest pain, dyspnea (breathing difficulty), bronchitis, pneumonitis; tremor, insomnia, irritability, indecision, headache, lassitude (weakness, exhaustion); stomatitis, salivation; gastrointestinal disturbance, anorexia, weight loss; proteinuria	Eyes, skin, respiratory system, central nervous system, kidneys	Metal: Silver-white, heavy, odorless liquid. [Note: "Other" Hg compounds include all inorganic & aryl Hg compounds except (organo) alkyls.] BP: 674°F Fl.Pt. = NA LEL: NA UEL: NA Metal: Noncombustible Liquid
Nickel	7440-02-0	TWA 1.5 mg/m^3 [elemental] TWA 0.1 mg/m^3 [soluble inorganic compound] TWA 0.2 mg/m^3 [insoluble inorganic compound] TWA 0.1 mg/m^3 [Nickel subsulfide]	Ca TWA 0.015 mg/m^3	TWA 1 mg/m^3	Ca [10 mg/m3 (as Ni)]	Inhalation, ingestion, skin and/or eye contact	Sensitization dermatitis, allergic asthma, pneumonitis; [potential occupational carcinogen]	Nasal cavities, lungs, skin	Lustrous, silvery, odorless solid. BP: 5139°F Fl.Pt. = NA LEL: NA UEL: NA Combustible Solid; nickel sponge catalyst may ignite spontaneously in air.
Zinc	7440-66-6	https://cameochemicals.noaa.gov/chemical/4814				Inhalation, skin absorption, ingestion, skin and/or eye contact	Inhalation or contact with vapors, substance or decomposition products may cause severe injury or death. May produce corrosive solutions on contact with water. Fire will produce irritating, corrosive and/or toxic gases. Runoff from fire control may cause pollution	Lungs	A grayish powder BP: NA Fl.Pt. = NA LEL: NA UEL: NA

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Abbreviations:

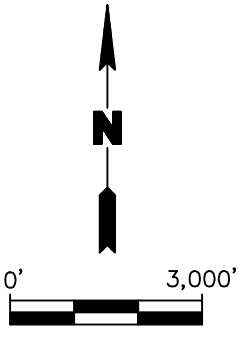
ACGIH – American Conference of Governmental Industrial Hygienists.
BP – boiling point at 1 atmosphere, °F
C – Ceiling, is a concentration that should not be exceeded during and part of the working exposure.
Ca – Carcinogenic.
CAS# - Chemical Abstracts Service registry number which is unique for each chemical.
DSEN - Dermal Sensitization
Ft Pt. – Flash point
IDLH - Immediately Dangerous to Life and Health concentrations represent the maximum concentration from which, in the event of respirator failure, one could escape within 30 minutes without a respirator and without experiencing any escape-impairing or irreversible health effects.
LEL – Lower explosive (flammable) limit in air, % by volume (at room temperature)
mg/m^3 – Milligrams of substance per cubic meter of air
NIOSH - National Institute for Occupational Safety and Health.
OSHA – Occupational Safety and Health Administration
OTO - Ototoxicant
PEL - OSHA Permissible Exposure Limit (usually) a time weighted average concentration that must not be exceeded during any 8 hour work shift of a 40 hr work week.
ppm – parts per million
REL – NIOSH Recommended Limit indicated a time weighted average concentration that must not be exceeded during any 10 hour work shift of a 40 hr work week
RSEN - Respiratory Sensitization
SG - Specific Gravity
STEL – ACGIH Short-term exposure limit (ST)
TLV - ACGIH Threshold Limit Values (usually 8 hour time weighted average concentrations).
TWA – 8-hour, time-weighted average
UEL – Upper explosive (flammable) limit in air, % by volume (at room temperature)
VP - Vapor Pressure

FIGURES

1. Site Location and Vicinity Map
2. Site Plan with Emergency Muster Area
3. Route to Hospital

QUADRANGLE LOCATION

SOURCE:
BUFFALO, NY, 2023
USGS 7.5 MINUTE TOPOGRAPHIC MAP



Title:
SITE LOCATION AND VICINITY MAP

HEALTH AND SAFETY PLAN

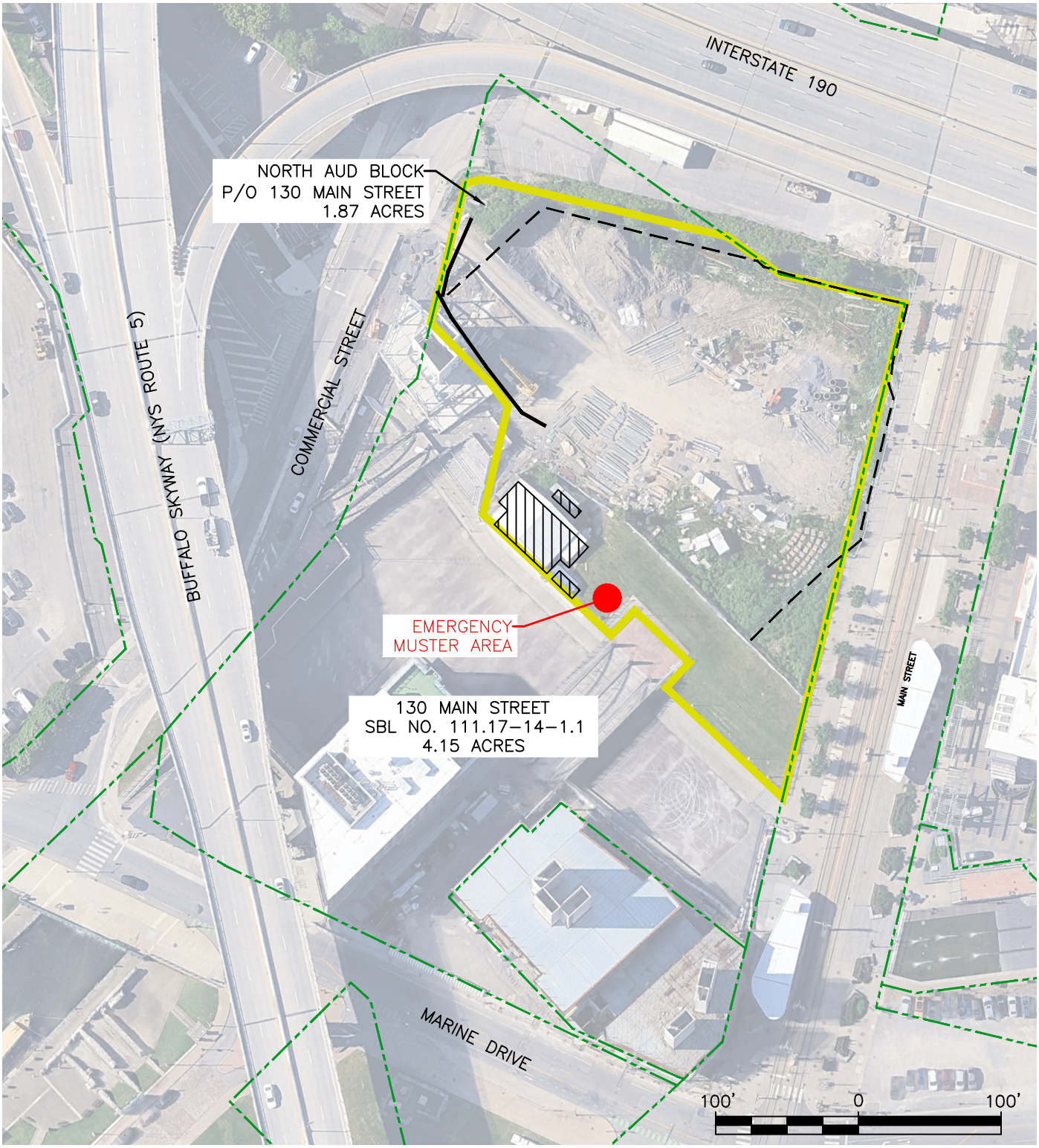
NORTH AUD BLOCK (C915406)
P/O 130 MAIN STREET, BUFFALO, NEW YORK

Prepared for:
NORTH AUD OWNER LLC

ROUX

Compiled by: CNK	Date: SEPTEMBER 2025	FIGURE
Prepared by: CNK	Scale: AS SHOWN	1
Project Mgr: BWM	Project: 4375.0002B000	
File: FIGURE 1; SITE LOCATION AND VICINITY MAP.DWG		

F:\CAD\0-ROUX\PENNROSE\NORTH AUD BLOCK\RAW\PHASP\FIGURE 1; SITE LOCATION AND VICINITY MAP.DWG



LEGEND

- BCP SITE BOUNDARY
- PARCEL BOUNDARY
- WOODEN/SHEET PILE RETAINING WALL
- CONCRETE WALL
- EXISTING STRUCTURES (TO BE REMOVED)

NOTES

1. AERIAL IMAGE SOURCE GOOGLE EARTH 2024.

N

Title:

SITE PLAN WITH EMERGENCY MUSTER AREA

HEALTH AND SAFETY PLAN

NORTH AUD BLOCK (C915406)
P/O 130 MAIN STREET, BUFFALO, NEW YORK

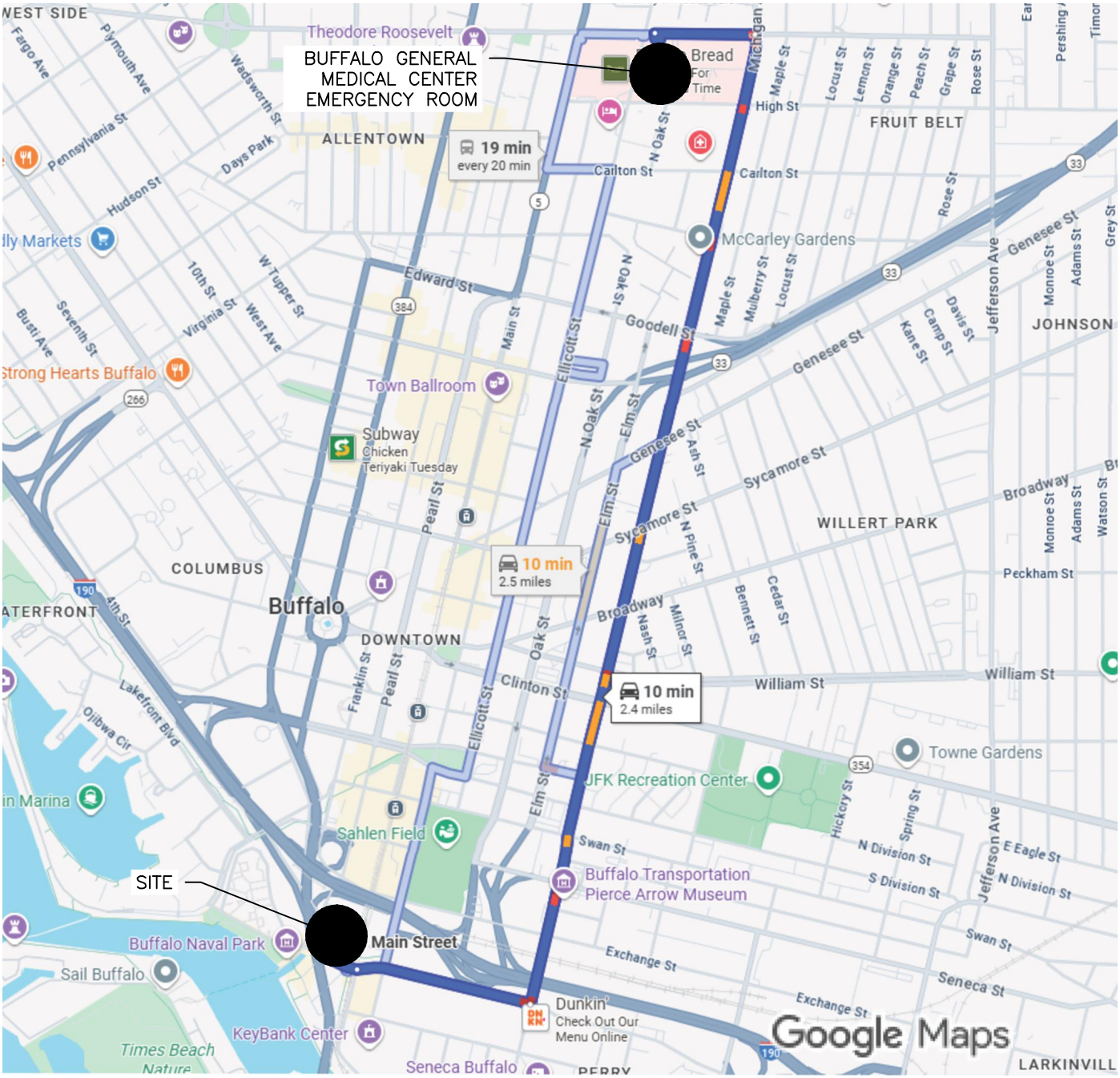
Prepared for:

NORTH AUD OWNER LLC

ROUX

Compiled by: CNK	Date: SEPTEMBER 2025	FIGURE
Prepared by: CNK	Scale: AS SHOWN	2
Project Mgr: BWM	Project: 4375.0002B000	
File: FIGURE 2; SITE PLAN WITH EMERGENCY MUSTER AREA.DWG		

F:\CAD\0-ROUX\PENNROSE\NORTH AUD BLOCK\RAW\PI\HASP\FIGURE 2; SITE PLAN WITH EMERGENCY MUSTER AREA.DWG



ROUTE TO BUFFALO GENERAL MEDICAL CENTER EMERGENCY ROOM:

- HEAD SOUTH ON MAIN STREET
- TURN LEFT ONTO SCOTT STREET
- TURN LEFT ONTO MICHIGAN AVENUE
- TURN LEFT ONTO E NORTH STREET
- TURN LEFT INTO EMERGENCY ROOM DROP-OFF AREA

IMAGE SOURCE: GOOGLE MAPS 2025

N

0' 1,500'

Title:

ROUTE TO HOSPITAL

HEALTH AND SAFETY PLAN

NORTH AUD BLOCK (C915406)
P/O 130 MAIN STREET, BUFFALO, NEW YORK

Prepared for:

NORTH AUD OWNER LLC

ROUX

Compiled by: CNK	Date: SEPTEMBER 2025	FIGURE
Prepared by: CNK	Scale: AS SHOWN	3
Project Mgr: BWM	Project: 4375.0002B000	
File: FIGURE 3; ROUTE TO HOSPITAL.DWG		

F:\CAD\0-ROUX\PENNROSE\NORTH AUD BLOCK\RAW\PIHASP\FIGURE 3; ROUTE TO HOSPITAL.DWG

APPENDICES

A. Job Safety Analysis (JSA) Forms
B. SDSs for Chemicals Used
C. Heat Illness Prevention Program
D. Personal Protective Equipment (PPE) Management Program
E. Subsurface Utility Clearance Management Program
F. Heavy Equipment Exclusion Zone Management Program

APPENDIX A

Job Safety Analysis (JSA) Forms

JOB SAFETY ANALYSIS	Ctrl. No. GEN-003	DATE 4/10/2023	☐ NEW ☒ REVISED	PAGE 1 of 2

JSA TYPE CATEGORY	WORK TYPE	WORK ACTIVITY (Description)
GENERIC	**Construction - Excavation**	**Backfilling Excavation & Compaction**

DEVELOPMENT TEAM	POSITION / TITLE	REVIEWED BY:	POSITION / TITLE
David Kaiser	Project Engineer	Brian Hobbs	CHSD
Edward Lacina	Senior Construction Manager		

REQUIRED AND / OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT

☐ LIFE VEST	☐ GOGGLES	☐ AIR PURIFYING RESPIRATOR	☒ GLOVES: Leather/ cut-resistant level 2
☒ HARD HAT	☐ FACE SHIELD	☐ SUPPLIED RESPIRATOR	☐ OTHER _____
☐ LIFELINE / BODY HARNESS	☒ HEARING PROTECTION	☒ PPE CLOTHING: reflective DOT approved safety	
☒ SAFETY GLASSES	☒ SAFETY TOE BOOTS		

REQUIRED AND / OR RECOMMENDED EQUIPMENT

Payloader, Backhoe, Dump Trucks, Mechanical gas powered tampers, Excavator with hydraulic tamper. APR when tamping if dust present. Two-way radios.

COMMITMENT TO SAFETY- All personnel onsite will actively participate in hazard recognition and mitigation throughout the day by verbalizing SPSAs.

EXCLUSION ZONE (EZ): Maintain Minimum Heavy Equipment Exclusion Zone (HEEZ) around equipment and loads while it is in motion. The HEEZ must be greater than the swing zone of any moving part of the equipment, tip zone of the equipment, fall zone of the equipment and contents, distance that debris may travel during demolition activities and/or foot print of a structure to be demolished.

Assess [1]JOB STEPS	Analyze [2]POTENTIAL HAZARDS	Act [3]CRITICAL ACTIONS
1. Pre-construction meeting: Review proposed excavation locations	**1a. CONTACT:** Potential for contact with subsurface utilities and above ground utilities	1a. Call state 811 for mark out service and one call ticket. 1a. Obtain private utility mark out service as necessary. 1a. Review and mark proposed excavations w/white paint. 1a. Identify all "Critical" zones. A Critical zone is any area within 10 feet of any operating utility. 1a. Complete subsurface clearance checklist. 1a. Soft dig must be conducted within 2 lateral feet of any suspected underground utility. 1a. Protection of aboveground utilities identified as being located within the work zone must be coordinated w/ client and utility owner.
2. Secure Work Area	**2a. CONTACT:** Potential for personnel to enter the work area. Potential for equipment to contact, or crush personnel. **2b. EXERTION:** Potential for muscle strain or tear while installing traffic cones and barrel	2a. Ensure work area is secure and inform others of work activity. Establish a HEEZ using 42" traffic cones, barrels & snow fencing or telescoping poles. Use of flag persons to maintain clear traffic and to minimize motorist confusion during set-up of new traffic pattern. HEEZ to include tip/swing radius of equipment. 2a. Dump Truck/Excavator/Payloader/Backhoe equipment to be set-up by personnel who are familiar with machinery. Spotters shall be in place for all equipment. and to control access to the HEEZ 2a. Truck wheels are chocked when driver is not in truck and engine shut off. 2a. Personnel shall stay out of the exclusion zone (10' minimum or greater than the equipment boom) while equipment is maneuvering. 2b. Keep back straight, keep load close to the body and bend knees while lifting and working. If over 50 lbs., use 2 or more laborers for lifting or use of equipment.

[1] Each Job or Operation consists of a set of tasks / steps. Be sure to list all the steps needed to perform job.
[2] A hazard is a potential danger. Break hazards into six types: Contact - victim is struck by or strikes an object; Caught - victim is caught on, caught in or caught between objects; Fall - victim falls to ground or lower level (includes slips and trips); Exertion - excessive strain or stress / ergonomics / lifting techniques; Exposure - inhalation/skin hazards; Energy Source – electricity, pressure, compression/tension.
[3] Using the first two columns as a guide, decide what actions or procedures are necessary to eliminate or minimize the risk. List the recommended safe operating procedures. Say exactly what needs to be done - such as "use two persons to lift". Avoid general statements such as, "be careful".

3. Backfilling excavation, and compaction	**3a. CONTACT:** Traffic and live equipment. . **3b. EXPOSURE:** Fumes from gas powered tamper **3c. FALL:** Slips, trips, fall hazards. **3d. OVEREXERTION:** Muscle strain, or tear. **3e. EXPOSURE:** Noise from tamper. Dust inhalation.	3a. Equipment and trucks shall be isolated from other workers, subcontractors and third party traffic with 42" traffic cones, barricades, snow fencing or telescoping poles, and/or Jersey barriers. Spotters shall direct dump truck for placement of fill near excavation. Pay loader/ Excavator, as directed by spotter, shall move fill into trench where it shall be placed in layers and compacted by mechanical means. 3a. Spotters will wear florescent vests at all times. 3a. Spotters will remain out of the exclusion zone, line-of-fire from equipment and third-party vehicles. 3a. Spotters and operators will have radios for communication, when other visual and/or hand signals are insufficient. 3a. Locate all overhead utilities. All personnel and machinery should maintain a minimum 10' distance from overhead electric lines. Refer to OSHA chart for distances and voltage. 3a. For excavations engineered (shored, sloped, benched} all personnel, equipment, and materials must remain a minimum of 2 feet from edge of excavation. 3b. Fueling of all equipment will be done outside of work area in a well-ventilated area. Refueling will be done only after a 2-5-minute cool down. 3c. Work area will be clean and free of any debris to remove slip, trip and fall hazards. All tools will be kept in designated areas. Insure work area is well illuminated. 3c. Workers should only be working in areas that have been leveled with a machine. 3c. All persons working at elevations over 6' shall use a guardrail system or personal fall arrest system while around excavation. 3d. Keep knees bent and back straight while transferring/ lifting/lowering tamper from elevated areas. Utilize a co-worker to avoid staining muscles. 3d. Keep knees bent and back straight while maneuvering tamper. Utilize a co-worker to avoid staining muscles. 3e. Workers will wear hearing protection during compaction tamper activities. 3e. Wear NIOSH approved dust mask for personal comfort. If dust is visible for extended time, limit by wetting down area. 3e. If dust continues stop work and evaluate if increase in APR is needed with approval and clearance.
4. Secure/leave site.	**4a. FALL:** Slip, trip, fall	4a. Clear work area of all debris and store all equipment in designated areas/containers before opening to traffic. 4a. Replace fencing and barricades as needed to secure path before opening roadway or area up to traffic(vehicle, pedestrian and/or bicycle).

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[2] A hazard is a potential danger. Break hazards into six types: Contact - victim is struck by or strikes an object; Caught - victim is caught on, caught in or caught between objects; Fall - victim falls to ground or lower level (includes slips and trips); Exertion - excessive strain or stress / ergonomics / lifting techniques; Exposure - inhalation/skin hazards; Energy Source – electricity, pressure, compression/tension.
[3] Using the first two columns as a guide, decide what actions or procedures are necessary to eliminate or minimize the risk. List the recommended safe operating procedures. Say exactly what needs to be done - such as "use two persons to lift". Avoid general statements such as, "be careful".

JOB SAFETY ANALYSIS	Ctrl. No. GEN-007	DATE 4/10/2023	☐ NEW ☒ REVISED	PAGE 1 of 2

JSA TYPE CATEGORY	WORK TYPE	WORK ACTIVITY (Description)
GENERIC	**General Site Activity**	**Driving**

DEVELOPMENT TEAM	POSITION / TITLE	REVIEWED BY:	POSITION / TITLE
Valerie Sabatasso	Project Scientist	Brian Hobbs	CHSD

REQUIRED AND / OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT

☐ LIFE VEST	☐ GOGGLES	☐ AIR PURIFYING RESPIRATOR	☒ GLOVES: Leather/ cut-resistant level 2
☒ HARD HAT: when outside vehicle	☐ FACE SHIELD	☐ SUPPLIED RESPIRATOR	☐ OTHER _____
☐ LIFELINE / BODY HARNESS	☒ HEARING PROTECTION	☒ PPE CLOTHING: high visibility vest, when outside vehicle	
☒ SAFETY GLASSES:when outside vehicle	☒ SAFETY TOE BOOTS: when outside vehicle		

REQUIRED AND / OR RECOMMENDED EQUIPMENT

Motor Vehicle (i.e. car, truck, SUV)

COMMITMENT TO SAFETY- All personnel onsite will actively participate in hazard recognition and mitigation throughout the day by verbalizing SPSAs

EXCLUSION ZONE (EZ): Maintain Minimum Heavy Equipment Exclusion Zone around equipment and loads while it is in motion. The HEEZ must be greater than the swing zone of any moving part of the equipment, tip zone of the equipment, fall zone of the equipment and contents, distance that debris may travel during demolition activities and/or foot print of a structure to be demolished.

Assess [1]JOB STEPS	Analyze [2]POTENTIAL HAZARDS	Act [3]CRITICAL ACTIONS
1. Driving to/leaving Site	**1a. CONTACT:** Severe injury/disability, property damage, monetary loss (insurance premiums, deductibles, loss of license/job) caused by collision with or struck by other vehicles, obstructions, pedestrians, animals, etc. *Common factors that may lead to CONTACT incident, but not limited to: • distracted driving (cell phone, GPS, radio, billboards, "rubber necking") • lack of situational awareness • unfamiliarity with traffic patterns/road layout • weather conditions (wet/icy roads, hydroplaning, black ice) • weariness • high speeds • obstructed vision (solar glare, debris on windshield, blind spots, large vehicle at the front) • changes in travel pathway (construction, snow banks, non-operational signals, potholes, detours, special events) • improper vehicle maintenance (non-operational signal light, worn tires, cracked windshield, ineffective wipers) • loose or unsecure objects	1a. PLAN AHEAD – review/make yourself familiar with maps and driving directions before beginning the drive to the Site. Do not attempt to drive and review maps/directions at the same time. Pull over and stop your vehicle before looking at maps/directions. 1a. Complete a basic vehicle inspection before driving. Verify Inspection and Registration are current, tires and wipers are in good condition, all lights are functional, all glass/mirrors are undamaged, the horn is functional, roof/hood/trunk are free from accumulated snow and visibility is not impaired due to snow/ice/frost/fog on windows. 1a. Do not hang items in car that can obstruct your view or become projectiles in a collision. 1a. Do not get distracted using touch screen radios or GPS units built into newer models. Keep your eyes on the road and stay alert. 1a. Follow posted speed limits and obey traffic signals and roadway signs. 1a. Always wear your seat belt and shoulder harness when driving. 1a. When driving around large vehicles and trucks, maintain extra space as these vehicles may not be able to see a smaller car too close. 1a. Follow the "Rules of the Road" including: using your turn signals, coming to a complete stop, and allowing vehicles the right of way (yield) when they are when traffic laws require. 1a. Apply the Smith Five Keys® of safe driving • Aim High in Steering® - Expand eye lead time to a minimum of 15 seconds • Get the Big Picture® - Maintain proper a 4 second minimum following distance at all times - Scan mirrors every 5-8 seconds to achieve a circle of awareness - Position your vehicle so you can see relevant/non-relevant objects • Keep Your Eyes Moving® - Try to maintain about 180 degrees of visibility - Avoid blank and fixed stares. Avoid focusing on one object for more than 2 seconds • Leave Yourself an Out® - Avoid traveling in traffic clusters - Surround yourself with space - Anticipate the actions of others

[1] Each Job or Operation consists of a set of tasks / steps. Be sure to list all the steps needed to perform job.
[2] A hazard is a potential danger. Break hazards into six types: Contact - victim is struck by or strikes an object; Caught - victim is caught on, caught in or caught between objects; Fall - victim falls to ground or lower level (includes slips and trips); Exertion - excessive strain or stress / ergonomics / lifting techniques; Exposure - inhalation/skin hazards; Energy Source – electricity, pressure, compression/tension.
[3] Using the first two columns as a guide, decide what actions or procedures are necessary to eliminate or minimize the risk. List the recommended safe operating procedures. Say exactly what needs to be done - such as "use two persons to lift". Avoid general statements such as, "be careful".

Assess [1]JOB STEPS	Analyze [2]POTENTIAL HAZARDS	Act [3]CRITICAL ACTIONS
1. Driving to/leaving Site (cont'd)	**1a. CONTACT:** Severe injury/disability, property damage, monetary loss (insurance premiums, deductibles, loss of license/job) caused by collision with or struck by other vehicles, obstructions, pedestrians, animals, etc.	• Make Sure They See You® - Maintain eye contact with on-coming vehicles/pedestrians - Use warning devices (e.g., hand signals, high-lights, horns etc.) - Proper timing is essential 1a. Do not perform reconnaissance or inspections while driving. Your vehicle should be parked in a safe location when viewing or surveying the Site and vicinity 1a. Avoid sudden turns and stops. Don't drive recklessly – be in control of vehicle at all times. 1a. In inclement weather, first determine if work can be POSTPONED. Otherwise, plan according to weather conditions including checking forecast along entirety of travel route (especially, for long distances). Reduce speed as road conditions warrant. Travelling with winter car equipment in the winter is strongly recommended (i.e., shovel, scraper, brush, blanket, extra clothing, flashlight, bag of sand). If your vehicle has 4-wheel drive, review the operators manual and understand operating procedure prior to engaging 4-wheel drive. If at any point on your drive weather becomes too severe to proceed safely pull over if safe to do so or seek nearest cover (e.g., overpass) 1a. If feeling drowsy or sleepy, do not drive. Pull over in a safe place to rest if you experience any signs of drowsiness. Make sure to get adequate sleep the night before an early drive. 1a. Never operate a vehicle under the influence of alcohol or illegal substances or medications affecting your performance. 1a. Keep your eyes on the road. Do not call or talk on cellular phones. Pull over to a safe location if you must answer or make a call. 1a. When parking, pull-through when possible. If backing is required visually inspect area to ensure it is free from obstructions prior to backing in and relying solely on mirrors; use spotters when available.
2. Entering/Exiting Vehicle.	**2a. CAUGHT:** Personal injury (broken fingers/hand) while entering or exiting vehicles **2b. FALL:** Personal injury (twisted ankle, deep contusion, concussion, broken wrist/arm, etc.) from slip/fall on uneven or unstable or slippery surface while exiting/entering vehicle **2c. CONTACT:** Severe injury/disability, property damage, monetary loss (insurance premiums, deductibles, loss of license/job) caused by collision with or struck by other vehicles, obstructions, pedestrians, animals, etc.	2a. Open and close doors slowly. Never put hands or feet in between door and vehicle to avoid pinch points. 2b. When exiting the vehicle make sure your feet are on firm footing and weight is evenly distributed before exiting/standing. In inclement weather use hands to support yourself, by holding the car door and/or steering wheel, when exiting the vehicle. 2c. Check both directions for traffic before opening door. Do not exit vehicle if traffic does not permit you to exit safely 2c. Check anticipated path of door prior to opening, do not open door into any obstructions (e.g., bollards, high curbing)

[1] Each Job or Operation consists of a set of tasks / steps. Be sure to list all the steps needed to perform job.
[2] A hazard is a potential danger. Break hazards into six types: Contact - victim is struck by or strikes an object; Caught - victim is caught on, caught in or caught between objects; Fall - victim falls to ground or lower level (includes slips and trips); Exertion - excessive strain or stress / ergonomics / lifting techniques; Exposure - inhalation/skin hazards; Energy Source – electricity, pressure, compression/tension.
[3] Using the first two columns as a guide, decide what actions or procedures are necessary to eliminate or minimize the risk. List the recommended safe operating procedures. Say exactly what needs to be done - such as "use two persons to lift". Avoid general statements such as, "be careful".

JOB SAFETY ANALYSIS	Ctrl. No. GEN-009	DATE: 4/10/2023	☐ NEW ☒ REVISED	PAGE 1 of 1
JSA TYPE CATEGORY **Generic**	WORK TYPE **O&M**	WORK ACTIVITY (Description) **Movement of 55-Gallon Drums/Drum Handling with Mobile Carrier**		

DEVELOPMENT TEAM	POSITION / TITLE	REVIEWED BY:	POSITION / TITLE
Michael Sarni	Technician	Brian Hobbs	CHSD

REQUIRED AND / OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT

☐ LIFE VEST	☐ GOGGLES	☐ AIR PURIFYING RESPIRATOR	☒ GLOVES: Cut-resistant gloves
☒ HARD HAT	☐ FACE SHIELD	☐ SUPPLIED RESPIRATOR	☐ OTHER:
☐ LIFELINE / BODY HARNESS	☐ HEARING PROTECTION	☒ PPE CLOTHING: Fluorescent long sleeve shirt or long sleeve shirt and reflective safety vest.	
☒ SAFETY GLASSES	☒ SAFETY SHOES: Steel or composite toe		

REQUIRED AND / OR RECOMMENDED EQUIPMENT

Mobile Drum Carrier, over-pack drum container, safety cones, and caution tape

COMMITMENT TO SAFETY- All personnel onsite will actively participate in hazard recognition and mitigation throughout the day by verbalizing SPSAs

EXCLUSION ZONE (EZ): Maintain Minimum Heavy Equipment Exclusion Zone around equipment (i.e. forklift) and loads while it is in motion. The HEEZ must be greater than the swing zone of any moving part of the equipment, tip zone of the equipment, fall zone of the equipment and contents, distance that debris may travel during demolition activities and/or foot print of a structure to be demolished.

Assess [1]JOB STEPS	Analyze [2]POTENTIAL HAZARDS	Act [3]CRITICAL ACTIONS
1. Preparing for and Inspection of Drum	**1a. FALL:** Tripping/falling due to uneven surface. Loose debris/garbage in work area.	1a. Clear area of loose garbage and debris. Inspect 55-gal drums for proper condition, labeling, check drum ring and bolts for tightness, inspect mobile drum carrier. 1a. Do a Test Lift to get a general sense of the weight of the drum. 1a. Inspect and use established pathways to avoid uneven terrain, weather-related hazards (i.e., debris, puddles, ice, etc.), and other obstructions. 1a. Secure work area and coordinate and communicate the planned work activities with other personnel working in the area. 1a. Delineate work area with 42" safety cones.
	1b. CONTACT/EXPOSURE: Drums could potentially be damaged or contain hazardous material. Mobile drum carrier could potentially be in poor working condition causing malfunctioning during operation.	1b. Prior to inspecting drums don cut-resistant gloves. If drum is not properly labeled, do not open and cease all drum transport activities. Immediately contact project manager and inform him/her of drum situation. 1b. Do not continue drum transport activities until further actions are determined by the project manager. 1b. If the drum is properly labeled, but leaking, improperly sealed or in poor condition, place drum in an over-pack drum. 1b. Inspect mobile drum carrier to ensure its overall integrity. Look for rust marks or potential weak points where the drum carrier could malfunction. Inspect the wheels to ensure that they easily turn and nothing is impeding their movement.
	1c. EXERTION/CAUGHT: Potential pinching/exertion hazards while securing ring/ tightening bolts	1c. Keep back straight and knees slightly bent while securing drum ring/tightening bolt. Wear cut-resistant gloves.
2. Position drum clamp tightly in between drum ribs, securing drum clamp to drum with chain	**2a. CAUGHT:** Pinching fingers between drum clamp and handle/chain.	2a. Attach drum clamp with chain and tighten until snug. Do not place hands between drum clamp and drum as the chain is tightened; wear cut resistant gloves. Keep face away from drum when handling in case of escaping vapors.

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[3] Using the first two columns as a guide, decide what actions or procedures are necessary to eliminate or minimize the risk. List the recommended safe operating procedures. Say exactly what needs to be done - such as "use two persons to lift." Avoid general statements such as, "be careful."

Assess [1]JOB STEPS	Analyze [2]POTENTIAL HAZARDS	Act [3]CRITICAL ACTIONS
3. Disengage safety latches on handle, pull handle down until drum is lifted off ground and safety latches are reengaged; slightly suspending drum off the ground	**3a. EXERTION/ CONTACT:** Potential muscle strain associated with lifting/engaging drum/handle. Drum could shift/slip downward and crush toes.	3a. Ascertain whether the drum is overweight; if it is, then two people are needed to lower handle while drum is secured with clamp so that safety latches can be engaged. Keep body out of the lin-of-fire of the handle (do not position head above handle) as it is being pushed down. Do not allow feet/toes to be positioned under the drum as it is being lifted; wear steel/composite-toed boots.
	3b. CAUGHT: Fingers could be pinched while engaging/disengaging safety latches on handle	3b. Wear cut-resistant gloves while disengaging/reengaging safety latches. 3b. Avoid placing hands in pinch points.
4. Transport drums to designated location and disengage drum clamp (repeat Step 3 in reverse order)	**4a. FALL:** Tripping/ falling due to obstructions and uneven terrain. Potential for drum to fall during transport.	4a. Ensure transport path is free of potential obstructions that may cause the drum/carrier to become unstable. Position drum clamp between the ribs on the drum to prevent possible slipping.

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JSA TYPE CATEGORY	WORK TYPE	WORK ACTIVITY (Description)
Generic	**Surveying**	**Elevation Surveying**

DEVELOPMENT TEAM	POSITION / TITLE	REVIEWED BY:	POSITION / TITLE
Bjorn Wespestad	Senior Engineer	Brian Hobbs	CHSD
William Hansen	Senior Engineer		

REQUIRED AND / OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT

☐ LIFE VEST	☐ GOGGLES	☐ AIR PURIFYING RESPIRATOR	☒ GLOVES: Cut-resistant or leather
☒ HARD HAT	☐ FACE SHIELD	☐ SUPPLIED RESPIRATOR	☒ OTHER: Long sleeve Shirt
☐ LIFELINE / BODY HARNESS	☐ HEARING PROTECTION	☒ PPE CLOTHING: Fluorescent reflective vest or high visibility clothing	
☒ SAFETY GLASSES	☒ SAFETY SHOES: Steel-toe boots		

REQUIRED AND / OR RECOMMENDED EQUIPMENT

Surveying equipment (i.e., leveling rod/measuring ruler, tripod and autolevel).

COMMITMENT TO SAFETY- All personnel onsite will actively participate in hazard recognition and mitigation throughout the day by verbalizing SPSAs.

Assess [1]JOB STEPS	Analyze [2]POTENTIAL HAZARDS	Act [3]CRITICAL ACTIONS
1. Check in with Site manager/ property owner.	**1a. CONTACT/EXPOSURE/FALL:** Lack of communication could result in H&S incident.	1a. Inform Site personnel of work scope, timeline and location(s). 1a. Inquire about other activities taking place at the Site. 1a. If applicable, obtain General Work permit for the day.
2. Locate surveying position for instrument and rod and set-up work area	**2a. FALL:** Slip/trip hazards	2a. Inspect area for uneven terrain, weather-related hazards (i.e., ice, puddles, snow, etc.) and obstructions prior to setting up at the survey location. Keep eyes engaged with walking surface while in movement. Remember "Walking is Working." 2a. Conduct housekeeping and maintain clear paths to walk in and remove debris as required.
	2b. CONTACT: Traffic (surveying locations could potentially be in parking areas and sidewalks)	2b. Be aware of oncoming traffic. Utilize a flagman / spotter for locations in streets or high-traffic areas. 2b. Place 42 inch cones around the work area and delineate work zone with caution tape, snow fencing or safety bars, if necessary. 2b. Wear appropriate PPE including long-sleeved high visibility clothing and or reflective safety vest. 2b. Face traffic, maintain eye contact with oncoming vehicles and establish a safe exit route.
	2c. OVEREXERTION: Hazard due to carrying, lifting, and bending while transporting equipment	2c. Use proper body positioning and lifting techniques; keep back straight, lift with legs, keep load close to body, and never reach with a load. 2c. Avoid carrying too much equipment at one time and team-lift equipment that is heavier than 50 lb.
	2d. CAUGHT/CONTACT: Pinch Points / sharp edges associated with setting up the tripod	2d. Wear cut resistant gloves when handling the tripod and keep fingers away from pinch points located near moving parts of the tripod. Don't carry tripod by the pointed ends.
	2e. OVEREXERTION: Hazard due to bending awkwardly to look through the autolevel	2e. When practical, set the height of the autolevel optic so as to minimize bending at the waist.

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Assess [1]JOB STEPS	Analyze [2]POTENTIAL HAZARDS	Act [3]CRITICAL ACTIONS
3. Open / close manhole cover to well that is being surveyed (if necessary).	**3a. OVEREXERTION:** Muscle strain	3a. See 2c. Bend knees when reaching to open well. Use manhole lifting hook or pry bar to avoid bending.
	3b. CAUGHT: Pinch points associated with removing / replacing manholes and working with hand tools	3b. Wear leather gloves or cut resistant gloves when working with well cover and hand tools. 3b. Use proper tools (ratchet and crowbar, pry bar or magnet for well cover) and inspect before use. 3b. Do not put fingers under well cover.
	3c. EXPOSURE: To potentially hazardous vapors To biological hazards	3c. No open flames/heat sources. 3c. To minimize exposure to vapors, allow well to vent after opening it and before survey activities begin. 3c. Work on the upwind side of manhole/well. 3.c Use caution while opening lids to inspect work area for bees and insects inside of covers. 3c. Use insect/tick repellent as necessary.
	3d. CONTACT: With traffic	3d. See 2b.
4. Perform survey.	**4a. FALL:** Slip/trip hazards	4a. See 2a.
	4b. CONTACT: Traffic (surveying locations could be potentially located in parking areas and sidewalks)	4b. See 2b. 4b. Personnel using the scope will be devoting most of their attention to the surveying activity and shall be aware of vehicular and pedestrian traffic. Personnel holding the measuring stick should be extra vigilant of survey personnel and communicate any potential hazards to the instrument person via handheld radio or similar means. Ensure reflective safety vest is worn.
	4c. ENERGY SOURCES: Electrical shock from survey rod striking overhead electric lines or lights	4c. Prior to raising and extending the survey rod, personnel should thoroughly inspect the area above the measuring point. If overhead electrical lines are encountered within 20 feet of the measuring point; stop work and consult with the Office Health and Safety Officer.
5. Break down work area.	**5a. CONTACT:** Traffic (surveying locations can potentially be in parking areas and sidewalks)	5a. See 2b.
	5b. EXERTION: Hazard due to carrying, lifting, and bending while transporting equipment	5b. See 2c.
	5c. CONTACT: Personal injury or equipment damage by striking surroundings with an extended rod or unsecured tripod leg	5c. Ensure rod is entirely collapsed prior to mobilization / demobilization between survey points. 5c. Ensure tripod legs are fully collapsed and secured with strap prior to mobilization / demobilization between set-ups.

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JSA TYPE CATEGORY	WORK TYPE	WORK ACTIVITY (Description)
Generic	**Construction - Excavation**	**Excavation / Trenching**

DEVELOPMENT TEAM	POSITION / TITLE	REVIEWED BY:	POSITION / TITLE
David Kaiser	Senior Engineer	Brian Hobbs	CHSD
Tim Unalp	SHSO		

REQUIRED AND / OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT

☐ LIFE VEST	☐ GOGGLES	☐ AIR PURIFYING RESPIRATOR	☒ GLOVES: Leather or cut resistant
☒ HARD HAT	☐ FACE SHIELD	☐ SUPPLIED RESPIRATOR	☐ OTHER
☒ LONG SLEEVED SHIRT	☒ HEARING PROTECTION	☒ PPE CLOTHING: Fluorescent reflective vest or high visibility long sleeved clothing	
☐ LIFELINE / BODY HARNESS	☒ SAFETY SHOES: Steel-toe boots		
☒ SAFETY GLASSES			

REQUIRED AND / OR RECOMMENDED EQUIPMENT

Jackhammer, Excavator, Backhoe, Hand Tools, Photoionization Detector, barrels, 42" traffic cones, snow fencing, telescoping poles, temporary chain link fence, ladders, shovels, digging bars, power tools (cut-off saw), Two-way radios, Sheeting, Trench box, Retractable lanyard, Harness

COMMITMENT TO SAFETY- All personnel onsite will actively participate in hazard recognition and mitigation throughout the day by verbalizing SPSAs

EXCLUSION ZONE (EZ): Maintain Minimum Heavy Equipment Exclusion Zone around equipment and loads while it is in motion. The HEEZ must be greater than the swing zone of any moving part of the equipment, tip zone of the equipment, fall zone of the equipment and contents, distance that debris may travel during demolition activities and/or footprint of a structure to be demolished.

Assess [1]JOB STEPS	Analyze [2]POTENTIAL HAZARDS	Act [3]CRITICAL ACTIONS
1. Pre-Clearance Protocol.	**1a. CONTACT:** Damage to underground utility.	1a. Confirm that (if applicable) "Call Before You Dig" and local utility companies were contacted prior to trenching in order to confirm utility mark outs. Must have a case # before digging.
	1b. ENERGY SOURCE/CONTACT: Property damage; Pressurized water mains may cause lacerations or broken bones. Pressurized gas mains may explode causing serious injury, or death. Underground electric may cause severe burns, shock, or death.	1b. Pre-clearing of the trenching location must be conducted to a minimum of 5 vertical feet below the ground surface (10 feet minimum for Critical Zone) using soft digging methods or hand tools (shovel and non-metallic dig bar) prior to trenching. Supervisor should be contacted to discuss appropriate pre-clearing depth. **1b. Complete subsurface clearance checklist**.
	1c. FALL: Slip, Trip or Fall may cause muscle strains or tears, abrasions, lacerations, or broken bones.	1c. Be aware of the conditions when walking or loading equipment and working. Walk within established pathway avoiding uneven surfaces. Remove potential slip/trip/fall hazards.
2. Set up work zone.	**2a. CONTACT/CAUGHT:** Cuts/lacerations from equipment. Broken bones from contact by vehicle.	2a. Isolate work area from hazards with cones, barricades, and snow fencing, telescoping poles or temporary chain link fence. Utilize a flag person when necessary (i.e., third party traffic in area). Install traffic signs in roadways and for detours. Spotters will maintain and enforce exclusion zone.
	2b. FALL: Slip, Trip or Fall may cause muscle strains or tears, abrasions, lacerations, or broken bones.	2b. See 1c.

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Assess [1]JOB STEPS	Analyze [2]POTENTIAL HAZARDS	Act [3]CRITICAL ACTIONS
3. Trenching Activity.	**3a. CONTACT:** Serious injury including broken bones, muscle strains or tears, and possibly death due to contact with machine.	3a. Spotter(s) required for all heavy equipment operation. No worker shall be allowed inside the exclusion zone or along the trench/excavation area while any equipment is in operation. A minimum exclusion zone greater than the length of the equipment boom must be established. Workers only allowed in exclusion zone if the operator is in "Hands Off "mode. Operator will not operate equipment until worker is out of exclusion zone. Spotters and operators will have radios for communication, when either loses sight of one another, and/or in case of emergency.
	3b. FALL: Slip, Trip or Fall may cause muscle strains or tears, abrasions, lacerations, or broken bones	3b. Any trench/excavation deeper than 3' must have a ladder within 25' of any worker in the excavation. At least 3'(rungs) of the ladder shall be above the top of the excavation. All spoil piles shall be maintained 2' minimum from edge of excavation. 3b. Any trench/excavation deeper than 6' must have fall protection, retractable lanyard for ladder use, and 42" high guardrails along the edge of the trench/excavation.
	3c. EXPOSURE: Noise, Dust, Concrete- Asphalt, petroleum hydrocarbon vapors may cause damage to ears and lungs	3c. Air monitoring using a calibrated photoionization detector (PID) will be used to monitor the breathing zone of the work area. If a reading of >5ppm is recorded, the oversight personnel must temporarily cease work and instruct all Site personnel to step away from the area of elevated readings.
4. Setting Trench protections if necessary.	**4a. CAUGHT:** Injury due to contact with failed trench, may include muscle strains or tears, abrasions or lacerations, broken bones and possibly death.	4a. To prevent cave-ins and avoid caught by/between, excavations over 4' in depth, unless working in stable rock, shall have engineer approved shoring, sheeting or trench box. Top of protection shall be at least 2' above top of excavation.
	4b. CONTACT/CAUGHT: Injury due to rigging activities and entering exclusion zone during lifting and/or transport of shoring/trench box/material may include muscle strains or tears, abrasions or lacerations, broken bones and possibly death.	4b. Use only inspected rigging with 2, 3 or 4 lift points; wear cut-resistant gloves. Rigging to be hooked up to factory installed hook up points on equipment. Control load with non-conductive tag lines with workers out of exclusion zone. Don't stand underneath suspended load; wear steel toed boots and hard hat.
	4c. FALL: Possible injury due to fall into excavation may include muscle strains or tears, abrasions or lacerations, or broken bones.	4c. Shoring to be set and sides will be backfilled to avoid fall hazards before workers are allowed to enter area. Operator will be in "HANDS OFF" mode before workers enter work area to unhook rigging. An inspected ladder extending 3' above top of the shoring will be used to enter and exit the excavation. Workers will use three points of contact when using the ladder.
5. Secure/Leave Site. If backfilling, see excavation backfilling and compaction JSA for potential hazards and critical actions.	**5a. FALL:** Potential Slip, Trip or Fall - may cause muscle strains or tears, abrasions or lacerations, or broken bones.	5a. See 1c. 5a. All open excavations must be backfilled or secured prior to departure with steel plates, orange construction fence or temporary chain link fencing.

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JSA TYPE CATEGORY	WORK TYPE:	WORK ACTIVITY (Description):
Generic	**Construction - General**	**Installation or Repair of Chain Link Fence**

DEVELOPMENT TEAM	POSITION / TITLE	REVIEWED BY:	POSITION / TITLE
Tim Unalp	SHSO	Brian Hobbs	CHSD

REQUIRED AND / OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT

☐ LIFE VEST	☐ GOGGLES	☐ AIR PURIFYING RESPIRATOR	☒ GLOVES: Cut-resistant
☒ HARD HAT	☐ FACE SHIELD	☐ SUPPLIED RESPIRATOR	☐ OTHER
☐ LIFELINE / BODY HARNESS	☒ HEARING PROTECTION	☒ PPE CLOTHING: Fluorescent reflective vest or high visibility clothing	
☒ SAFETY GLASSES	☒ SAFETY SHOES: Steel or Composite toed boots		

REQUIRED AND / OR RECOMMENDED EQUIPMENT

Required Equipment: Fence materials, Hand tools, Power Tools, GFCI

COMMITMENT TO SAFETY- All personnel onsite will actively participate in hazard recognition and mitigation throughout the day by verbalizing SPSAs.

Assess [1]JOB STEPS	Analyze [2]POTENTIAL HAZARDS	Act [3]CRITICAL ACTIONS
1. Secure work zone	**1a. FALL:** Slip, trip, or fall hazards associated with site conditions.	1a. Maintain good housekeeping and keep work area free of potential Slip, Trip and Fall hazards. 1b. Utilize Traffic Control devices to secure work zone (42" traffic cones with flags, and caution tape).
	1b. CONTACT: Vehicular and pedestrian traffic.	1b. Use work truck or rigid barriers to barricade the side of work area in the line-of-fire of vehicular traffic.
2. Development of anchor locations for Post-Holes for fences using either a Hammer drill or Post-Hole digger.	**2a. CONTACT:** Potential cut/abrasion hazards and splinters. Operation of hammer drill can result in ejected debris and eye hazard.	2a. De-energize power tools by removing battery packs or unplugging from electrical supply prior to switching out components (i.e., Sawsall blades or drill bits). 2a. Unplug from electrical power or remove battery pack from tools before handing them off to another person. 2a. Wear cut-resistant gloves and safety glasses.
	2b. ERGONOMICS: Back strain while maneuvering Post-Hole digger or Shovel.	2b. Utilize proper lifting techniques when using digging tools. Keep back straight, bend at the knees, keep load close to body, turn with legs, and do not twist back. 2b. Inspect post-hole digger prior to use. Ensure there are no splinters on handle. Ensure that the shovel section bolts are in good working condition. 2b. Wear leather or cut-resistant gloves.
	2c. EXPOSURE: Operation of hammer drill can generate greater than 85 dBAs	2c. Wear hearing protection. Personnel not involved in the task must stand at least 10-foot away from the operating hammer drill.
	2d. ENERGY SOURCE: Electric hazards from operation of power tools.	2d. Use heavy-duty, outdoor cords with ground, rated for the electrical load required. Inspect extension cords, verify good condition; no exposed wires, cuts, damage, worn insulation, or damaged plugs. 2d. If the use of a generator is required, do not refuel generator while it is running. Allow generator to cool for 5 minutes prior to refueling. 2d. Use GFCI power outlet.
	2e. ERGONOMICS: Vibration injury.	2e. Wear vibration resistant gloves. 2f. See 2c.
	2f. EXPOSURE: Exposure to generator noise/fumes.	2f. Position generator such that exhaust is pointed away from workers or downwind of work area. Wear hearing protection if generator cannot be positioned out of the work area and if noise levels exceed 85 dBAs.
	2g. FALL: Trip hazards from equipment being left in work zone.	2g. Maintain good housekeeping and keep work area free of Slip, Trip and Fall hazards. Stage tools in designated areas at lowest potential energy. 2g. When possible route extension cords and hoses overhead or outside of walk path.

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Assess [1]JOB STEPS	Analyze [2]POTENTIAL HAZARDS	Act [3]CRITICAL ACTIONS
3. Manual lifting of fence materials	**3a. EXERTION/ERGONOMICS:** Back strain and personal injury from lifting heavy loads.	3a. 50 lbs is the maximum allowable weight per manual lift. Use a mechanical lifting device or the buddy system if the weight is greater than 50 lbs. 3a. Keep back straight, bend at the knees, and keep load close to body when lifting. 3a. Use buddy system when lifting awkward materials.
	3b. CONTACT: Potential cut/abrasion hazards.	3b. Ensure long sleeves are covering arms, wear cut-resistant gloves. Avoid grabbing sharp edges.
4. Installation of chain link fence or fabric.	**4a. OVEREXERTION:** Back strain and personal injury from lifting heavy loads	4a. See 3a.
	4b. CONTACT: Potential cut/abrasion hazards on fencing.	4b. Avoid sharp edges on fencing; ensure long sleeved shirts are fully covering arms, wear cut-resistant gloves. 4b. Use retractable knife for cutting privacy fabric.
5. Housekeeping.	**5a. FALL:** Slip, trip, fall hazards from items left in the work zone.	5a. Clean up loose items including fabric cuttings, tools, etc. 5a. Remove Slip, Trip and Fall hazards from the work area. 5a. Inspect work area to verify it is left in a safe condition.

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JOB SAFETY ANALYSIS	Ctrl. No. GEN-015	DATE: 4/10/2023	☐NEW ☒REVISED	PAGE 1 of 2

JSA TYPE CATEGORY	WORK TYPE	WORK ACTIVITY (Description)	
GENERIC	**Site Recon**	**Mobilization/Demobilization**	
DEVELOPMENT TEAM	**POSITION / TITLE**	**REVIEWED BY:**	**POSITION / TITLE**
Tim Unalp	SHSO	Brian Hobbs	CHSD

REQUIRED AND / OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT

☐ LIFE VEST ☒ HARD HAT ☐ LIFELINE / BODY HARNESS ☒ SAFETY GLASSES	☐ GOGGLES ☐ FACE SHIELD ☒ HEARING PROTECTION (as needed) ☒ SAFETY SHOES: Steel Toe or composite toe	☐ AIR PURIFYING RESPIRATOR ☐ SUPPLIED RESPIRATOR ☒ PPE CLOTHING: Fluorescent reflective vest of high-visibility clothing; long sleeve shirt; long pants	☒ GLOVES: Leather, nitrile, and cut resistant (as needed) ☐ OTHER

REQUIRED AND / OR RECOMMENDED EQUIPMENT

Required Equipment: Varies

COMMITMENT TO SAFETY- All personnel onsite will actively participate in hazard recognition and mitigation throughout the day by verbalizing SPSAs

EXCLUSION ZONE (EZ): Maintain Minimum Heavy Equipment Exclusion Zone around equipment and loads while it is in motion. The HEEZ must be greater than the swing zone of any moving part of the equipment, tip zone of the equipment, fall zone of the equipment and contents, distance that debris may travel during demolition activities and/or foot print of a structure to be demolished.

Assess [1]JOB STEPS	Analyze [2]POTENTIAL HAZARDS	Act [3]CRITICAL ACTIONS
1. Mobilize/demobilize and establish work area	**1a. FALL:** Slip/trips/falls from obstructions, uneven terrain, weather conditions, heavy loads, and/or poor housekeeping.	1a. Use 3 points-of-contact/ensure secure footing when entering and exiting vehicle. 1a. Inspect walking path for uneven terrain, steep hills, obstructions, and/or weather-related hazards (i.e., ice, snow, and puddles) prior to mobilizing equipment. Use established pathways. Walk on stable/secure ground. 1a. Do not climb over stored materials/equipment; walk around. Practice good housekeeping; organize and store equipment neatly in one area at its lowest potential energy. 1a. Wear boots with adequate treads. 1a. Delineate unsafe areas with 42” cones, caution tape and/or flagging.
	1b. CONTACT: Personal injury and/or property damage caused by being struck by Site traffic or equipment used in Site activities.	1b. Observe and maintain the posted speed limits. 1b. When first arriving onsite, park vehicles in designated parking space and/or out of the way locations. Use parking brake on all vehicles and tire chocks on work trucks and trailers. 1b. Check in with Site Manager/Supervisor to ensure coordination with other Site activities and to discuss any special hazards. Ensure that short-service employees (SSE) are identified. 1b. Identify potential traffic sources. 1b. Wear PPE including high visibility clothing or reflective vest. 1b. Use a spotter while moving work vehicles; plan ahead to avoid backing whenever possible. 1b. Maintain a minimum exclusion zone when vehicles are in motion (i.e. greater than swing/tip radius of equipment). When backing up truck rig with an attached trailer use a second spotter if there is tight clearance simultaneously on multiple sides of the equipment or if turning angles limit driver-to-spotter visibility. 1b. Delineate work area with 42” cones, flags, caution tape, and/or other barriers. 1b. Position “Work Area” signs at Site entrances, if possible, or at either side of work area.

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Assess [1]JOB STEPS	Analyze [2]POTENTIAL HAZARDS	Act [3]CRITICAL ACTIONS
		1b. Position largest vehicle to protect against oncoming traffic. 1b. Face traffic, maintain eye contact with oncoming vehicles, use a spotter, and establish a safe exit route. 1b. Observe potential overhead and ground surface features that may interfere with moving equipment. Clear the path of physical hazards prior to initiating mobilization.
	1c. CAUGHT: Personal injury from pinch points and being in line-of-fire of vehicle and/or equipment.	1c. Make sure driver has engaged parking brake and placed wheel chocks in a position to prevent movement. Be sure that vehicle is parked in front/down gradient (positioned to best block oncoming traffic) of work area. 1c. Wear leather gloves when handling any tools or equipment. Wear cut-resistant gloves (Kevlar or similar) when handling sharp objects/cutting tools/glass. 1c. Keep body parts away from line-of-fire of equipment. 1c. Always carry tools by the handles and/or designated carrier. Ensure sharp-edged tools are sheathed/secure. 1c. Remove any loose jewelry. Avoid wearing loose clothing and/or ensure loose clothing is secure. 1c. Secure all items on the equipment, tighten up any items or features that have potential to shift or break during mobilization.
	1d. OVEREXERTION: Muscle strains while lifting/carrying equipment.	1d. Use body positioning and lifting techniques that avoid muscle strain; keep back straight, lift with legs, turn with whole body, keep load close to body, and never reach with a load. 1d. Ensure that loads are balanced. Use assistance (mechanical or additional person) to carry equipment that is either unwieldy or over 50 lbs.
	1e. EXPOSURE: Personal injury from exposure to biological and environmental hazards.	1e. Inspect area to avoid contact with biological hazards (i.e. poisonous plants, stinging insects, ticks, etc.). 1e. Wear long sleeved clothes treated with Permethrin, apply insect repellant containing DEET to exposed skin, and inspect clothes and skin for ticks during and after work. 1e. Apply sunscreen (SPF 15+) if exposure to sun for 30 minutes or more is expected.
	1f. EXPOSURE: Weather related injuries.	1f. Watch for heat stress symptoms (muscle cramping, exhaustion, dizziness, nausea, rapid and shallow breathing). Take breaks in cool places and hydrate as needed. 1f. Watch for cold stress symptoms (severe shivering, slowing of body movement, weakness, stumbling or inability to walk, collapse). Take breaks in warm areas as needed. 1f. Wear clothing appropriate for weather and temperature conditions (e.g., rain jackets, snow pants, multiple layers). 1f. If lightning is observed, wait 30 minutes in a sheltered location (car is acceptable) before resuming work.
	1g. EXPOSURE: Personal injury from noise hazards.	1g. Wear hearing protection if sound levels exceed 85 dBA (if you must raise your voice for normal conversation).

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[3] Using the first two columns as a guide, decide what actions or procedures are necessary to eliminate or minimize the risk. List the recommended safe operating procedures. Say exactly what needs to be done - such as "use two persons to lift". Avoid general statements such as, "be careful".

JOB SAFETY ANALYSIS	Ctrl. No. GEN-019	DATE: 4/10/2023	☐NEW ☒REVISED	PAGE 1 of 2

JSA TYPE CATEGORY	WORK TYPE	WORK ACTIVITY (Description)
GENERIC	**Site Reconnaissance**	**Site Walk and Inspection**

DEVELOPMENT TEAM	POSITION / TITLE	REVIEWED BY:	POSITION / TITLE
Sara Barrientos	Project Geologist	Brian Hobbs	Corporate Health and Safety Director
Tim Unalp	SHSO	Joe Duminuco	Executive Vice President

REQUIRED AND / OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT

☐ LIFE VEST ☒ HARD HAT ☐ LIFELINE / BODY HARNESS ☒ SAFETY GLASSES	☐ GOGGLES ☐ FACE SHIELD ☒ HEARING PROTECTION: ear plugs as necessary ☒ SAFETY SHOES: Steel or composite toed	☐ AIR PURIFYING RESPIRATOR ☐ SUPPLIED RESPIRATOR ☒ PPE CLOTHING: High-visibility vest or high-vis outerwear	☒ GLOVES: Leather/cut-resistant/chemical resistant ☒ OTHER: Tyvek and rubber boots as necessary, dust mask as necessary

REQUIRED AND / OR RECOMMENDED EQUIPMENT

Required Equipment: Site map, emergency contact list, documentation of urgent care/hospital routes and / or guide familiar with Site, operating cell phone or walkie-talkie if Site allows, and bug spray.

Commitment to Safety – All personnel onsite will actively participate in SPSA performance by verbalizing SPSAs throughout the day.

EXCLUSION ZONE (EZ): Maintain Minimum Heavy Equipment Exclusion Zone around equipment and loads while it is in motion. The HEEZ must be greater than the swing zone of any moving part of the equipment, tip zone of the equipment, fall zone of the equipment and contents, distance that debris may travel during demolition activities and/or foot print of a structure to be demolished.

SITE SECURITY: Prior to site inspection verify appropriate method to address Site Security concerns as it relates to potential criminal activity, homeless population, and/or isolation concerns. Work with the Project Principal and/or Project Manager to address appropriately.

Assess [1]JOB STEPS	Analyze [2]POTENTIAL HAZARDS	Act [3]CRITICAL ACTIONS
1. Check in with Site contact.	**1a. CONTACT/EXPOSURE/FALL:** Personal injury caused by lack of awareness of site-specific hazards.	1a. Inquire about hazards and other activities taking place at the Site. 1a. Inform Site contact of work scope, timeline and location(s). 1a. Discuss emergency evacuation procedures and muster points with Site contact.
2. Traversing the Site	**2a. CONTACT:** Property damage and personal injury caused by obstructions/vehicles or unauthorized personnel at remote Sites.	2a. All equipment must be stowed and secured prior to moving. 2a. Maintain speed limit as posted on-site. 2a. When possible, drive on established roadways. 2a. Yield to all pedestrians. 2a. Use pull-through spots or back into parking spots. 2a. Don high visibility clothing/safety vest. If working at remote Site, add orange accessories during hunting season.
	2b. FALL: Uneven terrain and weather conditions. Overgrown shrubs and vines. Equipment in the work zone.	2b. Inspect walking path for uneven terrain, weather-related hazards (i.e., ice, puddles, snow, etc.), and obstructions prior to mobilizing equipment. 2b. When possible, use established pathways and walk on stable, secure ground. 2b. Communicate traversing hazards with others.
	2c. OVEREXERTION: Muscle strain while carrying equipment.	2c. When carrying equipment to/from work area, use proper lifting techniques; keep back straight, lift with legs, keep load close to body, never reach with a load. Ensure that loads are balanced to reduce the potential for muscle strain. Use the buddy system or mechanical means to maneuver items heavier than 50-lb. If necessary, make multiple trips to carry equipment.
	2d. EXPOSURE: Biological hazards – ticks; bees/wasps; poison ivy; insects; (Ticks are most active any time the temperature is above freezing, typically from March to November.)	2d. Inspect area to avoid contact with biological hazards. 2d. Ticks: • Treat outer clothing including pants, shirts, socks, boots and hats the evening before with Permethrin (allowing at least two hours before use). • Apply DEET to exposed skin before travelling to the Site and reapply after two hours. • Check for ticks during and after work. 2d. Bees: • Use bee spray as appropriate to deter/eliminate bees.

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	2e. EXPOSURE: Heat Stress & Cold Stress. Personal injury from working in inclement weather conditions.	• Protect exposed skin with insect repellent. 2d. Poison Ivy: • Identify areas of poison ivy and spray with weed killer. Don Tyvek and rubber boots while traversing poison ivy areas. • If skin contacts poison ivy, wash skin thoroughly with soap and water. 2e. Wear sunscreen with SPF 15 or greater on exposed skin whenever 30 minutes or more of sun exposure is expected. 2e. Watch for heat stress symptoms (muscle cramping, exhaustion, dizziness, rapid and shallow breathing). Take breaks as needed. 2e. Watch for cold stress symptoms (severe shivering, slowing of body movement, weakness, stumbling or inability to walk, collapse). Take breaks as needed. 2e. Wear appropriate rain gear as needed. 2e. Take frequent breaks if tired, wet, or cold/hot. Drink water. 2e. If lightning is observed, wait 30 minutes after last thunder boom/lightning bolt in a sheltered location (car acceptable) before starting work again.
3. Walking near heavy equipment and machinery.	**3a. CONTACT:** Personal injury from Site and roadway traffic. Personal injury from flying debris **3b. OVEREXERTION:** Personal injury from lifting/moving/rotating equipment. **3c. EXPOSURE:** Hearing damage from noise generating equipment/processes. Inhalation/exposure to hazardous vapors and or dust. **3d. EXPOSURE:** Working in a remote area.	3a. See 2a. 3a. Maintain an exclusion zone of at least 10'-25' feet from all engaged equipment. 3a. Keep body parts out of the line-of-fire of pinch points. 3a. Wear appropriate PPE always. 3b. See 2c. 3c. Wear hearing protection if >85 dBA. (i.e. noise levels which require you to raise your voice to communicate) 3c. Always wear leather gloves when handling any tools or equipment. 3c. Always wear appropriate PPE based off chemicals present. 3d. Use the "buddy system" whenever possible. If working alone, contact PM upon arrival/departure, as well as during work activities prior to commencing work if applicable. 3d. Always carry a communication device (i.e., cell phone, walkie-talkie) or directional (i.e., map, compass, etc.) when traversing remote areas. 3d. If available, follow Lone Worker Protocol/Procedure.
4. Working in adverse weather conditions.	**4a. EXPOSURE:** Heat Stress & Cold Stress. Personal injury from working in inclement weather conditions.	4a. Watch for heat stress symptoms (muscle cramping, exhaustion, dizziness, rapid and shallow breathing). Take breaks as needed. 4a. Watch for cold stress symptoms (severe shivering, slowing of body movement, weakness, stumbling or inability to walk, collapse). Take breaks as needed. 4a. Wear appropriate rain gear as needed. 4a. Take frequent breaks if tired, wet, or cold/hot. Drink water. 4a. If lightning is observed, wait 30 minutes after last thunder boom/lightning bolt in a sheltered location (car acceptable) before starting work again.
5. Departing Site.	**5a. EXPOSURE:** Exposure to unnecessary hazards should personnel believe Roux is on-Site during an emergency and conduct a search.	5a. Sign out or notify Site contact and Roux Project Manager of your departure.

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[3] Using the first two columns as a guide, decide what actions or procedures are necessary to eliminate or minimize the risk. List the recommended safe operating procedures. Say exactly what needs to be done - such as "use two persons to lift". Avoid general statements such as, "be careful".

JOB SAFETYANALYSIS Ctrl. No. GEN-020	DATE: 04/11/2023	☐NEW ☒REVISED	PAGE 1 of 2

JSA TYPE CATEGORY:	WORK TYPE:	WORK ACTIVITY (Description):	
GENERIC	**Gauging & Sampling**	**Soil Sampling**	
DEVELOPMENT TEAM	**POSITION / TITLE**	**REVIEWED BY:**	**POSITION / TITLE**
MaryBeth Lyons	Project Scientist	Brian Hobbs	CHSD
Tim Unalp	SHSO		

REQUIRED AND / OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT

☐ LIFE VEST ☒ HARD HAT ☐ LIFELINE / BODY HARNESS ☒ SAFETY GLASSES ☒ FLAME RESISTANT CLOTHING (as needed)	☐ GOGGLES ☐ FACE SHIELD: ☒ HEARING PROTECTION: (as needed) ☒ SAFETY SHOES: Composite-toe or steel toe boots	☐ AIR PURIFYING RESPIRATOR ☐ SUPPLIED RESPIRATOR ☒ PPE CLOTHING: Fluorescent reflective vest or high visibility clothing	☒ GLOVES: Leather, Nitrile and cut resistant ☒ OTHER: Insect repellant, sunscreen (as needed)

REQUIRED AND / OR RECOMMENDED EQUIPMENT

Recommended Equipment: 42" traffic cones, caution tape, trowel

COMMITMENT TO SAFETY- All personnel onsite will actively participate in hazard recognition and mitigation throughout the day by verbalizing SPSAs.

EXCLUSION ZONE (EZ): Maintain Minimum Heavy Equipment Exclusion Zone around equipment and loads while it is in motion. The HEEZ must be greater than the swing zone of any moving part of the equipment, tip zone of the equipment, fall zone of the equipment and contents, distance that debris may travel during demolition activities and/or foot print of a structure to be demolished.

Assess [1]JOB STEPS	Analyze [2]POTENTIAL HAZARDS	Act [3]CRITICAL ACTIONS
1. Secure location	**1a. CONTACT:** Personnel and vehicular traffic may enter the work area.	1a. If in an area with foot or vehicle traffic, delineate the work area with 42" traffic cones and/or caution tape to prevent exposure to traffic and inform others of work activity. 1a. Wear reflective vest and/or high visibility clothing. 1a. Face the direction of any vehicular traffic. Position vehicle to protect worker from traffic. 1a. Communicate work activity with adjacent work areas.
	1b. FALL: Tripping/falling due to uneven terrain or entry/exit from excavations.	1b. Inspect pathways and work area for uneven terrain, weather-related hazards (i.e., ice, puddles, snow, etc.), and obstructions. 1b. Use established pathways and walk on stable, secure ground. 1b. Stage equipment and tools in a convenient, stable, and orderly manner. Store equipment at lowest potential energy. 1b. Roux employees should stay 5 feet from in-progress excavations and trenches. Should entry to an excavation be required (when stabilization is complete), ladders must be employed for steep embankments, excavations, pits, and trenches.
	1c. EXPOSURE: Exposure to sun and excessive heat, possibly causing sunburn, heat exhaustion or heat stroke. Exposure to cold temperatures possibly causing cold stress. Skin burn as a result of fire, if applicable. Exposure to explosive vapors due to tank farm operations. Exposure to airborne dust due to high wind speeds. Biological hazards - ticks, bees/wasps, poison ivy, thorns, insects, etc.	1c. Wear sunscreen with an SPF 15 or greater whenever 30 minutes or more of exposure is expected. 1c. Use a tent to shade the work area from direct sunlight particularly when warm temperatures are expected. 1c. Be aware of the location of all Site personnel. 1c. Watch for heat stress symptoms (muscle cramping, exhaustion, dizziness, rapid and shallow breathing). 1c. Watch for cold stress symptoms (severe shivering, slowing of body movement, weakness, stumbling or inability to walk, collapse). 1c. Take breaks for rest and water as necessary. Move to an area that is well shaded or a climate controlled area (i.e., car, site trailer, etc.). 1c. No open flames/heat sources. 1c. Conduct air monitoring and ensure that harmul vapor concentrations are within the levels detailed in the Site Specific HASP. Follow procedures detailed in HASP for exceedances. 1c. Flame retardant clothing must be worn when specified by Site policy. 1c. Cell phones should be disabled when specified by Site policy. 1c. Pre-treat field clothing with Permethrin prior to site visit to kill ticks and insects. 1c. Wear long sleeved shirts and tuck in (or tape) pant legs into socks or boots to prevent ticks from reaching skin. 1c. Spray insect repellant containing DEET on exposed skin when working in overgrown areas of the Site. 1c. Inspect area to avoid contact with biological hazards. 1c. Wear cut-resistant gloves when handling branches, shrubs, etc. that may lie within the walking path. 1c. Wear spoggles if the average wind speeds are above 15 mph. 1c. Personnel shall examine themselves and co-worker's outer clothing for ticks periodically when onsite. 1c. If skin comes in contact with poison ivy, wash skin thoroughly with soap and water. If rash persists after washing, immediately notify your supervisor, the OM and OHSM for possible consultation with a physician at an approved Occupational Health Clinic.

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[3] Using the first two columns as a guide, decide what actions or procedures are necessary to eliminate or minimize the risk. List the recommended safe operating procedures. Say exactly what needs to be done - such as "use two persons to lift". Avoid general statements such as, "be careful".

Assess [1]JOB STEPS	Analyze [2]POTENTIAL HAZARDS	Act [3]CRITICAL ACTIONS
2. Collect Soil Sample	**2a. CONTACT:** Personal injury from pinch points, cuts, and abrasions from sampling equipment tools, and material within soil sample. Personal injury from contact with moving equipment while sampling. Personal injury from contact with glass sample jars.	2a. Wear cut-resistant (i.e., Kevlar) gloves under chemical-resistant (nitrile) disposable gloves when handling soil samples and sampling jars. 2a. Where possible, use trowel or equivalent tool to avoid contact with soil. 2a. If sampling from bucket of heavy equipment, ensure all equipment is off and operator utilizes the “show me your hands” policy. 2a. See 1a.
	2b. EXPOSURE: Exposure to contamination (impacted soil) and/or lab preservatives.	2b. Wear chemical-resistant (nitrile) disposable gloves over cut resistant gloves to protect hands when handling samples; use containment material or plastic sheeting to protect surrounding areas. 2b. Wear safety glasses to protect eyes from dust or air-borne contaminants that may results from disturbing the soil. 2b. Where possible, remain upgradient from sample location if collecting soil sample from stockpile, drill rig, etc. to avoid breathing contaminant vapors, if they are present. 2b. When collecting soil sample from hand auger, put large zip lock bag over entire auger to prevent spillage of soil on to the ground. 2b. Open sample jars slowly and fill carefully to avoid contact with preservatives.
	2c. EXERTION: Exertion due to repetitive motion and ergonomics.	2c. Utilize a table or raised surface for soil sampling if multiple soil samples are going to be taken to minimize repetitive bending motion.
3. Decontaminate equipment	**3a. EXPOSURE/CONTACT:** Contamination (e.g., Separate Phase Hydrocarbons (SPH), contaminated vapors and/or soil). **3b. EXPOSURE:** Chemicals in cleaning solution including ammonia.	3a. Wear chemical-resistant (nitrile) disposable gloves and safety glasses. 3a. Use an absorbent pad to clean spills. 3a. Properly dispose of used materials/PPE in provided drums in designated drum storage area. 3a. Remain upwind of sample and avoid breathing contaminant vapors, if they are present. 3b. Wear chemical-resistant (nitrile) disposable gloves and safety glasses. 3b. Work on the upwind side of decontamination area. 3b. Use an absorbent pad to clean spills. 3b. Properly dispose of used materials/PPE in provided drums in designated drum storage area. Ensure that all drums are properly labeled and secured.

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JOB SAFETY ANALYSIS	Ctrl. No. GEN-023	DATE: 04/11/2023	☐ NEW ☒ REVISED	PAGE 1 of 2

JSA TYPE CATEGORY	WORK TYPE	WORK ACTIVITY (Description)	
Generic	**Construction**	**Spotting Heavy Machinery**	
DEVELOPMENT TEAM	**POSITION / TITLE**	**REVIEWED BY:**	**POSITION / TITLE**
Levi Curnutte	Senior Scientist	Brian Hobbs	CHSD
Tim Unalp	SHSO		

REQUIRED AND / OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT

☐ LIFE VEST	☐ GOGGLES	☐ Particulate Respirator	☒ GLOVES: Cut resistant / leather
☒ HARD HAT	☐ FACE SHIELD	☐ SUPPLIED RESPIRATOR	☐ OTHER:
☒ LONG SLEEVED SHIRT	☐ HEARING PROTECTION	☒ PPE CLOTHING: Fluorescent reflective clothing	
☐ LIFELINE / BODY HARNESS	☒ SAFETY SHOES: Steel-/Composite-toe boots/shoes		
☒ SAFETY GLASSES			

REQUIRED AND / OR RECOMMENDED EQUIPMENT

Heavy Machinery (i.e. excavator, payloader, truck, forklift, etc.), two-way radios.

COMMITMENT TO SAFETY- All personnel onsite will actively participate in hazard recognition and mitigation throughout the day by verbalizing SPSAs

EXCLUSION ZONE (EZ): Maintain Minimum Heavy Equipment Exclusion Zone around equipment and loads while it is in motion. The HEEZ must be greater than the swing zone of any moving part of the equipment, tip zone of the equipment, fall zone of the equipment and contents, distance that debris may travel during demolition activities and/or foot print of a structure to be demolished.

Assess [1]JOB STEPS	Analyze [2]POTENTIAL HAZARDS	Act [3]CRITICAL ACTIONS
1. Prepare for machine activity.	**1a. CONTACT:** Obstructions in the work area may create contact hazards from machinery. **1b. Fall :** Slip/Trip/Fall	1a. Cordon off the work area with safety barrels/cones and a rigid barrier (snow fence, traffic bar, etc.). Communicate that only necessary personnel should be in the work area. Spotter and equipment operator shall enforce the **EZ.** Operator will not operate but shall remain in the hands-off mode while personnel are within the exclusion zone. 1b. Ensure that work area is flat, level and clear of any obstructions or debris before setting up work zone.
2. Spotting.	**2a. CONTACT:** Machine or load contact with personnel, property, or machinery.	2a. Discuss the specifics of the work with the operator and be clear about any hand signals that will be used. Clearly discuss the limits of the assigned work area and the machine's Exclusion Zone. Maintain Exclusion Zone. The Exclusion Zone shall be delineated by using 42-inch traffic cones/barrels and a fixed rigid barrier. 2a. The Minimum Heavy Equipment Exclusion zone is greater than the swing/tip radius of equipment. 2a. Both the spotter and equipment operators shall have 2-way radios/cellular devices on their persons to ensure audible communication in the event any changes or new hazards may arise. 2a. All workers should stay outside of the Exclusion Zone of all equipment unless operator is stopped and in "Hands Off" mode. **(This includes the spotter unless an exception has been established in the Site-specific JSA).** If the Exclusion Zone must be reduced due to work area restrictions, then the spotter and operator shall enforce the reduced Exclusion Zone. 2a. Spotters must make eye contact with the machine operator or all movement ceases until visual contact can be reestablished. 2a. Spotter shall keep an eye out for any issues with the machine the operator may not see and communicate with other work crews and spotters on behalf of the operator. 2a. If the spotter needs to take a break, he must find a replacement before leaving or have the machine stop operations. **No heavy equipment shall operate without a spotter under any circumstances.** 2a. Wear fluorescent clothing/safety vest. 2a. **Do not multitask. Only perform Spotting**

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Assess [1]JOB STEPS	Analyze [2]POTENTIAL HAZARDS	Act [3]CRITICAL ACTIONS
	2b. FALL: Slip/Trip/Fall	2b. Look where walking to identify and avoid slip/trip/fall hazards. Avoid icy and/or wet surfaces. Remove obstacles if possible. 2b. Use designated walkways during spotting whenever possible. 2b. **Do not walk backwards. Always face the direction you are walking towards.**
	2c. CAUGHT: Caught between machinery and nearby objects.	2c. **Maintain Exclusion Zone.** Do not stand between large, loose or fixed objects or structures and the machinery while it is in motion. Keep in sight of operator at all times while being aware of surrounding structures.
	2d. EXPOSURE: Inhalation of exhaust from machinery.	2d. The spotter will position him/herself upwind of the working machinery, when possible. Spotter will also inform others working within the vicinity of the EZ of proper positioning, if applicable.

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JOB SAFETY ANALYSIS	Ctrl. No. GEN-025	DATE: 04/11/2023	☐ NEW ☒ REVISED	PAGE 1 of 1

JSA TYPE CATEGORY	WORK TYPE	WORK ACTIVITY (Description)
Generic	**General**	**Trucking**

DEVELOPMENT TEAM	POSITION / TITLE	REVIEWED BY:	POSITION / TITLE
Lauren Dolginko	Project Geologist	Brian Hobbs	CHSD
Tim Unalp	SHSO		

REQUIRED AND / OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT

☐ LIFE VEST	☐ GOGGLES	☐ AIR PURIFYING RESPIRATOR	☒ GLOVES: Leather or cut resistant
☒ HARD HAT	☐ FACE SHIELD	☐ SUPPLIED RESPIRATOR	☐ OTHER
☐ LONG SLEEVED SHIRT	☐ HEARING PROTECTION	☒ PPE CLOTHING: Fluorescent reflective vest or high visibility long sleeved clothing	
☐ LIFELINE / BODY HARNESS	☒ SAFETY SHOES: Steel-toe boots		
☒ SAFETY GLASSES			

REQUIRED AND / OR RECOMMENDED EQUIPMENT

Heavy equipment (i.e. trucks)

COMMITMENT TO SAFETY- All personnel onsite will actively participate in Hazard recognition and mitigation throughout the day by verbalizing SPSAs.

EXCLUSION ZONE (EZ): Maintain Minimum Heavy Equipment Exclusion Zone around equipment and loads while it is in motion. The HEEZ must be greater than the swing zone of any moving part of the equipment, tip zone of the equipment, fall zone of the equipment and contents, distance that debris may travel during demolition activities and/or foot print of a structure to be demolished.

Assess [1]JOB STEPS	Analyze [2]POTENTIAL HAZARDS	Act [3]CRITICAL ACTIONS
1. Set up work zone.	**1a. CONTACT:** Personal injury/property damage caused by obstruction/vehicle.	1a. Establish work zone for manifesting/paperwork by communicating with workers before task begins. Maintain a minimum **Exclusion Zone (EZ)** around all heavy equipment.
2. Loading of truck.	**2a. CONTACT:** Rolling Vehicle could cause bodily harm.	2a. All commercial vehicles without an operator must have their engines off and wheels chocked. Truck and loading area should be on level and stable ground.
	2b. CONTACT: Machine or load may crush personnel, property or machinery.	2b. All machines (Excavator, Lull, Backhoe) must have a spotter. Spotter must communicate contact hazards such as other personnel in the work area, objects in the machine's blind spot, and overhead lines to the operator. Spotter and operator should have 2-way radios or established hand signals to communicate when needed. 2b. Loads must not be swung over other vehicles or personnel. 2b. Maintain **EZ** around all equipment.
	2c. CONTACT: Load shifting during travel.	2c. Secure all loads prior to moving the truck with chains or straps or cribbing. 2c. Any loose soil or debris should be cleaned off truck sides prior to truck mobilization. 2c. All truck beds must be secured prior to traveling.
3. Dumping loads.	**3a. CONTACT:** Truck may flip sideways or backwards.	3a. All workers must stay behind and away from the side of trucks that are dumping to avoid contact with flying debris and the truck potentially tipping sideways or backwards. EZ must be maintained equal to the height of bed while lifted.
4. Exchanging paperwork with truck driver.	**4a. CONTACT/CAUGHT:** Broken bones from contact by vehicle.	4a. Truck driver should exit truck with proper PPE, using the three-point stance, and enter the established work zone to complete paperwork. If Site-specific safety prohibits drivers from exiting the truck, wait until truck is finished loading, with engine turned off, before approaching truck. 4a. Always establish eye contact with driver prior to approaching truck. 4a. Confirm sides of truck have been cleaned/brushed off prior to approaching truck.
	4b. FALL: Slip, Trip or Fall may cause muscle strains or tears, abrasions or lacerations, or broken bones.	4b. Survey walking route to identify slip/trip/fall hazards. Avoid icy/wet surfaces. Remove slip/trip/fall hazards if present. 4b. Communicate with driver and spotter prior to approaching truck. Maintain **EZ** around all heavy equipment.

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[3] Using the first two columns as a guide, decide what actions or procedures are necessary to eliminate or minimize the risk. List the recommended safe operating procedures. Say exactly what needs to be done - such as "use two persons to lift". Avoid general statements such as, "be careful".

JOB SAFETY ANALYSIS	Ctrl. No. GEN-026	DATE: 04/11/2023	☐ NEW ☒ REVISED	PAGE 1 of 2

JSA TYPE CATEGORY	WORK TYPE	WORK ACTIVITY (Description)
GENERIC	**O&M**	**Vac Truck Product Pump Out of ASTs and Drums**

DEVELOPMENT TEAM	POSITION / TITLE	REVIEWED BY:	POSITION / TITLE
Alfredo Fernandez	Staff Scientist	Brian Hobbs	CHSD
Tim Unalp	SHSO		

REQUIRED AND / OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT

☐ LIFE VEST	☐ GOGGLES	☐ AIR PURIFYING RESPIRATOR	☒ GLOVES: Cut Restant / Leather / Nitrile / Chemical resistant
☒ HARD HAT	☐ FACE SHIELD	☐ SUPPLIED RESPIRATOR	☐ OTHER
☒ LIFELINE / BODY HARNESS	☒ HEARING PROTECTION	☒ PPE CLOTHING: High Visibility clothing, Tyvek suit (if needed), fire retardant suit	
☒ SAFETY GLASSES	☒ SAFETY SHOES: Steel or composite toed		

REQUIRED AND / OR RECOMMENDED EQUIPMENT

Required Equipment: vac hoses, 5-gas meter (multi-gas meter), 20 lb. Type ABC fire extinguishers, safety cones, rigid barriers
Recommended: sunscreen/bug repellent (as needed)

COMMITMENT TO SAFETY- All personnel onsite will actively participate in hazard recognition and mitigation throughout the day by verbalizing SPSAs.

EXCLUSION ZONE (EZ): Maintain Minimum Heavy Equipment Exclusion Zone around equipment and loads while it is in motion. The HEEZ must be greater than the swing zone of any moving part of the equipment, tip zone of the equipment, fall zone of the equipment and contents, distance that debris may travel during demolition activities and/or foot print of a structure to be demolished.

Assess [1]JOB STEPS	Analyze [2]POTENTIAL HAZARDS	Act [3]CRITICAL ACTIONS
1. Calibrate multi-gas meter	**1a. EXPOSURE:** Calibration gas.	1a. Outside of work area calibrate the multi-gas meter while wearing nitrile gloves and safety glasses. 1a. Ensure calibration gas is contained. Avoid inhalation of the gas.
2. Perform Vac Truck Inspection	**2b. CONTACT:** With personnel and structures	2a. Don appropriate PPE including high visibility clothing. 2a. Prior to moving truck, perform a visual check of the critical parts with the driver and complete appropriate checklist.
3. Setup Vac Truck and Work area	**3a. CONTACT:** With personnel and structures.	3a. Don high visibility clothing. 3a. Prior to moving truck, review where truck is to be positioned and secure work area with 42" traffic cones and rigid barrier/snow fence. 3a. Review hand signals with driver prior to backing and use a spotter at all times while moving the vehicle. 3a. Chock wheels once in place.
	3b. CAUGHT: In the line of fire of vac truck while backing. Caught in pinch points while making hose connections.	3b. Back up spotter must position self to "leave an out". Stay out of the line-of-fire of the truck. 3b. Keep hands clear of potential pinch points while making hose connections (i.e., cam fittings); wear cut-resistant gloves.
	3c. SLIP/TRIP/FALL: Hazards from any debris in the immediate area.	3c. Inspect work area for slip, trip or fall hazards and remove or delineate. Designate a walking path free of debris. 3c. Stage tools and equipment out of walking surfaces to prevent slip/trip/falls. Maintain good housekeeping. 3c. Minimize vac hose/bond wire lengths and setup outside of walking paths.
	3d. EXPOSURE: Biological hazards. Contaminants in or on vac hose Loud noise from truck.	3d. Inspect work area for signs of biological inhabitation (insect nests or activity, animal signs). 3d. Use permethrin and DEET when working in grassy locations to prevent tick and insect exposure. 3d. Wear light clothing when possible and conduct a tick/insect check routinely. 3d. Wear nitrile gloves and keep hose clean with absorbent pads. 3d. Minimize duration or work around loud equipment if possible. Don hearing protection when noise levels exceed 85 dBA.
	3e. ERGONOMICS: From setting up work area and vac hoses.	3e. Utilize correct body positioning (i.e., knees bent, back straight, shoulders square). 3e. Do not reach more than an arm's length away to obtain an item. 3e. Use the buddy system to maneuver loads heavier than 50lbs.
	3f. ENERGY: Static electricity.	3f. Verify truck is bonded to vessel that is being vacuumed and that the truck is grounded.

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[3] Using the first two columns as a guide, decide what actions or procedures are necessary to eliminate or minimize the risk. List the recommended safe operating procedures. Say exactly what needs to be done - such as "use two persons to lift." Avoid general statements such as, "be careful."

Assess [1]JOB STEPS	Analyze [2]POTENTIAL HAZARDS	Act [3]CRITICAL ACTIONS
4. Perform Vac Activities.	**4a. SLIP/TRIP/FALL:** Hazards from any debris in the immediate area.	4a. Maintain distance of 10 feet from vac hose/truck while operating. 4a. Ensure vac truck wheels are chocked.
	4b. CAUGHT: In crush/pinch points associated with vac truck valve handles.	4b. Keep hands clear of potential pinch points while making hose connections (i.e., cam fittings); wear cut-resistant gloves.
	4c. TRIP/SLIP/FALL: Hazards from any debris in the immediate area.	4c. See 3c.
	4d. EXPOSURE: Liquids, noise, and vapors.	4d. Secure hose connections prior to beginning vac activities (cam-lock couplings fully latched and locking pins in place). 4d. Upon completing vac activities, wipe down equipment with absorbent pads, as necessary. 4d. Don nitrile gloves while handling impacted equipment. 4d. Monitor breathing zone with multi-gas meter. 4d. Minimize duration or work around loud equipment if possible. Don hearing protection if noise exceeds 85 dBA.
4. Obtain tank level measurement / Pack truck for departure.	**5a. SLIP/TRIP/FALL:** From tools and equipment in the work area. Climbing fixed ladder to gauge truck.	5a. See 3c. 5a. Prior to ascending truck ladder, verify that it is secure and in good condition (i.e., all steps intact, no signs of rot, no missing hardware). Use three points of contact at all times. 5a. If vac truck is equipped with a catwalk and guardrails, verify that they are structurally sound. 5a. Don harness and attach lanyard to anchor point if truck is not equipped with catwalk around hatch of truck. Inspect harness and lanyard for tears prior to use.
	5b. ERGONOMICS: Opening vac truck hatch.	5b. See 3e.
	5c. EXPOSURE: Petroleum-impacted materials.	5c. Wipe down gauge stick over hatch so as not to drip liquids on truck or ground. 5c. See 4d.
	5d. CAUGHT: Pinch points when closing hatch, storage boxes.	5d. See 4b.

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JOB SAFETY ANALYSIS	Cntrl. No. GEN-027	DATE: 04/11/2023	☐ NEW ☒ REVISED	PAGE 1 of 2

JSA TYPE CATEGORY	WORK TYPE	WORK ACTIVITY (Description)
GENERIC	**Drilling**	**Pre-Drilling Clearance, Vactron and Air Knife**

DEVELOPMENT TEAM	POSITION / TITLE	REVIEWED BY:	POSITION / TITLE
Courtney Rempfer	Project Scientist	Joseph Midwig	Senior Engineer
Sara Redding	Senior Hydrogeologist	Brian Hobbs	CHSD

REQUIRED AND / OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT

☐ LIFE VEST ☒ HARD HAT ☐ LIFELINE / BODY HARNESS ☒ SAFETY GLASSES	☐ GOGGLES ☒ FACE SHIELD (While Air Knifing) ☒ HEARING PROTECTION (As needed) ☒ SAFETY SHOES: Composite toe or steel toe boots	☐ AIR PURIFYING RESPIRATOR ☐ SUPPLIED RESPIRATOR ☒ PPE CLOTHING: Fluorescent reflective vest or high visibility clothing; long-sleeve shirt	☒ GLOVES: Leather, Nitrile, cut-resistant ☒ OTHER: Dusk mask, insect repellant, sunscreen (as needed)

REQUIRED AND / OR RECOMMENDED EQUIPMENT

Vac-Truck or Vac Drum, Compressor, Jack Hammer, Air Knife. Circular Saw, Hand Tools, Dust Mask, Photoionization Detector, Multi Gas Meter, 42 inch safety cones and flags, Retractable Cone Bars, Caution Tape, 20 lb. Fire Extinguisher, "Work Area" Signs, Pressurized Water Sprayer

Commitment to Safety – All personnel onsite will actively participate in hazard recognition and mitigation throughout the day by verbalizing SPSAs

EXCLUSION ZONE: All non-essential personnel will maintain a distance of 10 feet from drilling equipment while equipment is moving/engaged

Assess [1]JOB STEPS	Analyze [2]POTENTIAL HAZARDS	Act [3]CRITICAL ACTIONS
1. Verify pre-clearance protocol	**1a. CONTACT:** Underground utility damage; property damage; personal injury.	1a. Confirm that (if applicable) "Call Before You Dig" and local utility companies were contacted prior to starting work in order to confirm utility mark outs. Must have a case # before digging. 1a Walk the Site to evaluate utility markings and review maps (see Site Walk Inspection JSA - GEN-019). Utilities are not always properly marked out, ensure use of observational skills through the pre-clearing checklist. 1a. Review pre-clearing checklist form and sub-surface clearance form. Pre-clearing protocol indicates that clearance must be conducted to a minimum of 5 vertical feet below ground surface or 10 vertical feet below ground surface in the critical zone using hand tools.
	1b. ENERGY SOURCE/CONTACT: Property damage; Pressurized water mains may cause lacerations or broken bones. Pressurized gas mains may explode causing serious injury, or death. Underground electric may cause severe burns, shock, or death.	1b. Pre-clearing of each soil boring/monitoring well location must be conducted to a minimum of 5 vertical feet below the ground surface (10 feet minimum for Critical Zone) using hand tools (shovel and non-metallic dig bar and hand auger) prior to drilling. Supervisor should be contacted to discuss appropriate pre-clearing depth. 1b. MUST Complete subsurface clearance checklist prior to pre-clearance.
	1c. FALL: Slip, Trip or Fall may cause muscle strains or tears, abrasions, lacerations, or broken bones.	1c. Be aware of the conditions when walking or loading equipment and working. Walk within established pathway avoiding uneven surfaces. Remove potential slip/trip/fall hazards.
2. Mobilize/demobilize and establish work area	**2a. SEE MOBILIZATION / DEMOBILIZATION JSA – GEN-015**	2a. See Mobilization / Demobilization JSA.
3. Concrete saw cutting, jack hammer and hand clearance with hand tools, air knife	**3a. CONTACT:** Flying debris striking face or body	3a Maintain 10' minimum exclusion zone. Use the required PPE (i.e., leather/cut proof gloves, safety glasses/face shield). 3a. Use anti-whip devices on compressor hoses. Ensure hose couplings are secure. 3a Wear a face shield to protect face from flying debris when using air knife. 3a. Utilize a traffic cone, cage or physical barriers over the hole during air knife activities to keep flying debris close to ground.
	3b. EXPOSURE: Inhalation/exposure to hazardous vapors and/or concrete dust, noise exposure	3b. Monitor breathing zone with a calibrated PID and/or multi-gas meter. If meters sustain readings greater than recommeneded in the HASP for the specific contaminant of concerns (COCs) the Roux field personnel must temporarily cease work, instruct all Site personnel to step away from the area of elevated readings. Contact PM. 3b. Wet concrete while using saw to minimize dust and wear dust mask to prevent inhalation. 3b. Stand upwind and keep body behind saw. Observers and helpers should avoid line-of-fire for saw blade. Always cut away from body. 3b. No open flames/heat sources.

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	3c. ENERGYSOURCE/CONTACT: Property damage; Pressurized water mains may cause lacerations or broken bones. Pressurized gas mains may explode causing serious injury, or death. Underground electric may cause severe burns, shock, or death.	3b. Wear hearing protection when saw, jackhammer or air compressor are in operation. Otherwise, if sound levels exceed 85 dbA, put on hearing protection. 3c. For air knifing, ensure extention/lance tip reaches the full 5 feet bgs. Air knife should be advanced **AT A MINIMUM** in all four corners of the expected boring location to find any possible arrangement of utilities. 3c. Ensure diameter of soil preclearance hole is at a **MINIMUM 2x** the diameter of any drilling or hard dig equipment that will be entering the hole. 3c. See Complete subsurface clearance protocol for information provided above.
	3d. ERGONOMICS/EXERTION: Muscle strain due to poor body positioning when handling equipment and materials	3d. Use body positioning and lifting techniques that minimizes muscle strain; keep back straight, lift with legs, keep load close to body, and never reach with a load. 3d. Ensure that loads are balanced to reduce the potential for muscle strain. 3d. Two people or a mechanical lifting aid are required when lifting objects over 50 lbs. or when the shape makes the object difficult to lift.
	3e. FALL: Tripping/falling due to uneven terrain, weather conditions, and materials/equipment stored at the Site	3e. Inspect walking path for uneven terrain, weather-related hazards (i.e., ice, puddles, snow, etc.), and obstructions prior to mobilizing equipment. Mob/Demob JSA. 3e. Do not climb over stored materials/equipment; walk around. Practice good housekeeping. 3e. Use established pathways and walk on stable, secure ground. 3e. Equipment and tools will be stored at the lowest point of potential energy and out of the walkway and immediate work area (i.e. tools should not be propped against walls or nearby equipment or vehicles). 3e. Equipment and tools that are not anticipated to be used will be returned to a storage area that is out of the immediate work area. 3e. Ensure power cords and compressed air lines are grouped when used within the work area. 3e. Pre-cleared location will be finished flush to grade as to prevent a slip/trip hazard or coned and taped off.
	3f. CAUGHT: Amputation points associated with the equipment and vacuum hose	3f. Always wear leather gloves when making connections and using hand tools; wear cut-resistant (i.e., Kevlar) gloves when handling cutting tools. 3f. Inspect the equipment prior to use for potential pinch points. 3f. Test all emergency shutdown devices prior to using equipment. 3f. Inspect saw blade for worn surface or missing teeth; switch blade if damaged or blunt. 3f. Ensure all jewelry is removed, loose clothing is secured, and PPE is secured close to the body. 3f. All non-essential personnel shall maintain a 10 foot exclusion zone; position body out of the line-of-fire of equipment. 3f. Drillers and helpers will understand and use the “Show Me Your Hands Policy”.
4. Move drum to staging area using drum cart	**4a. EXPOSURE/CONTACT:** Contamination (e.g., Separate Phase Hydrocarbons (SPH), contaminated groundwater, soil)	4a. Wear Nitrile chemical-resistant gloves under leather or cut proof gloves. 4a. Do not overfill drums. Ensure that the drum lids are attached securely. 4a. All drums will be staged in the designated storage area.
	4b. EXERTION: Muscle strain while maneuvering drums with drum cart/lift gate	4b. See 3d. Do not overfill drums. Use lift gate on back of truck to load and unload drums. Use drum dolly to move drum.
	4c. CAUGHT: Pinch points associated with handling drum lid	4c. Ensure that fingers are not placed under the lid of the drum. Wear leather gloves or cut proof gloves. Use appropriate ratchet while sealing drum lid.
5. Decontaminate equipment.	**5a. EXPOSURE/CONTACT**: To contamination (e.g., Separate Phase Hydrocarbons (SPH), contaminated groundwater, vapors).	5a. Wear chemical-resistant disposable gloves and safety glasses. 5a. Contain decontamination water so that it does not spill. 5a. Use an absorbent pad to clean spills, if necessary. 5a. Spray equipment from side angle, not straight on, to avoid backsplash. 5a. See 3b.
	5b. EXPOSURE: To chemicals in cleaning solution.	5b. See 4a. Review SDS to ensure appropriate precautions are taken and understood.

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APPENDIX B

SDSs for Chemicals Used

Activated Carbon

Safety Data Sheet

SECTION I

DATE: **November 20, 2017**

SUPPLIER:
Lab Alley LLC
22111 Highway 71 West, Suite 601
Spicewood, Texas 78669
Tel.: 512-668-9918

EMERGENCIES: **InfoTrac: 800-535-5053**

CHEMICAL NAME:
Activated Carbon

CHEMICAL NAME:
CHEMICAL FORMULA: Activated Carbon
SYNONYMS: Coconut Shell Base/Coal / Wood Base Activated Carbon

SECTION II

HAZARDS IDENTIFICATION

OSHA Regulatory Status – Not Regulated

Health Effects – Prolonged over exposure to carbon dust can produce skin and eye irritation. Prolonged inhalation can cause irritation of mucus membranes. **(See Sections IV & XI)**

HMIS INDEX:
HMIS Index details are as follows,

HEALTH: **0**

FLAMMABILITY: **1**

REACTIVITY: **0**

PPE: **E**

GHS CLASSIFICATION

NOTE: Health effects comments refer to the pure component knowing that the concentration on the carbon is significantly less than 100%.

Hazard Symbol	Hazard / Category	Warning
	Respiratory Irritation Category 3 Eye Irritation 2A	Dust causes respiratory, skin and eye irritation. Prolonged or repeated inhalation or ingestion can cause irritation of mucous membranes. Wet activated carbon removes oxygen from air causing a severe hazard to workers in enclosed or confined space.

PRECAUTIONARY STATEMENTS –

Prevention

Avoid generation of dust during handling.
The dust or fines may be more susceptible to catalytic reaction than the large mesh product.
Avoid breathing dust.
Wash thoroughly after handling.
Use in a well ventilated area.
Avoid release to environment.

Response

IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing. Seek medical attention for any breathing difficulty.
IF IN EYES: Rinse cautiously with water for several minutes. Seek medical attention if irritation persists.
CONTACT WITH SKIN: Remove contaminated clothing. Rinse cautiously with soap and water for several minutes. Seek medical attention if irritation persists.
IF INGESTED: Drink a large volume of water; seek medical attention.

Storage

Store in a well-ventilated place.
Keep container tightly closed.

Container Labeling

Lab Alley LLC has added GHS classification information to this SDS document. However, changes to container labeling have not been implemented. Changes to container labels will be made in accordance to the requirements which will be defined by OSHA's revision to the Hazard Communication Standard once final adoption of rule is approved and released. Labels will be provided that include a signal word, pictogram, hazard statement, and precautionary statement for each hazard class and category.

SECTION III

INGREDIENTS:

Chemical Name (CAS#)		%	PEL(OSHA)	TLV(ACGIH)	Other
Carbon*	(7440-44-0)	100	N/A	N/A	N/A

*ACGIH (TWA) for reparable dust is 2.5 mg/m^3

There are no established PEL, TWA or TLV values for this material. Caution should be taken for respirable dust. The product has no known carcinogenic properties.

Non-Hazardous components are recorded at 3% or >; Acute hazards are recorded when present at 1% or >; Chronic hazards are recorded when present at 0.01% or >.

This is not intended to be a comprehensive compositional disclosure.

SECTION IV

EMERGENCY FIRST AID MEASURES:

In ease off ingestion do not induce vomiting. Dilute by giving water or milk.
Seek medical attention.

In case of inhalation remove to fresh air. Administer first aid as appropriate.
Seek medical attention.

In case of skin contact, wash thoroughly with soap and water.
If irritation persists seek medical attention.

In case of eye contact flush with lukewarm water for at least 15 minutes. Lift upper and lower eye lids occasionally.
Seek medical attention.

OTHER:

The effects of chronic and sub-chronic exposure have not been determined. Safe handling on a long-term basis should emphasize protection against respective or long-term exposure to carbon dust inhalation and avoidance of contact to any liquids that may leach off the impregnated carbon.

Affected individuals with pre-existing conditions pertaining to digestive, respiratory, skin or eye problems can be more susceptible to potential effects of carbon dust.

HEALTH HAZARD DATA:

Route (s) of Entry:

Ingestion:	Carbon is non-toxic through ingestion. Dust may cause mild irritation to the digestive tract resulting in nausea or diarrhea.
Inhalation:	The physical nature of carbon may irritate the respiratory system. Dust may cause mild irritation to the upper respiratory tract
Skin:	Carbon *is* non-toxic through skin absorption. Dust may cause mild irritation probably reddening.
Eye Irritation:	The physical nature of carbon may cause eye irritation. Dust may cause mild irritation probably reddening.

SECTION V

FIRE & EXPLOSION DATA:

Flash Point:	N/A
Extinguishing media:	Alcohol foam, CO_2, dry chemical, water.
Special Firefighting procedures:	Exercise caution when responding to any chemical fire. Respiratory protection is essential.

Decomposition Products:	CO may be formed in fire.
Thermal Decomposition:	Sulfur Oxides (SO_x)

FIRE FIGHTING MEASURES:

Flashpoint:	Not Applicable.
Non-flammable:	16CFR1500.44.
Not Self Heating:	UN Manual of Tests and Criteria, Test N.3.
Flammability Limits in Air:	LFL and UFL Not Applicable.

GENERAL HAZARD: Carbon Monoxide and Carbon Dioxide gas may be generated during combustion. Caution is advised.

Contact of activated carbon with strong oxidizers such as ozone or liquid oxygen may cause rapid combustion.

Fire is possible at elevated temperatures or by contact with an ignition with most types of organic solids. Activated carbon is difficult to ignite and when it does, it has a tendency to burn or smolder very slowly without any smoke or flame.

Toxic gases will form upon combustion.

FIRE FIGHTING INSTRUCTIONS: If possible to do safely, move smoldering activated carbon to a non-hazardous area, preferably out of doors. Extinguish fire using water fog, fine water spray, carbon dioxide or foam. Avoid stirring up dust clouds.

FIREFIGHTING EQUIPMENT: Firefighting personnel should wear full protective equipment, including self-contained breathing apparatus (SCBA) for all inside fires and large outdoor fires.

HAZARDOUS COMBUSTION PRODUCTS: Combustion products may include smoke and oxides of carbon (for example, carbon monoxide). Materials allowed to smolder or long periods in enclosed spaces, may produce amounts of carbon monoxide which reach the lower explosive limit (carbon monoxide LEL = 12.5% in air). Under certain conditions, any airborne dust may be an explosion hazard. Used activated carbon may produce additional combustion products.

SECTION VI

SPILL AND/OR ACCIDENTAL RELEASE HANDLING MEASURES:

Reportable Quantities:	No EPA requirements.
Personal Precautions:	Wear protective equipment, keep unnecessary personnel away, and ventilate area of spill.
Environmental Precautions:	The carbon is not soluble in water; however, dust particles can cause a particulate emission if discharged to waterways. Block all entrances to sewers and drains to avoid introducing the material into the waterways.

Steps To Be Taken For Containment & Clean-up:	Block all entrances to sewers and drains. Vacuum, shovel or sweep up spilled material, neutralize and place in closed container for disposal. **Do not release to sewer or waterway** Remove product to appropriate storage area until it can be properly disposed of in accordance with local, state and federal regulations. Avoid formation of dust.
Waste Disposal Method:	Unused product may have a lot pH. Used product may contain hazardous chemicals or hazardous properties that may have to be examined to determine proper disposal method. Dispose in accordance with local, state, and federal regulations.
Disposal Considerations:	Activated carbon, in its original state, is not a hazardous material or hazardous waste. Follow applicable governmental regulations for waste disposal. Used activated carbon may become classified as a hazardous waste depending upon the application. Follow applicable regulations for disposal. Recycling (reactivation) may be a viable alternative to disposal. Contact Carbon Activated Corp. for information.

SECTION VII

STORAGE AND HANDLING INFORMATION:

Storage Temperature:	Ambient
Storage Pressure:	Atmospheric
Handling:	Follow good handling and housekeeping practices to minimize spills, generation of airborne dusts, and accumulation of dusts on exposed surfaces. Use with adequate exhaust ventilation to draw dust away from workers' breathing zones. Keep away from ignition sources. Use in well ventilated areas. Protect containers from physical damage. Avoid prolonged contact with eyes and skin. Prevent or minimize exposures to dusts by using appropriate personal protection equipment Avoid Wash exposed skin areas thoroughly with soap and water after handling.
Storage:	Dry airtight storage recommended. Store in cool, dry, ventilated area and in closed containers. Maintain good housekeeping. Store away from strong oxidizers such as ozone, liquid oxygen, chlorine, permanganate, etc. Keep away from heat or flames or ignition sources.

SECTION VIII

SPECIAL PROTECTION INFORMATION:

Respiratory Protection:	Use NIOSH/MSHA approved respiratory protection equipment appropriate to the material and/or its concentration where airborne exposure is likely. If exposures cannot be kept to a minimum with engineering controls, consult respirator manufacturer to determine appropriate type equipment for a given application. Observe respirator use limitations specified by NIOSH/MSHA or the manufacturer.
Ventilation/Local Exhaust:	Essential in confined areas
Eye Protection:	Safety glasses or goggles with side shields are recommended for any type of handling. Where eye contact or dusty conditions may be likely, dust tight goggles are recommended. Have eye flushing equipment available.
Skin Protection:	Avoid contact with the skin. Wear appropriate dust resistant clothing. Wash contaminated clothing and clean protective equipment before reuse. Wash skin

thoroughly after handling. Protective gloves are recommended.

Airborne Exposure Guidelines:	Recommended Exposure Limits 8-hr TWA	Activated Carbon
	Total Dust	10 mg/m3*
	Respirable Fraction	3 mg/m3*

EXPOSURE CONTROL:

NOTE:	*PEL, TLV and Toxicological data when available are provided for the pure component knowing that the carbon product contains a lesser percentage.*		
Component	**OSHA PEL**	**ACGIH TLV**	**Other Limits**
*Activated Carbon	Data not available	Data not available	
Exposure Guidelines	Wet activated carbon removes oxygen from air posing a hazard to workers in enclosed or confined space. Before entering such an area, sample the air within to assure sufficient oxygen supply. Use work procedures for low oxygen levels, observing all local, state and federal regulations. Comment: Remove from the area any worker who shows allergic reactions from exposure to sulfur.		
Engineering Controls	Exhaust ventilation should be designed to prevent accumulation and recirculation in the workplace and safely remove carbon black from the air. Note: Wet activated carbon removes oxygen from air causing a severe hazard to workers in enclosed or confined space. If risk of overexposure exists, wear an approved respirator. Provide adequate ventilation in warehouse or closed storage area.		
Personal Protective Equipment	Use of NIOSH approved particulate filter is recommended if dust is generated in handling. The usual precautionary measures for handling chemicals should be followed, i.e. gloves, safety glasses w/side shields or goggles, long sleeve shirt or lab coat, dust respirator if dusty and/or other protective clothing/equipment as determined appropriate.		
General Hygiene	The usual precautionary measures for handling chemicals should be followed: i.e. Keep away from food and beverage; remove contaminated clothing immediately; wash hands before breaks or eating; avoid contact with eyes and skin.		
*OSHA and ACGIH have not established specific exposure limits for this material. The recommended exposure limits for these activated carbon products are based on the Threshold Limit Values adopted by ACGIH for Particulates (insoluble) Not Otherwise Classified. The OSHA PEL for Nuisance Dust is 15 mg/m^3 (5 mg/m^3 respirable fraction).			

SECTION IX

PHYSICAL DATA:

Appearance:	Granular, powder of extruded pellet
Odor:	None
Color:	Black
pH Value:	7-10
Specific Gravity, (H2O = 1):	3.5
Solubility in water:	Insoluble
Vapor Pressure:	0
Vapor Density:	Solid
Relative Density:	0.4 – 0.7
Flammability:	> 220^{O} C
Auto Ignition Temperature:	> 220^{O} C
Melting Point:	N/A
Boiling Point:	N/A
Freezing Point:	N/A
Flash Point:	N/A
Evaporation:	N/A

Molecular Weight: N/A

SECTION X

STABILITY & REACTIVITY DATA:

Chemical Stability :	Stable ☑ Unstable ☐
Conditions to Avoid :	None
Possibility of Hazardous Reaction :	Will Not Occur ☑ May Occur ☐
Conditions to Avoid :	None
Incompatibility / Materials to Avoid :	Strong oxidizers such as oxygen, ozone, chlorine, permanganates, etc…alkali metals, liquid acids.
Hazardous Decomposition Products :	Carbon monoxide and carbon dioxide gas can be generated if combustion of this material takes place. Sulfur oxides emission is possible during combustion.
Caution:	High concentrations of organics in air will cause temperature rise due to heat of adsorption. At very high concentration levels this may result in a thermal excursion, referred to as a bed fire. High concentrations of Ketones and Aldehydes may cause a rise in bed temperature due to adsorption and oxidation.

SECTION XI

TOXICOLOGICAL INFORMATION:

NOTE: Toxicological data is provided for the pure component knowledge that the carbon product contains a lesser %

ACUTE EFFECTS

Toxicity Studies	Oral LD50	Not determined on the finished product.
	Dermal LD50	Not determined on the finished product.
Inhalation	See section IV	-
Ingestion	See section IV	-
Eye Irritation	See section IV	-
Skin Irritation	See section IV	-
Target Organs or Systems		Eyes, skin, and upper respiratory system
Signs and Symptoms of Exposure	See section III & IV	Irritation and redness of eyes, irritation of skin and respiratory system may result from exposure to carbon dust

CHRONIC EFFECTS

Carcinogenicity	Not determined on the finished product

Mutagenicity	Not determined on the finished product
Reproductive Effects	Not determined on the finished product
Developmental Factors	Not determined on the finished product

SECTION XII

ECOLOGICAL INFORMATION:

NOTE: Ecological data is provided for the pure component knowledge that the carbon product contains a lesser %.

Ecotoxicity	Not determined on the finished product.
Mobility in Environmental Media	Not determined on the finished product.
Bioaccumulation/Accumulation	Not determined on the finished product.
Persistence/Degradability	Not determined on the finished product.
Any Other Adverse Effects	Not determined on the finished product.

SECTION XIII

DISPOSAL CRITERIA:

See Section VI.

Storage and disposal should be in accordance with applicable local, state and federal laws and regulations.

Activated Carbon is an adsorbent media; hazard classification is generally determined by the adsorbate that the carbon has picked up.

Consult with the US EPA Guidelines as per 40 CFR Part 261.3 for the classifications of hazardous waste before disposal.

SECTION XIV

TRANSPORTATION INFORMATION:

USDOT (United States Department of Transportation) Regulations

Proper Shipping Name:	Steam Activated Carbon, Non-Regulated OR Carbon, Activated, Non-Regulated
Shipping Class:	Class 70
Hazard Class:	Not Applicable See *Note Below
UN/NA Number:	Not Applicable
Packing Group:	Not Applicable
Freight Classification:	STCC Code - #2899643 / NMFC #40560
DOT Marking:	Not Applicable
DOT Placard:	Not Applicable
Precautions To Be Taken In Transportation:	No specific precautions See Section

EMERGENCY ACCIDENT PRECAUTIONS AND PROCEDURES:
Contact: Carbon Activated Corporation
Phone: 310 885 4555

Land	Global Transport	Proper Shipping	Steam Activated Carbon, Non-Regulated

	Regulations	Description:	OR Carbon, Activated, Non-Regulated
		Hazard Class:	Not Applicable See *Note Below
		UN/NA Number:	Not Applicable
		Packing Group:	Not Applicable
		Marine Pollutant:	Not Applicable

Water	IMO / IMDG	Proper Shipping Description:	Steam Activated Carbon, Non-Regulated OR Carbon, Activated, Non-Regulated
		Hazard Class:	Not Applicable See *Note Below
		UN/NA Number:	Not Applicable
		Packing Group:	Not Applicable
		Marine Pollutant:	Not Applicable

Air	ICAO / IATA	Proper Shipping Description:	Steam Activated Carbon, Non-Regulated OR Carbon, Activated, Non-Regulated
		Hazard Class:	Not Applicable See *Note Below
		UN/NA Number:	Not Applicable
		Packing Group:	Not Applicable
		Marine Pollutant:	Not Applicable
		+ Information reported for product/size: 0.5 Kg	

Note: *Under the UN classification for activated carbon, all activated carbons have been identified as a class 4.2 product. However, This product has been tested according to the United Nations Transport of Dangerous Goods test protocol for a "self-heating substance" (United Nations Transportation of Dangerous Goods, Manual of Tests and Criteria, Part III, Section 33.3.1.6 - Test N.4 - Test Method for Self Heating Substances) and it has been specifically determined that this product does not meet the definition of a self-heating substance (class 4.2) or any other hazard class, and therefore should not be listed as a hazardous material. This information is applicable only for the Activated Carbon Product identified in this document.*

SECTION XV

FEDERAL REGULATIONS:

US FEDERAL REGULATIONS

OSHA (29 CFR1910:1200):	Not Regulated See Table Z-1 of 29CFR1910.1000, Limits For Air Contaminates.
CERCLA/SUPERFUND (40CFR117, 302):	Contains no CERCLA hazardous substances. Notification of spills of this material is not required Specific reporting requirements at the local, regional, or state level pertaining to releases of this material may exist.
RCRA (40CFR261.33, 261.20-24):	This product, in its original state, does not meet the criteria of hazardous waste.
Toxic Substances Control Act (40CFR710):	Activated carbon does not contain any relevant components.
Clean Water Act (40CFR122.21 and 40CFR122.42):	Activated carbon does not contain any substances regulated as pollutants.
Clean Air Act (CAA, Section112, 40CFR82):	Activated carbon does not contain any components listed as Hazardous Air Pollutants, Flammable Substances, Toxic Substances, or Class 1 or 2 Ozone Depletors.
California Prop. 65	Product and impregnate component are not listed.

Section 302 - Extremely Hazardous Substances (40CFR355):	This product is not listed as an extremely hazardous substance.
SECTION 313- List of Toxic Chemicals:	This product is not listed.

Amendments and Reauthorization Act of 1986 (Title III), Sections 302, and 313

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

Activated carbon, (CAS: 7440-44-0) is found on the following regulatory lists:	US EPA High Production Volume Program Chemical List US FDA CFSAN Color Additive Status List 4 US FDA CFSAN Color Additive Status List 6 US DOE Temporary Emergency Exposure Limits (TEELs) US - Hawaii Air Contaminant Limits US - Idaho - Toxic and Hazardous Substances - Mineral Dust US - Minnesota Hazardous Substance List US - Minnesota Permissible Exposure Limits (PELs) US - Rhode Island Hazardous Substance List US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants US - Washington Permissible exposure limits of air contaminants Canada - British Columbia Occupational Exposure Limits Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances Canada Domestic Substances List (DSL) International Air Transport Association (IATA) Dangerous Goods Regulations OECD Representative List of High Production Volume (HPV) Chemicals

CANADIAN CLASSIFICATION

WHMIS (CPR, SOR/88-66):	Product and impregnate component are listed
DSL #.	Product and impregnate component are listed

EEC Council Directives relating to the classification, packaging, and labeling of dangerous substances and preparations

Risk and Safety Phrases	R36: Irritating to the eyes R37: Irritating to the respiratory system R38: Irritating to the skin

SECTION XVI

OTHER INFORMATION:

The information contained herein is based on data considered to be accurate and applies to this specific material as supplied.

This SDS will not be valid for this material if it is used in combination with any other material/s.

It is the user's responsibility to determine the suitability and completeness of this information for their particular use and to ensure that its activities comply with federal, state, provincial and local laws.

Lab Alley LLC makes no warranty with respect to the information and recommendations provided and disclaim all liability for any reliance or usage. Furthermore, no warranty is expressed or implied regarding the accuracy of this data.

Prepared in accordance with the United States Hazard Communication
Standard: 29 CFR 1910.1200 (March 26, 2012)

SAFETY DATA SHEET

US OSHA Hazard Communication Standard (29 CFR 1910.1200) and Canada WHMIS 2015 which includes the amended Hazardous Products Act (HPA) and the Hazardous Products Regulation (HPR)

Issuing Date 15-Aug-2023 **Revision Date** 15-Aug-2023 **Revision Number** 1

1. Identification

Product identifier

Product Name Alconox

Other means of identification

Product Code(s) 1101, 1103, 1104, 1104-1, 1112, 1112-1, 1125, 1150

Synonyms None

Recommended use of the chemical and restrictions on use

Recommended use Cleaning agent; Detergent

Restrictions on use Do not mix with other detergents unless otherwise specified

Details of the supplier of the safety data sheet

Supplier Address
Alconox Inc.
30 Glenn St., Suite 309
White Plains, NY 10603 USA
914-948-4040

E-mail cleaning@alconox.com

Emergency telephone number

Emergency telephone ChemTel Inc.: North America: 1-888-255-3924
International: +1-813-248-0573

2. Hazard(s) identification

Classification

Acute toxicity - Oral	Category 4
Skin corrosion/irritation	Category 2
Serious eye damage/eye irritation	Category 2A

Label elements

Warning

Hazard statements
Harmful if swallowed.
Causes skin irritation.
Causes serious eye irritation.

Precautionary Statements - Prevention
Wash face, hands and any exposed skin thoroughly after handling.
Do not eat, drink or smoke when using this product.
Wear protective gloves, eye protection and face protection.
Precautionary Statements - Response
Specific treatment (see information on this label).
Eyes
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 advice and attention.
Skin
IF ON SKIN: Wash with plenty of water and soap.
If skin irritation occurs: Get medical advice and attention.
Take off contaminated clothing and wash it before reuse.
Ingestion
IF SWALLOWED: Call a POISON CENTER or doctor if you feel unwell.
Rinse mouth.
Precautionary Statements - Disposal
Dispose of contents and container to an approved waste disposal plant.

Unknown acute toxicity

Other information
May be harmful in contact with skin. Harmful to aquatic life with long lasting effects.

3. Composition/information on ingredients

Substance

Not applicable.

Mixture

Chemical name	CAS No.	Weight-%	Hazardous Material Information Review Act registry number (HMIRA registry #)	Date HMIRA filed and date exemption granted (if applicable)
Benzenesulfonic acid, mono-C10-16-alkyl derivs., sodium salts	68081-81-2	10-30	-	-
Sodium carbonate	497-19-8	7-13	-	-
Sodium Dodecyl Sulphate	151-21-3	0.5-1.5	-	-
Tetrasodium EDTA	64-02-8	0.1-1	-	-

*The exact percentage (concentration) of composition has been withheld as a trade secret.

4. First-aid measures

Description of first aid measures

General advice Show this safety data sheet to the doctor in attendance.

Inhalation Remove to fresh air. Get medical attention immediately if symptoms occur.

Eye contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.

	Remove contact lenses, if present and easy to do. Continue rinsing. Keep eye wide open while rinsing. Do not rub affected area. Get medical attention if irritation develops and persists.
Skin contact	Wash off immediately with soap and plenty of water for at least 15 minutes. Get medical attention if irritation develops and persists.
Ingestion	Do NOT induce vomiting. Rinse mouth. Never give anything by mouth to an unconscious person. Call a physician.
Self-protection of the first aider	Avoid contact with skin, eyes or clothing. Wear personal protective clothing (see section 8).

Most important symptoms and effects, both acute and delayed

Symptoms	May cause redness and tearing of the eyes. Burning sensation.
Effects of Exposure	No information available.

Indication of any immediate medical attention and special treatment needed

Note to physicians	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.
Hazardous combustion products	Sodium oxides, Carbon oxides, Sulfur oxides, Phosphorus oxides, Nitrogen oxides (NOx).

Explosion data

Sensitivity to mechanical impact	None.
Sensitivity to static discharge	None.

Special protective equipment and precautions for fire-fighters	Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear. Use personal protection equipment.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

Personal precautions	Avoid contact with skin, eyes or clothing. Ensure adequate ventilation. Use personal protective equipment as required.
Other information	Refer to protective measures listed in Sections 7 and 8.

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	Pick up and transfer to properly labeled containers.
Prevention of secondary hazards	Clean contaminated objects and areas thoroughly observing environmental regulations.

7. Handling and storage

Precautions for safe handling

Advice on safe handling	Avoid breathing dust. Handle in accordance with good industrial hygiene and safety

practice. Avoid contact with skin, eyes or clothing. Do not eat, drink or smoke when using this product. Take off contaminated clothing and wash before reuse.

Conditions for safe storage, including any incompatibilities

Storage Conditions Keep containers tightly closed in a dry, cool and well-ventilated place. Keep out of the reach of children.

8. Exposure controls/personal protection

Control parameters

Exposure Limits This product, as supplied, does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.

Appropriate engineering controls

Engineering controls Showers
Eyewash stations
Ventilation systems.

Individual protection measures, such as personal protective equipment

Eye/face protection If splashes are likely to occur, wear safety glasses with side-shields.

Hand protection Wear nitrile or rubber gloves. Wear suitable gloves. Impervious gloves.

Skin and body protection Wear suitable protective clothing. Long sleeved clothing.

Respiratory protection No protective equipment is needed under normal use conditions. If exposure limits are exceeded or irritation is experienced, ventilation and evacuation may be required.

General hygiene considerations Avoid breathing dust. Wear suitable gloves and eye/face protection. Do not eat, drink or smoke when using this product. Avoid contact with skin, eyes or clothing.

9. Physical and chemical properties

Information on basic physical and chemical properties

Appearance	Off-white powder
Physical state	Solid
Color	Off-white
Odor	No information available
Odor threshold	No information available

Property	Values	Remarks • Method
pH	9.5 (1% Solution)	No data available
Melting point / freezing point		No data available
Initial boiling point and boiling range		No data available
Flash point		No data available
Evaporation rate		No data available
Flammability		No data available
Flammability Limit in Air		
Upper flammability or explosive limits		No data available
Lower flammability or explosive limits		No data available
Vapor pressure		No data available
Relative vapor density		No data available
Relative density		No data available
Water solubility		No data available

Solubility(ies)	No data available
Partition coefficient	No data available
Autoignition temperature	No data available
Decomposition temperature	No data available
Kinematic viscosity	No data available
Dynamic viscosity	No data available

Other information

Explosive properties	No information available.
Oxidizing properties	No information available.
Softening point	No information available
Molecular weight	No information available
VOC content	0 %
Liquid Density	No information available
Bulk density	No information available

10. Stability and reactivity

Reactivity None under normal use conditions.

Chemical stability Stable under normal conditions.

Possibility of hazardous reactions None under normal processing.

Conditions to avoid None known based on information supplied.

Incompatible materials Strong acids, Strong bases, Strong oxidizing agents.

Hazardous decomposition products None known based on information supplied.

11. Toxicological information

Information on likely routes of exposure

Product Information

Inhalation Specific test data for the substance or mixture is not available. May cause irritation of respiratory tract.

Eye contact Specific test data for the substance or mixture is not available. Causes serious eye irritation. (based on components). May cause redness, itching, and pain.

Skin contact Specific test data for the substance or mixture is not available. Causes skin irritation. (based on components).

Ingestion Specific test data for the substance or mixture is not available. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea. Harmful if swallowed. (based on components).

Symptoms related to the physical, chemical and toxicological characteristics

Symptoms Redness. May cause redness and tearing of the eyes.

Acute toxicity Harmful if swallowed.

Numerical measures of toxicity

The following values are calculated based on chapter 3.1 of the GHS document:

ATEmix (oral)	1,962.10 mg/kg
ATEmix (dermal)	2,660.40 mg/kg
ATEmix (inhalation-dust/mist)	6.95 mg/l

Unknown acute toxicity

Component Information

Chemical name	Oral LD50	Dermal LD50	Inhalation LC50
Sodium carbonate	= 4090 mg/kg (Rat)	> 2000 mg/kg (Rabbit)	= 2300 mg/m³ (Rat) 2 h
Sodium Dodecyl Sulphate	= 1288 mg/kg (Rat)	= 200 mg/kg (Rabbit)	> 3900 mg/m³ (Rat) 1 h
Tetrasodium EDTA	= 1658 mg/kg (Rat)	-	-

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Skin corrosion/irritation Classification based on data available for ingredients. Causes skin irritation.

Serious eye damage/eye irritation Classification based on data available for ingredients. Causes serious eye irritation.

Respiratory or skin sensitization No information available.

Germ cell mutagenicity No information available.

Carcinogenicity No information available.

Reproductive toxicity No information available.

STOT - single exposure No information available.

STOT - repeated exposure No information available.

Aspiration hazard No information available.

12. Ecological information

Ecotoxicity Harmful to aquatic life with long lasting effects.

Chemical name	Algae/aquatic plants	Fish	Toxicity to microorganisms	Crustacea
Sodium carbonate 497-19-8	-	LC50: =300mg/L (96h, Lepomis macrochirus) LC50: 310 - 1220mg/L (96h, Pimephales promelas)	-	EC50: =265mg/L (48h, Daphnia magna)
Sodium Dodecyl Sulphate 151-21-3	EC50: =53mg/L (72h, Desmodesmus subspicatus) EC50: 30 - 100mg/L (96h, Desmodesmus subspicatus) EC50: =117mg/L (96h, Pseudokirchneriella subcapitata) EC50: 3.59 - 15.6mg/L (96h, Pseudokirchneriella subcapitata)	LC50: 15 - 18.9mg/L (96h, Pimephales promelas) LC50: 8 - 12.5mg/L (96h, Pimephales promelas) LC50: 22.1 - 22.8mg/L (96h, Pimephales promelas) LC50: 4.3 - 8.5mg/L (96h, Oncorhynchus mykiss) LC50: =4.62mg/L (96h, Oncorhynchus mykiss) LC50: =4.2mg/L (96h, Oncorhynchus mykiss) LC50: =7.97mg/L (96h, Brachydanio rerio) LC50: 9.9 - 20.1mg/L (96h, Brachydanio rerio) LC50: 4.06 - 5.75mg/L	-	EC50: =1.8mg/L (48h, Daphnia magna)

		(96h, Lepomis macrochirus) LC50: 4.2 - 4.8mg/L (96h, Lepomis macrochirus) LC50: =4.5mg/L (96h, Lepomis macrochirus) LC50: 5.8 - 7.5mg/L (96h, Pimephales promelas) LC50: 10.2 - 22.5mg/L (96h, Pimephales promelas) LC50: 6.2 - 9.6mg/L (96h, Pimephales promelas) LC50: 13.5 - 18.3mg/L (96h, Poecilia reticulata) LC50: 10.8 - 16.6mg/L (96h, Poecilia reticulata) LC50: =1.31mg/L (96h, Cyprinus carpio)		
Tetrasodium EDTA 64-02-8	-	LC50: =41mg/L (96h, Lepomis macrochirus) LC50: =59.8mg/L (96h, Pimephales promelas)	-	-

Persistence and degradability No information available.

Bioaccumulation

Component Information

Chemical name	Partition coefficient
Sodium Dodecyl Sulphate 151-21-3	1.6

Other adverse effects No information available.

13. Disposal considerations

Disposal methods

Waste from residues/unused products Dispose of in accordance with local regulations, Dispose of waste in accordance with environmental legislation.

Contaminated packaging Do not reuse empty containers.

California waste information This product contains one or more substances that are listed with the State of California as a hazardous waste.

14. Transport information

DOT Not regulated

TDG Not regulated

IATA Not regulated

IMDG Not regulated

15. Regulatory information

Safety, health and environmental regulations/legislation specific for the substance or mixture

International Regulations

The Montreal Protocol on Substances that Deplete the Ozone Layer Not applicable

The Stockholm Convention on Persistent Organic Pollutants Not applicable

The Rotterdam Convention Not applicable

International Inventories
Contact supplier for inventory compliance status

US 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.

CWA (Clean Water Act)
This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42).

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.

US State Regulations

California Proposition 65
This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations

Chemical name	New Jersey	Massachusetts	Pennsylvania
Pentasodium Triphosphate 7758-29-4	-	X	X
Tetrasodium pyrophosphate 7722-88-5	X	X	X

U.S. EPA Label Information

EPA Pesticide Registration Number Not applicable

16. Other information

NFPA	**Health hazards** 2	**Flammability** 0	**Instability** 0	**Special hazards** -
HMIS	**Health hazards** 2	**Flammability** 0	**Physical hazards** 0	**Personal protection** X

(M)SDS Number UL-NOX-003

Key or legend to abbreviations and acronyms used in the safety data sheet

Legend
SVHC: Substances of Very High Concern for Authorization:
PBT: Persistent, Bioaccumulative, and Toxic (PBT) Substances
vPvB: Very Persistent and very Bioaccumulative (vPvB) Substances
STOT: Specific Target Organ Toxicity
ATE: Acute Toxicity Estimate
LC50: 50% Lethal Concentration
LD50: 50% Lethal Dose

Legend Section 8: Exposure controls/personal protection

TWA	TWA (time-weighted average)	STEL	STEL (Short Term Exposure Limit)
Ceiling	Maximum limit value	Sk*	Skin designation
+	Sensitizers		

Key literature references and sources for data used to compile the SDS
U.S. Environmental Protection Agency ChemView Database
European Food Safety Authority (EFSA)
Environmental Protection Agency
Acute Exposure Guideline Level(s) (AEGL(s))
U.S. Environmental Protection Agency Federal Insecticide, Fungicide, and Rodenticide Act
U.S. Environmental Protection Agency High Production Volume Chemicals
Food Research Journal
Hazardous Substance Database
International Uniform Chemical Information Database (IUCLID)
Japan GHS Classification
Australia National Industrial Chemicals Notification and Assessment Scheme (NICNAS)
NIOSH (National Institute for Occupational Safety and Health)
National Library of Medicine's ChemID Plus (NLM CIP)
U.S. National Toxicology Program (NTP)
New Zealand's Chemical Classification and Information Database (CCID)
Organization for Economic Co-operation and Development Environment, Health, and Safety Publications
Organization for Economic Co-operation and Development High Production Volume Chemicals Program
Organization for Economic Co-operation and Development Screening Information Data Set
World Health Organization

Issuing Date 15-Aug-2023

Revision Date 15-Aug-2023

Revision Note Initial Release.

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 Safety Data Sheet

Safety Data Sheet

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

Diesel Fuel

Product Use: Blendstock, Chemical Feedstock, Fuel Oil, Fuel
Synonyms: #2 ULSD; Dyed Diesel Fuel; Fuel Oil; #1 ULSD; CARB Diesel; CARB Diesel; Diesel; Diesel fuel – all grades; Diesel Fuels; Fuel Oil #1; Fuel Oil #2; Heating oil; HO; HSHO; Kero; Kerosene; LSHO; No. 1 ULSD; No. 2 ULSD; Off Road Diesel Fuel, B2 – B20 Diesel; R2 – R20 Diesel Fuel; SDS 900; ULS No. 1 Diesel; ULS No. 2 Diesel; ULSD; ULSK; Ultra Low Sulfur Diesel; Winter diesel
Company Identification
REG Marketing & Logistics Group, LLC
416 South Bell Avenue
Ames, IA 50010
United States of America

Transportation Emergency Response
CHEMTREC: (800) 424-9300 or (703) 527-3887
Health Emergency
Chevron Emergency & Information Center: Located in the USA. International collect calls accepted. (800) 231-0623 or (510) 231-0623
Product Information
Product Information: Phone: 1 888.734.8686 / Email: REG-SDSDistribution@chevron.com

SECTION 2 HAZARDS IDENTIFICATION

CLASSIFICATION:
- Flammable liquid: Category 3.
- Acute inhalation toxicant: Category 4.
- Aspiration toxicant: Category 1.
- Carcinogen: Category 2.
- Skin irritation: Category 2.
- Target organ toxicant (central nervous system): Category 3.
- Target organ toxicant (repeated exposure): Category 2.
- Target organ toxicant (respiratory irritant): Category 3.
- Acute aquatic toxicant: Category 2.
- Chronic aquatic toxicant: Category 2.

Signal Word: Danger
Physical Hazards:
- Flammable liquid and vapour.

Health Hazards:

- May be fatal if swallowed and enters airways.
- Causes skin irritation.
- Harmful if inhaled.
- May cause respiratory irritation.
- May cause drowsiness or dizziness.
- Suspected of causing cancer.
- May cause damage to organs (Blood/Blood Forming Organs, Liver, Thymus) through prolonged or repeated exposure.

Environmental Hazards:
- Toxic to aquatic life with long lasting effects.

PRECAUTIONARY STATEMENTS:
Prevention:
- Obtain special instructions before use.
- Do not handle until all safety precautions have been read and understood.
- Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
- Keep container tightly closed.
- Keep cool.
- Ground/bond container and receiving equipment.
- Use explosion-proof electrical/ventilating/lighting/equipment.
- Use only non-sparking tools.
- Take precautionary measures against static discharge.
- Do not breathe dust/fume/gas/mist/vapours/spray.
- Wash thoroughly after handling.
- Use only outdoors or in a well-ventilated area.
- Avoid release to the environment.
- Wear protective gloves/protective clothing/eye protection/face protection.
- Use personal protective equipment as required.

Response:
- IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
- IF ON SKIN: Wash with plenty of soap and water.
- IF INHALED: Remove person to fresh air and keep comfortable for breathing.
- IF exposed or concerned: Get medical advice/attention.
- Specific treatment (see Notes to Physician on this label).
- Do NOT induce vomiting.
- If skin irritation occurs: Get medical advice/attention.
- Take off contaminated clothing and wash it before reuse.
- In case of fire: Use media specified in the SDS to extinguish.
- Collect spillage.

Storage:
- Store in a well-ventilated place. Keep container tightly closed.
- Store locked up.

Disposal:
- Dispose of contents/container in accordance with applicable local/regional/national/international regulations.

HAZARDS NOT OTHERWISE CLASSIFIED: Not Applicable

SECTION 3 COMPOSITION/ INFORMATION ON INGREDIENTS

COMPONENTS	CAS NUMBER	AMOUNT

Fuel Oil, No. 2	68476-30-2	0 - 100 %weight
Kerosene	8008-20-6	0 - 100 %weight
Fatty acids, C14-18 and C16-18-unsatd., Methyl esters	67762-26-9	0 - 95 %weight
Fuels, diesel, C9-18 alkane branched and linear	1159170-26-9	0 - 95 %weight
Naphthalene	91-20-3	< 3 %weight

SECTION 4 FIRST AID MEASURES

Description of first aid measures
Eye: No specific first aid measures are required. As a precaution, remove contact lenses, if worn, and flush eyes with water.
Skin: Wash skin with water immediately and remove contaminated clothing and shoes. Get medical attention if any symptoms develop. To remove the material from skin, use soap and water. Discard contaminated clothing and shoes or thoroughly clean before reuse.
Ingestion: If swallowed, get immediate medical attention. Do not induce vomiting. Never give anything by mouth to an unconscious person.
Inhalation: Move the exposed person to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if breathing difficulties continue or if any other symptoms develop.

Most important symptoms and effects, both acute and delayed
IMMEDIATE HEALTH EFFECTS
Eye: Contact with the eyes may cause irritation. Not expected to cause prolonged or significant eye irritation.
Skin: Contact with the skin causes irritation. Skin contact may cause drying or defatting of the skin. Symptoms may include pain, itching, discoloration, swelling, and blistering. Contact with the skin is not expected to cause an allergic skin response.
Ingestion: Highly toxic; may be fatal if swallowed. Because of its low viscosity, this material can directly enter the lungs, if swallowed, or if subsequently vomited. Once in the lungs it is very difficult to remove and can cause severe injury or death. May be irritating to mouth, throat, and stomach. Symptoms may include pain, nausea, vomiting, and diarrhea.
Inhalation: The vapor or fumes from this material may cause respiratory irritation. Symptoms of respiratory irritation may include coughing and difficulty breathing. Excessive or prolonged breathing of this material may cause central nervous system effects. Central nervous system effects may include headache, dizziness, nausea, vomiting, weakness, loss of coordination, blurred vision, drowsiness, confusion, or disorientation. At extreme exposures, central nervous system effects may include respiratory depression, tremors or convulsions, loss of consciousness, coma or death. If this material is heated, fumes may be unpleasant and produce nausea and irritation of the eye and upper respiratory tract.

DELAYED OR OTHER HEALTH EFFECTS:
Cancer: Prolonged or repeated exposure to this material may cause cancer. Contains naphthalene, which has been classified as a Group 2B carcinogen (possibly carcinogenic to humans) by the International Agency for Research on Cancer (IARC).
Target Organs: Contains material that may cause damage to the following organ(s) following repeated inhalation at concentrations above the recommended exposure limit: Liver Blood/Blood Forming Organs Thymus
Medical Conditions Aggravated by Exposure: Exposure to naphthalene may aggravate existing blood disorders. Individuals with congenital erythrocyte glucose-6-phosphate dehydrogenase deficiency may be particularly susceptible to the hemolytic effects of naphthalene.

See Section 11 for additional information. Risk depends on duration and level of exposure.

Indication of any immediate medical attention and special treatment needed
Note to Physicians: Ingestion of this product or subsequent vomiting may result in aspiration of light hydrocarbon liquid, which may cause pneumonitis.

SECTION 5 FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA: Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames. Do not use water spray or a direct stream of water.
Unusual Fire Hazards: See Section 7 for proper handling and storage.

PROTECTION OF FIRE FIGHTERS:
Fire Fighting Instructions: This material will burn although it is not easily ignited. For fires involving this material, do not enter any enclosed or confined fire space without proper protective equipment, including self-contained breathing apparatus.
Combustion Products: Highly dependent on combustion conditions. A complex mixture of airborne solids, liquids, and gases including carbon monoxide, carbon dioxide, and unidentified organic compounds will be evolved when this material undergoes combustion. Combustion may form oxides of: Hydrocarbons, Nitrogen, Sulfur.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Protective Measures: Eliminate all sources of ignition in the vicinity of the spill or released vapor. If this material is released into the work area, evacuate the area immediately. Monitor area with combustible gas indicator.
Spill Management: Stop the source of the release if you can do it without risk. Contain release to prevent further contamination of soil, surface water or groundwater. Clean up spill as soon as possible, observing precautions in Exposure Controls/Personal Protection. Use appropriate techniques such as applying non-combustible absorbent materials or pumping. All equipment used when handling the product must be grounded. A vapor suppressing foam may be used to reduce vapors. Use clean non-sparking tools to collect absorbed material. Where feasible and appropriate, remove contaminated soil. Place contaminated materials in disposable containers and dispose of in a manner consistent with applicable regulations.
Reporting: Report spills to local authorities and/or the U.S. Coast Guard's National Response Center at (800) 424-8802 as appropriate or required.

SECTION 7 HANDLING AND STORAGE

General Handling Information: Avoid contaminating soil or releasing this material into sewage and drainage systems and bodies of water.
Precautionary Measures: Liquid evaporates and forms vapor (fumes) which can catch fire and burn with explosive force. Invisible vapor spreads easily and can be set on fire by many sources such as pilot lights, welding equipment, and electrical motors and switches.
Do not get in eyes, on skin, or on clothing. Do not taste or swallow. Do not breathe vapor or fumes. Wash thoroughly after handling.
Static Hazard: Electrostatic charge may accumulate and create a hazardous condition when handling this material. To minimize this hazard, bonding and grounding may be necessary but may not, by themselves, be sufficient. Review all operations which have the potential of generating and accumulating an electrostatic charge and/or a flammable atmosphere (including tank and container filling, splash filling, tank cleaning, sampling, gauging, switch loading, filtering, mixing, agitation, and vacuum truck operations) and use appropriate mitigating procedures.

Container Warnings: Container is not designed to contain pressure. Do not use pressure to empty container or it may rupture with explosive force. Empty containers retain product residue (solid, liquid, and/or vapor) and can be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, static electricity, or other sources of ignition. They may explode and cause injury or death. Empty containers should be completely drained, properly closed, and promptly returned to a drum reconditioner or disposed of properly.

General Storage Information: DO NOT USE OR STORE near heat, sparks, flames, or hot surfaces . USE AND STORE ONLY IN WELL VENTILATED AREA. Keep container closed when not in use.

SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

GENERAL CONSIDERATIONS:
Consider the potential hazards of this material (see Section 2), applicable exposure limits, job activities, and other substances in the workplace when designing engineering controls and selecting personal protective equipment (PPE). If engineering controls or work practices are not adequate to prevent exposure to harmful levels of this material, refer to PPE information below.

Factors that affect PPE include, but are not limited to: properties of the chemical, other chemicals which may contact the same PPE, physical requirements (fit & sizing, cut/puncture protection, dexterity, thermal protection, etc.), and potential allergic reactions to the PPE material. It is the responsibility of the user to read and understand all instructions and limitations supplied with the equipment since protection is usually provided for a limited time or under certain circumstances. Refer to appropriate CEN standards.

ENGINEERING CONTROLS:
Use general ventilation, local exhaust ventilation, or a combination of both.

PERSONAL PROTECTIVE EQUIPMENT
Eye/Face Protection: Wear protective equipment to prevent eye contact. Selection of protective equipment may include safety glasses, chemical goggles, face shields, or a combination depending on the work operations conducted.
Skin Protection: Wear chemical personal protective equipment (PPE) to prevent skin contact. Selection of chemical protective clothing should be performed by an Occupational Hygienist or Safety Professional and be based upon applicable standards (ASTM F739 or EN 374). Using chemical PPE depends upon operations conducted and may include chemical gloves, boots, chemical apron, chemical suit, and complete facial protection. **Refer to PPE manufacturers to obtain breakthrough time information to determine how long PPE can be used before it needs to be replaced.** Unless specific glove manufacturer data indicates otherwise, the below table is based upon available industry data to assist in the glove selection process and is intended to be used as reference only.

Chemical Glove Material	Thickness (mm)	Typical Breakthrough Time (minutes)
Nitrile	0.5	5
Viton Butyl	0.3	60

Butyl	**Not recommended for use**
Neoprene	**Not recommended for use**
Polyvinyl Chloride (PVC)	**Not recommended for use**

Respiratory Protection: Determine if airborne concentrations are below the recommended occupational exposure limits for jurisdiction of use. If airborne concentrations are above the acceptable limits, wear an approved respirator that provides adequate protection from this material, such as: Air-Purifying

Respirator for Organic Vapors.

Use a positive pressure air-supplying respirator in circumstances where air-purifying respirators may not provide adequate protection.

Occupational Exposure Limits:

Component	Agency	Form	TWA	STEL	Ceiling	Notation
Fuel Oil, No. 2	ACGIH	Inhalable fraction and vapor	100 mg/m3	--	--	Skin total hydrocarbon
Kerosene	ACGIH	Vapor	200 mg/m3	--	--	Skin
Fuel Oil, No. 2	ACGIH	Vapor and aerosol	100 mg/m3	--	--	Skin total hydrocarbon
Kerosene	CVX	Vapor	200 mg/m3	--	--	Skin
Fuel Oil, No. 2	CVX	Vapor and aerosol	100 mg/m3	--	--	--
Naphthalene	ACGIH	--	10 ppm	--	--	Skin
Naphthalene	ACGIH	Vapor	10 ppm	15 ppm	--	A4 Skin
Naphthalene	OSHA Z-1	--	50 mg/m3	--	--	--

Consult local authorities for appropriate values.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Attention: the data below are typical values and do not constitute a specification.

Color: Varies depending on specification
Physical State: Liquid
Odor: Petroleum naphtha odor
Odor Threshold: No data available
pH: Not Applicable
Vapor Pressure: <13 psia
Relative Vapor Density: No data available
Initial Boiling Point: >130°C (266°F)
Solubility: Negligible
Freezing Point: No data available
Melting Point: No data available
Specific Gravity: 67 @ 15.6°C (60°F)
Particle Characteristics: Not applicable
Density: No data available
Kinematic Viscosity: 1.3 mm2/s - 4.1 mm2/s @ 40°C (104°F)
Coefficient of Therm. Expansion / °F: No data available
Evaporation Rate: Not Applicable
Decomposition temperature: No data available
Partition coefficient n-octanol/water (logarithmic value): No data available

FLAMMABLE PROPERTIES:
Flammability (solid, gas): No Data Available

Flashpoint: > 38 °C (> 100 °F)
Autoignition: > 210 °C (> 410 °F)
Flammability (Explosive) Limits (% by volume in air): Lower: 0.4 Upper: 8

SECTION 10 STABILITY AND REACTIVITY

Reactivity: May react with strong acids or strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.
Chemical Stability: This material is considered stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.
Conditions to Avoid: Do not store near sources of ignition. Do not heat above flash point. Avoid contact with mineral acid/alkali.
Incompatibility With Other Materials: Not applicable
Hazardous Polymerization: Hazardous polymerization will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

Information on toxicological effects
Serious Eye Damage/Irritation: The material is not considered an eye irritant. The product has not been tested. The statement is based on evaluation of data for similar materials or product components.

Skin Corrosion/Irritation: This material causes skin irritation. The product has not been tested. The statement is based on evaluation of data for similar materials or product components.

Skin Sensitization: The material is not considered a skin sensitizer. The product has not been tested. The statement is based on evaluation of data for similar materials or product components.

Acute Dermal Toxicity: LD50: >2000 mg/kg (rabbit).

Acute Oral Toxicity: LD50: >5000 mg/kg (rat).

Acute Inhalation Toxicity: LC50: 1 - 5 mg/l (rat).
Acute Toxicity Estimate: Not Determined

Germ Cell Mutagenicity: The material is not considered a mutagen. The product has not been tested. The statement is based on evaluation of data for similar materials or product components.

Carcinogenicity: This material is suspected of causing cancer. The product has not been tested. The statement is based on evaluation of data for similar materials or product components. Contains naphthalene, which has been classified as a Group 2B carcinogen (possibly carcinogenic to humans) by the International Agency for Research on Cancer (IARC).

Reproductive Toxicity: The material is not considered a reproductive toxicant. The product has not been tested. The statement is based on evaluation of data for similar materials or product components.

Specific Target Organ Toxicity - Single Exposure: This material may cause drowsiness or dizziness. The product has not been tested. The statement is based on evaluation of data for similar materials or product components.
This material may cause respiratory irritation. The product has not been tested. The statement is based on evaluation of data for similar materials or product components.

Specific Target Organ Toxicity - Repeated Exposure: This material may cause damage to organs through prolonged or repeated exposure. The product has not been tested. The statement is based on evaluation of data for similar materials or product components.

Aspiration Hazard: This material is considered an aspiration hazard based on the kinematic viscosity of the material.

ADDITIONAL TOXICOLOGY INFORMATION:

This product contains naphthalene.

GENERAL TOXICITY: Exposure to naphthalene has been reported to cause methemoglobinemia and/or hemolytic anemia, especially in humans deficient in the enzyme glucose-6-phosphate dehydrogenase. Laboratory animals given repeated oral doses of naphthalene have developed cataracts.

REPRODUCTIVE TOXICITY AND BIRTH DEFECTS: Naphthalene did not cause birth defects when administered orally to rabbits, rats, and mice during pregnancy, but slightly reduced litter size in mice at dose levels that were lethal to the pregnant females. Naphthalene has been reported to cross the human placenta. GENETIC TOXICITY: Naphthalene caused chromosome aberrations and sister chromatid exchanges in Chinese hamster ovary cells, but was not a mutagen in several other in-vitro tests.CARCINOGENICITY: In a study conducted by the National Toxicology Program (NTP), mice exposed to 10 or 30 ppm of naphthalene by inhalation daily for two years had chronic inflammation of the nose and lungs and increased incidences of metaplasia in those tissues. The incidence of benign lung tumors (alveolar/bronchiolar adenomas) was significantly increased in the high-dose female group but not in the male groups. In another two-year inhalation study conducted by NTP, exposure of rats to 10, 30, and 60 ppm naphthalene caused increases in the incidences of a variety of nonneoplastic lesions in the nose. Increases in nasal tumors were seen in both sexes, including olfactory neuroblastomas in females at 60 ppm and adenomas of the respiratory epithelium in males at all exposure levels. The relevance of these effects to humans has not been established. No carcinogenic effect was reported in a 2-year feeding study in rats receiving naphthalene at 41 mg/kg/day.

This product contains kerosene. CONCAWE (product dossier 94/106) has summarized current health, safety and environmental data available for a number of kerosenes (typically straight-run kerosene, CAS 8008-20-6, or hydrodesulfurized kerosene, CAS 64742-81-0). ACUTE/SUBCHRONIC: Following acute exposure to kerosene, signs observed in rats and rabbits were of a low order of toxicity: central nervous system depression occurred following oral exposure, skin irritation (ranging from slight to severe irritation) occurred with dermal exposure, and respiratory tract irritation occurred with inhalation exposure. None of the kerosenes tested produced more than slight eye irritation and none were skin sensitizers. However, intratracheal administration or artificial aspiration of small volumes (0.1 to 0.2 ml) of kerosene into the lungs of rats, chickens and primates resulted in lung damage and/or death. In a study in which rats, mice, rabbits and cats were exposed to kerosene aerosol concentrations in the range 0.05 to 120 mg/l for up to four weeks, reductions in respiratory rate, pulmonary hyperaemia, leucocytosis, monocytosis and decreased erythrocyte sedimentation rate were observed, and histological examination revealed inflammatory changes in the respiratory tract (tracheitis, bronchitis and pneumonia).

CANCER: Chronic (3 to 24 months) mouse dermal toxicity studies of kerosenes and jet fuels produced mild to moderate skin irritation, while long-term (2+ years) studies showed moderate to severe skin damage as well as an increased incidence of tumors after long latency periods (probably due to a secondary mechanism related to skin irritancy). DEVELOPMENTAL/REPRODUCTION: Hydrodesulfurized kerosene was tested by the Petroleum Product Stewardship Council in a OECD Guideline 421 Reproductive/Developmental Toxicity Study. The kerosene sample was diluted to 494 (60%), 330 (40%),and 165 (20%) mg/kg/day in food grade mineral oil and applied daily during pre-mating and mating to day 19 of gestation. There was no apparent maternal, reproductive, or developmental toxicity at any dose. Males treated for eight weeks had increased relative kidney weights in the high dose group but no microscopic changes in testes or epididymides. No gross anomalies were observed in the pups.

SECTION 12 ECOLOGICAL INFORMATION

ECOTOXICITY

This material is expected to be toxic to aquatic organisms and may cause long-term adverse effects in the aquatic environment.

The product has not been tested. The statement has been derived from the properties of the individual

components.

MOBILITY
No data available.

PERSISTENCE AND DEGRADABILITY
This material is expected to be readily biodegradable. The product has not been tested. The statement has been derived from the properties of the individual components.

POTENTIAL TO BIOACCUMULATE
Bioconcentration Factor: No data available.
Partition coefficient n-octanol/water (logarithmic value): No data available

SECTION 13 DISPOSAL CONSIDERATIONS

Use material for its intended purpose or recycle if possible. This material, if it must be discarded, may meet the criteria of a hazardous waste as defined by international, country, or local laws and regulations.

SECTION 14 TRANSPORT INFORMATION

The description shown may not apply to all shipping situations. Consult 49CFR, or appropriate Dangerous Goods Regulations, for additional description requirements (e.g., technical name) and mode-specific or quantity-specific shipping requirements.

DOT Shipping Description: UN1202, DIESEL FUEL, 3, III

IMO/IMDG Shipping Description: UN1202, DIESEL FUEL, 3, III, (FLASH POINT SEE SECTION 9), MARINE
POLLUTANT (DIESEL FUEL)

ICAO/IATA Shipping Description: UN1202, DIESEL FUEL, 3, III

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC code:
Not applicable

SECTION 15 REGULATORY INFORMATION

EPCRA 311/312 CATEGORIES:
Acute toxicity (any route of exposure)
Aspiration Hazard
Carcinogenicity
Flammable (gases, aerosols, liquids, or solids)
Skin Corrosion or Irritation
Specific target organ toxicity (single or repeated exposure)

REGULATORY LISTS SEARCHED:

01-1=IARC Group 1	05=MA RTK
01-2A=IARC Group 2A	06=NJ RTK
01-2B=IARC Group 2B	07=PA RTK
02=NTP Carcinogen	08-1=TSCA 5(e)
03=EPCRA 313	08-2=TSCA 12(b)

04=CA Proposition 65

The following components of this material are found on the regulatory lists indicated.

Fuel Oil, No. 2	06, 07
Kerosene	05, 06, 07
Naphthalene	01-1, 01-2B, 02, 03, 04, 05, 06, 07

CHEMICAL INVENTORIES:
All components comply with the following chemical inventory requirements: DSL (Canada), TSCA (United States).

One or more components does not comply with the following chemical inventory requirements: AIIC (Australia), EINECS (European Union), ENCS (Japan), IECSC (China), KECI (Korea), NZIoC (New Zealand), PICCS (Philippines), TCSI (Taiwan).

SECTION 16 OTHER INFORMATION

NFPA RATINGS: Health: 2 Flammability: 2 Reactivity: 0

HMIS RATINGS: Health: 2* Flammability: 2 Reactivity: 0
(0-Least, 1-Slight, 2-Moderate, 3-High, 4-Extreme, PPE:- Personal Protection Equipment Index recommendation, *- Chronic Effect Indicator). These values are obtained using the guidelines or published evaluations prepared by the National Fire Protection Association (NFPA) or the National Paint and Coating Association (for HMIS ratings).

REVISION STATEMENT: This is a new Safety Data Sheet.
No revision information

Revision Date: December 01, 2023

ABBREVIATIONS THAT MAY HAVE BEEN USED IN THIS DOCUMENT:

TLV - Threshold Limit Value	TWA - Time Weighted Average
STEL - Short-term Exposure Limit	PEL - Permissible Exposure Limit
GHS - Globally Harmonized System	CAS - Chemical Abstract Service Number
ACGIH - American Conference of Governmental Industrial Hygienists	IMO/IMDG - International Maritime Dangerous Goods Code
API - American Petroleum Institute	SDS - Safety Data Sheet
HMIS - Hazardous Materials Information System	NFPA - National Fire Protection Association (USA)
DOT - Department of Transportation (USA)	NTP - National Toxicology Program (USA)
IARC - International Agency for Research on Cancer	OSHA - Occupational Safety and Health Administration
NCEL - New Chemical Exposure Limit	EPA - Environmental Protection Agency
SCBA - Self-Contained Breathing Apparatus	PNOS - Particles Not Otherwise Specified

Prepared according to the 29 CFR 1910.1200 (2012) by Chevron Technical Center, 6001 Bollinger Canyon Road, San Ramon, CA 94583.

The above information is based on the data of which we are aware and is believed to be correct as of the date hereof. Since this information may be applied under conditions beyond our control and with which we may be unfamiliar and since data made available subsequent to the date hereof may suggest modifications of the information, we do not assume any responsibility

for the results of its use. This information is furnished upon condition that the person receiving it shall make his own determination of the suitability of the material for his particular purpose.

SAFETY DATA SHEET

Isobutylene

Section 1. Identification

GHS product identifier : Isobutylene

Chemical name : 2-methylpropene

Other means of identification : 1-Propene, 2-methyl-; Isobutene; Isobutylene; 1-Propene, 2-methyl- (isobutene); 1, 1-Dimethylethylene; Isopropylidenemethylene; iso-Butene; i-Butene; 2-Methylpropylene; 2-Methyl-2-propene; 2-Methyl-1-propene

Product type : Gas.

Product use : Synthetic/Analytical chemistry.

Synonym : 1-Propene, 2-methyl-; Isobutene; Isobutylene; 1-Propene, 2-methyl- (isobutene); 1, 1-Dimethylethylene; Isopropylidenemethylene; iso-Butene; i-Butene; 2-Methylpropylene; 2-Methyl-2-propene; 2-Methyl-1-propene

SDS # : 001031

Supplier's details : Airgas USA, LLC and its affiliates
259 North Radnor-Chester Road
Suite 100
Radnor, PA 19087-5283
1-610-687-5253

24-hour telephone : 1-866-734-3438

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 : FLAMMABLE GASES - Category 1
GASES UNDER PRESSURE - Liquefied gas

GHS label elements

Hazard pictograms :

Signal word : Danger

Hazard statements : Extremely flammable gas.
May form explosive mixtures with air.
Contains gas under pressure; may explode if heated.
May displace oxygen and cause rapid suffocation.

Precautionary statements

General : Read and follow all Safety Data Sheets (SDS'S) before use. Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand. Close valve after each use and when empty. Use equipment rated for cylinder pressure. Do not open valve until connected to equipment prepared for use. Use a back flow preventative device in the piping. Use only equipment of compatible materials of construction. Always keep container in upright position. Approach suspected leak area with caution.

Prevention : Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

Response : Leaking gas fire: Do not extinguish, unless leak can be stopped safely. Eliminate all ignition sources if safe to do so.

Storage : Protect from sunlight. Store in a well-ventilated place.

Disposal : Not applicable.

Hazards not otherwise classified : In addition to any other important health or physical hazards, this product may displace oxygen and cause rapid suffocation.

Section 3. Composition/information on ingredients

Substance/mixture : Substance

Chemical name : 2-methylpropene

Other means of identification : 1-Propene, 2-methyl-; Isobutene; Isobutylene; 1-Propene, 2-methyl- (isobutene); 1, 1-Dimethylethylene; Isopropylidenemethylene; iso-Butene; i-Butene; 2-Methylpropylene; 2-Methyl-2-propene; 2-Methyl-1-propene

Product code : 001031

CAS number/other identifiers

CAS number : 115-11-7

Ingredient name	%	CAS number
Isobutylene	100	115-11-7

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. Continue to rinse for at least 10 minutes. Get medical attention if irritation occurs.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. 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 adverse health effects persist or are severe. 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. To avoid the risk of static discharges and gas ignition, soak contaminated clothing thoroughly with water before removing it. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion : As this product is a gas, refer to the inhalation section.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : No known significant effects or critical hazards.

Inhalation : No known significant effects or critical hazards.

Skin contact : No known significant effects or critical hazards.

Frostbite : Try to warm up the frozen tissues and seek medical attention.

Ingestion : As this product is a gas, refer to the inhalation section.

Over-exposure signs/symptoms

Eye contact : No specific data.

Inhalation : No specific data.

Skin contact : No specific data.

Ingestion : No specific data.

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.

Specific treatments : No specific treatment.

Section 4. First aid measures

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. 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 an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media : None known.

Specific hazards arising from the chemical : Contains gas under pressure. Extremely flammable gas. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion.

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. Contact supplier immediately for specialist advice. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool. If involved in fire, shut off flow immediately if it can be done without risk. If this is impossible, withdraw from area and allow fire to burn. Fight fire from protected location or maximum possible distance. Eliminate all ignition sources if safe to do so.

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 : Accidental releases pose a serious fire or explosion hazard. No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing gas. 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 : Ensure emergency procedures to deal with accidental gas releases are in place to avoid contamination of the environment. 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 : Immediately contact emergency personnel. Stop leak if without risk. Use spark-proof tools and explosion-proof equipment.

Large spill : Immediately contact emergency personnel. Stop leak if without risk. Use spark-proof tools and explosion-proof equipment. 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). Contains gas under pressure. Avoid breathing gas. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Do not puncture or incinerate container. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement.

Use only non-sparking tools. Avoid contact with eyes, skin and clothing. Empty containers retain product residue and can be hazardous. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment.

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 away from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10). Eliminate all ignition sources. Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F). Keep container tightly closed and sealed until ready for use. See Section 10 for incompatible materials before handling or use.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
Isobutylene	**ACGIH TLV (United States, 3/2017).** TWA: 250 ppm 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: safety glasses with side-shields.

Skin protection

Section 8. Exposure controls/personal 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. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

Appearance

Physical state : Gas. [Compressed gas.]

Color : Colorless.

Odor : Characteristic.

Odor threshold : Not available.

pH : Not available.

Melting point : -140.7°C (-221.3°F)

Boiling point : -6.9°C (19.6°F)

Critical temperature : 144.75°C (292.6°F)

Flash point : Closed cup: -76.1°C (-105°F)

Evaporation rate : Not available.

Flammability (solid, gas) : Extremely flammable in the presence of the following materials or conditions: open flames, sparks and static discharge and oxidizing materials.

Lower and upper explosive (flammable) limits : Lower: 1.8%
Upper: 9.6%

Vapor pressure : 24.3 (psig)

Vapor density : 1.94 (Air = 1)

Specific Volume (ft ^{3}/lb) : 6.6845

Gas Density (lb/ft ^{3}) : 0.1496 (25°C / 77 to °F)

Relative density : Not applicable.

Solubility : Not available.

Solubility in water : 0.26 g/l

Partition coefficient: n-octanol/water : 2.34

Auto-ignition temperature : 465°C (869°F)

Decomposition temperature : Not available.

Viscosity : Not applicable.

Flow time (ISO 2431) : Not available.

Molecular weight : 56.12 g/mole

Aerosol product

Heat of combustion : -45029034 J/kg

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.

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.

Incompatible materials : Oxidizers

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Hazardous polymerization : Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Isobutylene	LC50 Inhalation Vapor	Rat	550000 mg/m³	4 hours

Irritation/Corrosion

Not available.

Sensitization

Not available.

Mutagenicity

Not available.

Carcinogenicity

Not available.

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Information on the likely routes of exposure : Not available.

Potential acute health effects

Eye contact : No known significant effects or critical hazards.

Section 11. Toxicological information

Inhalation : No known significant effects or critical hazards.

Skin contact : No known significant effects or critical hazards.

Ingestion : As this product is a gas, refer to the inhalation section.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : No specific data.

Inhalation : No specific data.

Skin contact : No specific data.

Ingestion : No specific data.

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

Not available.

General : No known significant effects or critical hazards.

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Not available.

Section 12. Ecological information

Toxicity

Not available.

Persistence and degradability

Not available.

Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
Isobutylene	2.34	-	low

Mobility in soil

Soil/water partition coefficient (K_{OC}) : Not available.

Section 12. Ecological information

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. Empty Airgas-owned pressure vessels should be returned to Airgas. 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. Empty containers or liners may retain some product residues. Do not puncture or incinerate container.

Section 14. Transport information

	DOT	TDG	Mexico	IMDG	IATA
UN number	UN1055	UN1055	UN1055	UN1055	UN1055
UN proper shipping name	ISOBUTYLENE	ISOBUTYLENE	ISOBUTYLENE	ISOBUTYLENE	ISOBUTYLENE
Transport hazard class(es)	2.1 	2.1 	2.1 	2.1 	2.1 
Packing group	-	-	-	-	-
Environmental hazards	No.	No.	No.	No.	No.

"Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product."

Additional information

DOT Classification : **Limited quantity** Yes.
Quantity limitation Passenger aircraft/rail: Forbidden. Cargo aircraft: 150 kg.
Special provisions 19, T50

TDG Classification : Product classified as per the following sections of the Transportation of Dangerous Goods Regulations: 2.13-2.17 (Class 2).
Explosive Limit and Limited Quantity Index 0.125
ERAP Index 3000
Passenger Carrying Ship Index Forbidden
Passenger Carrying Road or Rail Index Forbidden
Special provisions 29

IATA : **Quantity limitation** Passenger and Cargo Aircraft: Forbidden. Cargo Aircraft Only: 150 kg.

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.

Transport in bulk according to Annex II of MARPOL and the IBC Code : Not available.

Section 15. Regulatory information

U.S. Federal regulations : **TSCA 8(a) CDR Exempt/Partial exemption**: Not determined

Clean Air Act (CAA) 112 regulated flammable substances: Isobutylene

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Not listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : Refer to Section 2: Hazards Identification of this SDS for classification of substance.

State regulations

Massachusetts : This material is listed.

New York : This material is not listed.

New Jersey : This material is listed.

Pennsylvania : This material is listed.

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.

Inventory list

Australia : This material is listed or exempted.

Canada : This material is listed or exempted.

China : This material is listed or exempted.

Europe : This material is listed or exempted.

Japan : **Japan inventory (ENCS)**: This material is listed or exempted.
Japan inventory (ISHL): Not determined.

Malaysia : Not determined.

New Zealand : This material is listed or exempted.

Philippines : This material is listed or exempted.

Republic of Korea : This material is listed or exempted.

Section 15. Regulatory information

Taiwan : This material is listed or exempted.

Thailand : Not determined.

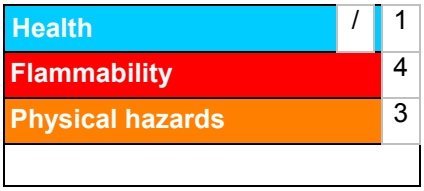
Turkey : Not determined.

United States : This material is listed or exempted.

Viet Nam : Not determined.

Section 16. Other information

Hazardous Material Information System (U.S.A.)



Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings and the associated label are not required on SDSs or products leaving a facility under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered trademark and service mark of the American Coatings Association, Inc.

The customer is responsible for determining the PPE code for this material. For more information on HMIS® Personal Protective Equipment (PPE) codes, consult the HMIS® Implementation Manual.

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
FLAMMABLE GASES - Category 1 GASES UNDER PRESSURE - Liquefied gas	Expert judgment Expert judgment

History

Date of printing : 5/10/2018

Date of issue/Date of revision : 5/10/2018

Date of previous issue : 7/11/2016

Version : 0.02

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
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL = International Convention for the Prevention of Pollution From Ships, 1973

Section 16. Other information

as modified by the Protocol of 1978. ("Marpol" = marine pollution)
UN = United Nations

References : Not available.

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, 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.

SAFETY DATA SHEET

1. Identification

Product identifier **UNLEADED GASOLINE**

Other means of identification

SDS number 002-GHS

Synonyms Regular/Premium/Midgrade - Unleaded Gasoline * RFG - Reformated Unleaded Gasoline * Conventional Unleaded Gasoline * Premium Conventional Gasoline * Oxygenated Unleaded Gasoline * Non-Oxygenated Unleaded Gasoline * CARB (California Air Resource Board) Unleaded Gasoline * PBOB - Premium Blendstock for Oxygenate Blending * RBOB - Reformulated Blendstock for Oxygenate Blending * Premium RBOB * CBOB - Conventional Blendstock for Oxygenate Blending * Petrol * Motor Fuel

Recommended use Motor fuels. Blendstock for motor fuels.

Recommended restrictions No other uses are advised.

Manufacturer/Importer/Supplier/Distributor information

Manufacturer/Supplier Valero Marketing & Supply Company and Affiliates
One Valero Way
San Antonio, TX 78269-6000

General Assistance 210-345-4593

E-Mail CorpHSE@valero.com

Contact Person Industrial Hygienist

Emergency Telephone 24 Hour Emergency 866-565-5220
1-800-424-9300 (CHEMTREC USA)

2. Hazard(s) identification

Physical hazards	Flammable liquids	Category 1
Health hazards	Skin corrosion/irritation	Category 2
	Germ cell mutagenicity	Category 1B
	Carcinogenicity	Category 1B
	Reproductive toxicity	Category 2
	Specific target organ toxicity, single exposure	Category 3 narcotic effects
	Aspiration hazard	Category 1
Environmental hazards	Hazardous to the aquatic environment, long-term hazard	Category 2

OSHA defined hazards Not classified.

Label elements

Signal word Danger

Hazard statement Extremely flammable liquid and vapor. May be fatal if swallowed and enters airways. Causes skin irritation. May cause drowsiness or dizziness. May cause genetic defects. May cause cancer. Suspected of damaging fertility or the unborn child. Toxic to aquatic life with long lasting effects.

Precautionary statement

Prevention Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Keep container tightly closed. Ground/bond container and receiving equipment. Use explosion-proof electrical/ventilating/lighting equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Avoid breathing mist/vapors. Wash thoroughly after handling. Use only outdoors or in a well-ventilated area. Avoid release to the environment. Wear protective gloves/protective clothing/eye protection/face protection.

Response	If swallowed: Immediately call a poison center/doctor. Do NOT induce vomiting. If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. If inhaled: Remove person to fresh air and keep comfortable for breathing. If exposed or concerned: Get medical advice/attention. If skin irritation occurs: Get medical advice/attention. Take off contaminated clothing and wash it before reuse. In case of fire: Use water fog, alcohol resistant foam, dry chemical powder, carbon dioxide for extinction. Collect spillage.
Storage	Keep cool. Store in a well-ventilated place. Keep container tightly closed. Store locked up.
Disposal	Dispose of contents/container in accordance with local/regional/national regulations.
Hazard(s) not otherwise classified (HNOC)	Static accumulating flammable liquid can become electrostatically charged even in bonded and grounded equipment.
Supplemental information	None.

3. Composition/information on ingredients

Mixtures

Chemical name	CAS number	%
Gasoline	86290-81-5	80 - 100

Hazardous Components of Complex Mixtures

Chemical name	CAS number	%
Octane (All isomers)	111-65-9	0 - 70
Toluene	108-88-3	0 - 30
Hexane (Other Isomers)	96-14-0	5 - 25
Xylene (o, m, p isomers)	1330-20-7	0 - 25
Butane (normal, iso and butylene)	106-97-8	0 - 15
Ethanol	64-17-5	≤ 10
1,2,4-Trimethylbenzene	95-63-6	0 - 6
Pentane (mixed isomers)	109-66-0	1 - 5
n-Heptane	142-82-5	1 - 5
Ethylbenzene	100-41-4	0 - 5
Cumene	98-82-8	≤ 5
Benzene	71-43-2	< 5
n-Hexane	110-54-3	0 - 3
Cyclohexane	110-82-7	0 - 3

Composition comments Note: Components of hazardous substances/mixtures are listed for disclosure purposes. Ranges may represent maximum regulatory limits or apply to multiple product grades (see Synonyms - Section 1). Typical and actual concentrations of individual components may be substantially less than the maximum values shown or zero, depending on the product grade or specifications.

4. First-aid measures

Inhalation	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a poison center or doctor/physician if they feel unwell.
Skin contact	Take off immediately all contaminated clothing. Rinse skin with water/shower. If skin irritation occurs: Get medical advice/attention. Wash contaminated clothing before reuse.
Eye contact	Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Get medical attention if irritation develops and persists.
Ingestion	Call a physician or poison control center immediately. Rinse mouth. Do not induce vomiting. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs.
Most important symptoms/effects, acute and delayed	Aspiration may cause pulmonary edema and pneumonitis. May cause drowsiness and dizziness. Headache. Nausea, vomiting. Direct contact with eyes may cause temporary irritation. Skin irritation. May cause redness and pain.
Indication of immediate medical attention and special treatment needed	Provide general supportive measures and treat symptomatically. Thermal 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. Keep victim under observation. Symptoms may be delayed.

General information	Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

5. Fire-fighting measures

Suitable extinguishing media	Water fog. Alcohol resistant 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	Vapors may form explosive mixtures with air. Vapors may travel considerable distance to a source of ignition and flash back. During fire, gases hazardous to health may be formed.
Special protective equipment and precautions for firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
Fire fighting equipment/instructions	In case of fire and/or explosion do not breathe fumes. Move containers from fire area if you can do so without risk.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials.
General fire hazards	Extremely flammable liquid and vapor.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Wear appropriate protective equipment and clothing during clean-up. Avoid breathing mist/vapors. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ventilate closed spaces before entering them. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.
Methods and materials for containment and cleaning up	Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Keep combustibles (wood, paper, oil, etc.) away from spilled material. Take precautionary measures against static discharge. Use only non-sparking tools. The product is immiscible with water and will spread on the water surface. This material is classified as a water pollutant under the Clean Water Act and should be prevented from contaminating soil or from entering sewage and drainage systems which lead to waterways. Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Following product recovery, flush area with water. Retain and dispose of contaminated wash water. Small Spills: Absorb with earth, sand or other non-combustible material and transfer to containers for later disposal. Clean surface thoroughly to remove residual contamination. Never return spills to original containers for re-use. Put material in suitable, covered, labeled containers. For waste disposal, see section 13 of the SDS.
Environmental precautions	Avoid release to the environment. Inform appropriate managerial or supervisory personnel of all environmental releases. Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling	Before entering storage tanks and commencing any operation in a confined area, check the atmosphere for oxygen content and flammability. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not handle, store or open near an open flame, sources of heat or sources of ignition. Protect material from direct sunlight. When using do not smoke. Explosion-proof general and local exhaust ventilation. Take precautionary measures against static discharges. All equipment used when handling the product must be grounded. Use non-sparking tools and explosion-proof equipment. Avoid breathing mist/vapors. Avoid contact with eyes, skin, and clothing. Avoid prolonged exposure. Pregnant or breastfeeding women must not handle this product. Should be handled in closed systems, if possible. Wear appropriate personal protective equipment. Wash hands thoroughly after handling. Avoid release to the environment. Observe good industrial hygiene practices.
Conditions for safe storage, including any incompatibilities	Store locked up. Keep away from heat, sparks and open flame. Prevent electrostatic charge build-up by using common bonding and grounding techniques. Store in a cool, dry place out of direct sunlight. Store in tightly closed container. Store in a well-ventilated place. Keep in an area equipped with sprinklers. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Hazardous Components of Complex Mixtures	Type	Value
Benzene (CAS 71-43-2)	STEL	5 ppm
	TWA	1 ppm

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Hazardous Components of Complex Mixtures	Type	Value
Ethanol (CAS 64-17-5)	PEL	1900 mg/m3
		1000 ppm
Xylene (o, m, p isomers) (CAS 1330-20-7)	PEL	435 mg/m3
		100 ppm
n-Hexane (CAS 110-54-3)	PEL	1800 mg/m3
		500 ppm
Cyclohexane (CAS 110-82-7)	PEL	1050 mg/m3
		300 ppm
Cumene (CAS 98-82-8)	PEL	245 mg/m3
		50 ppm
Ethylbenzene (CAS 100-41-4)	PEL	435 mg/m3
		100 ppm
n-Heptane (CAS 142-82-5)	PEL	2000 mg/m3
		500 ppm
Pentane (mixed isomers) (CAS 109-66-0)	PEL	2950 mg/m3
		1000 ppm
Octane (All isomers) (CAS 111-65-9)	PEL	2350 mg/m3
		500 ppm

US. OSHA Table Z-2 (29 CFR 1910.1000)

Hazardous Components of Complex Mixtures	Type	Value
Toluene (CAS 108-88-3)	Ceiling	300 ppm
	TWA	200 ppm
Benzene (CAS 71-43-2)	Ceiling	25 ppm
	TWA	10 ppm

US. ACGIH Threshold Limit Values

Material	Type	Value
UNLEADED GASOLINE	STEL	500 ppm
	TWA	300 ppm
Components	**Type**	**Value**
Gasoline (CAS 86290-81-5)	STEL	500 ppm
	TWA	300 ppm
Hazardous Components of Complex Mixtures	**Type**	**Value**
Ethanol (CAS 64-17-5)	STEL	1000 ppm

US. ACGIH Threshold Limit Values

Hazardous Components of Complex Mixtures	Type	Value
Butane (normal, iso and butylene) (CAS 106-97-8)	STEL	1000 ppm
Hexane (Other Isomers) (CAS 96-14-0)	STEL	1000 ppm
	TWA	500 ppm
Xylene (o, m, p isomers) (CAS 1330-20-7)	STEL	150 ppm
	TWA	100 ppm
n-Hexane (CAS 110-54-3)	TWA	50 ppm
Cyclohexane (CAS 110-82-7)	TWA	100 ppm
Toluene (CAS 108-88-3)	TWA	20 ppm
Benzene (CAS 71-43-2)	STEL	2.5 ppm
	TWA	0.5 ppm
Cumene (CAS 98-82-8)	TWA	50 ppm
Ethylbenzene (CAS 100-41-4)	TWA	20 ppm
n-Heptane (CAS 142-82-5)	STEL	500 ppm
	TWA	400 ppm
Pentane (mixed isomers) (CAS 109-66-0)	TWA	1000 ppm
1,2,4-Trimethylbenzene (CAS 95-63-6)	TWA	25 ppm
Octane (All isomers) (CAS 111-65-9)	TWA	300 ppm

US. NIOSH: Pocket Guide to Chemical Hazards

Hazardous Components of Complex Mixtures	Type	Value
Ethanol (CAS 64-17-5)	TWA	1900 mg/m3
		1000 ppm
Butane (normal, iso and butylene) (CAS 106-97-8)	TWA	1900 mg/m3
		800 ppm
Hexane (Other Isomers) (CAS 96-14-0)	Ceiling	1800 mg/m3
		510 ppm
	TWA	350 mg/m3
		100 ppm
Xylene (o, m, p isomers) (CAS 1330-20-7)	STEL	655 mg/m3
		150 ppm
	TWA	435 mg/m3
		100 ppm
n-Hexane (CAS 110-54-3)	TWA	180 mg/m3
		50 ppm
Cyclohexane (CAS 110-82-7)	TWA	1050 mg/m3
		300 ppm
Toluene (CAS 108-88-3)	STEL	560 mg/m3
		150 ppm

US. NIOSH: Pocket Guide to Chemical Hazards

Hazardous Components of Complex Mixtures	Type	Value
	TWA	375 mg/m3
		100 ppm
Benzene (CAS 71-43-2)	STEL	1 ppm
	TWA	0.1 ppm
Cumene (CAS 98-82-8)	TWA	245 mg/m3
		50 ppm
Ethylbenzene (CAS 100-41-4)	STEL	545 mg/m3
		125 ppm
	TWA	435 mg/m3
		100 ppm
n-Heptane (CAS 142-82-5)	Ceiling	1800 mg/m3
		440 ppm
	TWA	350 mg/m3
		85 ppm
Pentane (mixed isomers) (CAS 109-66-0)	Ceiling	1800 mg/m3
		610 ppm
	TWA	350 mg/m3
		120 ppm
1,2,4-Trimethylbenzene (CAS 95-63-6)	TWA	125 mg/m3
		25 ppm
Octane (All isomers) (CAS 111-65-9)	Ceiling	1800 mg/m3
		385 ppm
	TWA	350 mg/m3
		75 ppm

Biological limit values

ACGIH

Hazardous Components of Complex Mixtures	Value	Determinant	Specimen	Sampling Time
Benzene (CAS 71-43-2)	500 µg/g	t,t-Muconic acid	Creatinine in urine	*

ACGIH Biological Exposure Indices

Hazardous Components of Complex Mixtures	Value	Determinant	Specimen	Sampling Time
Xylene (o, m, p isomers) (CAS 1330-20-7)	1.5 g/g	Methylhippuric acids	Creatinine in urine	*
n-Hexane (CAS 110-54-3)	0.5 mg/l	2,5-Hexanedione, without hydrolysis	Urine	*
Toluene (CAS 108-88-3)	0.3 mg/g	o-Cresol, with hydrolysis	Creatinine in urine	*
	0.03 mg/l	Toluene	Urine	*
	0.02 mg/l	Toluene	Blood	*
Benzene (CAS 71-43-2)	25 µg/g	S-Phenylmercapturic acid	Creatinine in urine	*

ACGIH Biological Exposure Indices

Hazardous Components of Complex Mixtures	Value	Determinant	Specimen	Sampling Time
Ethylbenzene (CAS 100-41-4)	0.15 g/g	Sum of mandelic acid and phenylglyoxylic acid	Creatinine in urine	*

* - For sampling details, please see the source document.

Exposure guidelines

US - California OELs: Skin designation

Benzene (CAS 71-43-2)	Can be absorbed through the skin.
Cumene (CAS 98-82-8)	Can be absorbed through the skin.
n-Hexane (CAS 110-54-3)	Can be absorbed through the skin.
Toluene (CAS 108-88-3)	Can be absorbed through the skin.

US - Minnesota Haz Subs: Skin designation applies

Cumene (CAS 98-82-8)	Skin designation applies.
Toluene (CAS 108-88-3)	Skin designation applies.

US - Tennessee OELs: Skin designation

Cumene (CAS 98-82-8)	Can be absorbed through the skin.

US ACGIH Threshold Limit Values: Skin designation

Benzene (CAS 71-43-2)	Danger of cutaneous absorption
n-Hexane (CAS 110-54-3)	Danger of cutaneous absorption

US. NIOSH: Pocket Guide to Chemical Hazards

Cumene (CAS 98-82-8)	Can be absorbed through the skin.

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Cumene (CAS 98-82-8)	Can be absorbed through the skin.

Appropriate engineering controls Explosion-proof general and local exhaust ventilation. Good general ventilation 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. Provide eyewash station and safety shower.

Individual protection measures, such as personal protective equipment

Eye/face protection Wear safety glasses with side shields (or goggles).

Skin protection

Hand protection Wear protective gloves. Viton® or nitrile rubber gloves are possible options. Verify chemical resistant charts before using. Be aware that the liquid may penetrate the gloves. Frequent change is advisable. Suitable gloves can be recommended by the glove supplier.

Skin protection

Other Wear appropriate chemical resistant clothing. Use of an impervious apron is recommended.

Respiratory protection When conditions indicate, use chemical respirator with organic vapor cartridge and full facepiece or other appropriate methods.

Thermal hazards Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations Observe any medical surveillance requirements. When using do not smoke. 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

Physical state Liquid.

Form Liquid.

Color Clear to straw yellow.

Odor Characteristic Gasoline Odor (Strong).

Odor threshold Not available.

pH Not available.

Melting point/freezing point	< -76 °F (< -60 °C)
Initial boiling point and boiling range	80.1 - 440.1 °F (26.7 - 226.7 °C) (20% Evaporated Point: ≥100 °F)
Flash point	-40.0 °F (-40.0 °C) (closed cup)
Evaporation rate	10 - 11 BuAc
Flammability (solid, gas)	Not applicable.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	1.3 %
Flammability limit - upper (%)	7.1 %
Vapor pressure	60.8 - 101.3 kPa (20°C)
Vapor density	3 - 4 (Air=1)
Relative density	Not available.
Solubility(ies)	
Solubility (water)	Very slightly soluble.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	> 500 °F (> 260 °C)
Decomposition temperature	Not available.
Viscosity	Not available.
Other information	
Explosive properties	Not explosive.
Flash point class	Flammable IB
Oxidizing properties	Not oxidizing.
VOC	100 %

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	Hazardous polymerization does not occur.
Conditions to avoid	Avoid heat, sparks, open flames and other ignition sources. Avoid temperatures exceeding the flash point. Contact with incompatible materials.
Incompatible materials	Strong oxidizing agents.
Hazardous decomposition products	No hazardous decomposition products are known.

11. Toxicological information

Information on likely routes of exposure

Inhalation	May cause drowsiness and dizziness. Headache. Nausea, vomiting. Prolonged inhalation may be harmful.
Skin contact	Causes skin irritation.
Eye contact	Direct contact with eyes may cause temporary irritation.
Ingestion	Droplets of the product aspirated into the lungs through ingestion or vomiting may cause a serious chemical pneumonia.
Symptoms related to the physical, chemical and toxicological characteristics	Aspiration may cause pulmonary edema and pneumonitis. May cause drowsiness and dizziness. Headache. Nausea, vomiting. Skin irritation. May cause redness and pain.

Information on toxicological effects

Acute toxicity	May be fatal if swallowed and enters airways. Hydrogen sulfide, a highly toxic gas, may be present. Signs and symptoms of overexposure to hydrogen sulfide include respiratory and eye irritation, dizziness, nausea, coughing, a sensation of dryness and pain in the nose, and loss of consciousness. Odor does not provide a reliable indicator of the presence of hazardous levels in the atmosphere.

Components	Species	Test Results
Gasoline (CAS 86290-81-5)		
Acute		
Dermal		
LD50	Rabbit	> 2000 mg/kg, 24 Hours
Inhalation		
Vapor		
LC50	Rat	> 5610 mg/m3, 4 Hours
Oral		
LD50	Rat	> 5000 mg/kg

Hazardous Components of Complex Mixtures	Species	Test Results
Ethanol (CAS 64-17-5)		
Acute		
Dermal		
LD50	Rat	> 2000 mg/kg
Inhalation		
Vapor		
LC50	Mouse	39 g/m3, 4 Hours
Oral		
LD50	Rat	7000 - 11000 mg/kg
Butane (normal, iso and butylene) (CAS 106-97-8)		
Acute		
Inhalation		
LC50	Rat	658 mg/l, 4 Hours
Xylene (o, m, p isomers) (CAS 1330-20-7)		
Acute		
Oral		
LD50	Rat	3523 mg/kg
Cyclohexane (CAS 110-82-7)		
Acute		
Oral		
LD50	Rat	12710 mg/kg
n-Hexane (CAS 110-54-3)		
Acute		
Oral		
LD50	Rat	28710 mg/kg
Toluene (CAS 108-88-3)		
Acute		
Dermal		
LD50	Rabbit	12200 mg/kg
Inhalation		
Vapor		
LC50	Rat	28.1 mg/l, 4 Hours
Benzene (CAS 71-43-2)		
Acute		
Oral		
LD50	Rat	930 mg/kg

Hazardous Components of Complex Mixtures	Species	Test Results
Ethylbenzene (CAS 100-41-4)		
Acute		
Dermal		
LD50	Rabbit	15400 mg/kg
Inhalation		
LC50	Rat	17.4 mg/l, 4 hours
Oral		
LD50	Rat	3500 - 4700 mg/kg
n-Heptane (CAS 142-82-5)		
Acute		
Inhalation		
Vapor		
LC50	Rat	> 29.29 mg/l, 4 Hours
Oral		
LD50	Rat	15000 mg/kg
Pentane (mixed isomers) (CAS 109-66-0)		
Other		
NOAEL	Rat	> 1000 mg/kg/day
Acute		
Dermal		
LD50	Rabbit	3000 mg/kg/day
Inhalation		
LC50	Rat	18 mg/l, 4 Hours
Oral		
LD50	Rat	> 2000 mg/kg/day
Chronic		
Other		
NOAEL	Rat	20 mg/l
1,2,4-Trimethylbenzene (CAS 95-63-6)		
Acute		
Oral		
LD50	Rat	2720 - 3960 mg/kg

Skin corrosion/irritation Causes skin irritation.

Serious eye damage/eye irritation Direct contact with eyes may cause temporary irritation.

Respiratory or skin sensitization

Respiratory sensitization Not a respiratory sensitizer.

Skin sensitization This product is not expected to cause skin sensitization.

Germ cell mutagenicity May cause genetic defects.

Carcinogenicity May cause cancer.

IARC Monographs. Overall Evaluation of Carcinogenicity

Benzene (CAS 71-43-2)	1 Carcinogenic to humans.
Cumene (CAS 98-82-8)	2B Possibly carcinogenic to humans.
Ethylbenzene (CAS 100-41-4)	2B Possibly carcinogenic to humans.
Gasoline (CAS 86290-81-5)	2B Possibly carcinogenic to humans.
Toluene (CAS 108-88-3)	3 Not classifiable as to carcinogenicity to humans.
Xylene (o, m, p isomers) (CAS 1330-20-7)	3 Not classifiable as to carcinogenicity to humans.

NTP Report on Carcinogens

Benzene (CAS 71-43-2)	Known To Be Human Carcinogen.
Cumene (CAS 98-82-8)	Reasonably Anticipated to be a Human Carcinogen.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Benzene (CAS 71-43-2) Cancer

Reproductive toxicity Suspected of damaging fertility or the unborn child.

Specific target organ toxicity - single exposure May cause drowsiness and dizziness.

Specific target organ toxicity - repeated exposure Not classified.

Aspiration hazard May be fatal if swallowed and enters airways.

Chronic effects Prolonged inhalation may be harmful. Prolonged exposure may cause chronic effects.

Further information May be absorbed through the skin.

12. Ecological information

Ecotoxicity Toxic to aquatic life with long lasting effects.

Components		Species	Test Results
Gasoline (CAS 86290-81-5)			
Aquatic			
Algae	EC50	Pseudokirchneriella subcapitata	3.1 mg/l, 72 Hours
Crustacea	EC50	Daphnia magna	4.5 mg/l, 48 Hours
Fish	LC50	Oncorhynchus mykiss	10 mg/l, 96 Hours
		Pimephales promelas	8.2 mg/l, 96 Hours
Hazardous Components of Complex Mixtures		**Species**	**Test Results**
Ethanol (CAS 64-17-5)			
Aquatic			
Acute			
Crustacea	LC50	Ceriodaphnia dubia	5012 mg/l, 48 hours
		Daphnia magna	454 mg/l, 11 days
Fish	LC50	Pimephales promelas	13480 mg/l, 96 hours
Chronic			
Crustacea	NOEC	Ceriodaphnia dubia	9.6 mg/l, 10 days
Xylene (o, m, p isomers) (CAS 1330-20-7)			
Aquatic			
Fish	LC50	Rainbow trout,donaldson trout (Oncorhynchus mykiss)	2.6 mg/l, 96 hours
Cyclohexane (CAS 110-82-7)			
Aquatic			
Crustacea	EC50	Water flea (Daphnia magna)	0.9 mg/l, 48 hours
Acute			
Fish	LC50	Fathead minnow (Pimephales promelas)	3.961 - 5.181 mg/l, 96 hours
n-Hexane (CAS 110-54-3)			
Aquatic			
Acute			
Fish	LC50	Fathead minnow (Pimephales promelas)	2.101 - 2.981 mg/l, 96 hours
Toluene (CAS 108-88-3)			
Aquatic			
Acute			
Crustacea	EC50	Daphnia magna	11.5 mg/l, 48 hours
Fish	LC50	Oncorhynchus kisutch	5.5 mg/l, 96 hours
Chronic			
Crustacea	NOEC	Ceriodaphnia dubia	0.74 mg/l, 7 days
Fish	NOEC	Oncorhynchus kisutch	1.4 mg/l, 40 days

Hazardous Components of Complex Mixtures		Species	Test Results
Ethylbenzene (CAS 100-41-4)			
Aquatic			
Acute			
Crustacea	EC50	Water flea (Daphnia magna)	1.81 - 2.38 mg/l, 48 hours
Fish	LC50	Rainbow trout,donaldson trout (Oncorhynchus mykiss)	4.2 mg/l, 96 hours
Chronic			
Crustacea	EC50	Ceriodaphnia dubia	3.6 mg/l, 7 days
Pentane (mixed isomers) (CAS 109-66-0)			
Acute			
	EC50	Selenastrum capricornutum (new Pseudokirchneriella subcapita	7.51 mg/l, 72 Hours
Aquatic			
Acute			
Crustacea	EC50	Daphnia magna	2.7 mg/l, 48 Hours
Fish	LC50	Oncorhynchus mykiss	4.26 mg/l, 96 Hours
1,2,4-Trimethylbenzene (CAS 95-63-6)			
Aquatic			
Acute			
Fish	LC50	Fathead minnow (Pimephales promelas)	7.72 mg/l, 96 hours
Octane (All isomers) (CAS 111-65-9)			
Aquatic			
Crustacea	LC50	Daphnia magna	0.38 mg/l, 48 hours

Persistence and degradability Expected to be inherently biodegradable.

Bioaccumulative potential The product is not bioaccumulating.

Mobility in soil No data available.

Other adverse effects Oil spills are generally hazardous to the environment. The product contains volatile organic compounds which have a photochemical ozone creation potential.

13. Disposal considerations

Disposal instructions Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Incinerate the material under controlled conditions in an approved incinerator. Do not incinerate sealed containers. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container. Dispose of contents/container in accordance with local/regional/national/international regulations.

Local disposal regulations Dispose in accordance with all applicable regulations.

Hazardous waste code D001: Waste Flammable material with a flash point <140 F
D018: Waste Benzene
The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

US RCRA Hazardous Waste U List: Reference

Benzene (CAS 71-43-2)	U019
Cumene (CAS 98-82-8)	U055
Cyclohexane (CAS 110-82-7)	U056
Toluene (CAS 108-88-3)	U220
Xylene (o, m, p isomers) (CAS 1330-20-7)	U239

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 Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport information

DOT

UN number	UN1203
UN proper shipping name	Gasoline
Transport hazard class(es)	
Class	3
Subsidiary risk	-
Label(s)	3
Packing group	II
Environmental hazards	
Marine pollutant	Yes
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Special provisions	144, 177, B1, B33, IB2, T4, TP1
Packaging exceptions	150
Packaging non bulk	202
Packaging bulk	242

IATA

UN number	UN1203
UN proper shipping name	GASOLINE
Transport hazard class(es)	
Class	3
Subsidiary risk	-
Packing group	II
Environmental hazards	Yes
ERG Code	3H
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

IMDG

UN number	UN1203
UN proper shipping name	GASOLINE
Transport hazard class(es)	
Class	3
Subsidiary risk	-
Packing group	II
Environmental hazards	
Marine pollutant	Yes
EmS	F-E, S-E
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	Not applicable. However, this product is a liquid and if transported in bulk covered under MARPOL 73/78, Annex I.
General information	Shipping descriptions in this section are offered as examples only. Classification for transport must accurately reflect the material hazards as designated under a variety of regulations and is solely the responsibility of the person offering the material for transport into commerce.

15. Regulatory information

US federal regulations This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

Benzene (CAS 71-43-2)	Listed.
Butane (normal, iso and butylene) (CAS 106-97-8)	Listed.
Cumene (CAS 98-82-8)	Listed.
Cyclohexane (CAS 110-82-7)	Listed.
Ethylbenzene (CAS 100-41-4)	Listed.
Gasoline (CAS 86290-81-5)	Listed.
Hexane (Other Isomers) (CAS 96-14-0)	Listed.
n-Heptane (CAS 142-82-5)	Listed.
n-Hexane (CAS 110-54-3)	Listed.
Octane (All isomers) (CAS 111-65-9)	Listed.

Pentane (mixed isomers) (CAS 109-66-0) Listed.
Toluene (CAS 108-88-3) Listed.
Xylene (o, m, p isomers) (CAS 1330-20-7) Listed.

SARA 304 Emergency release notification

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Benzene (CAS 71-43-2)
Cancer
Central nervous system
Blood
Aspiration
Skin
Eye
respiratory tract irritation
Flammability

Toxic Substances Control Act (TSCA) All components of the mixture on the TSCA 8(b) inventory are designated "active".

Superfund Amendments and Reauthorization Act of 1986 (SARA)

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical Yes

Classified hazard categories
Flammable (gases, aerosols, liquids, or solids)
Skin corrosion or irritation
Germ cell mutagenicity
Carcinogenicity
Reproductive toxicity
Specific target organ toxicity (single or repeated exposure)
Aspiration hazard
Hazard not otherwise classified (HNOC)

SARA 313 (TRI reporting)

Chemical name	CAS number	% by wt.
1,2,4-Trimethylbenzene	95-63-6	0 - 6
Benzene	71-43-2	< 5
Cumene	98-82-8	≤ 5
Cyclohexane	110-82-7	0 - 3
Ethylbenzene	100-41-4	0 - 5
n-Hexane	110-54-3	0 - 3
Toluene	108-88-3	0 - 30
Xylene (o, m, p isomers)	1330-20-7	0 - 25

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Benzene (CAS 71-43-2)
Cumene (CAS 98-82-8)
Ethylbenzene (CAS 100-41-4)
n-Hexane (CAS 110-54-3)
Toluene (CAS 108-88-3)
Xylene (o, m, p isomers) (CAS 1330-20-7)

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Butane (normal, iso and butylene) (CAS 106-97-8)
Pentane (mixed isomers) (CAS 109-66-0)

Safe Drinking Water Act (SDWA) Not regulated.

Drug Enforcement Administration (DEA). List 2, Essential Chemicals (21 CFR 1310.02(b) and 1310.04(f)(2) and Chemical Code Number

Toluene (CAS 108-88-3) 6594

Drug Enforcement Administration (DEA). List 1 & 2 Exempt Chemical Mixtures (21 CFR 1310.12(c))

Toluene (CAS 108-88-3) 35 %WV

DEA Exempt Chemical Mixtures Code Number

Toluene (CAS 108-88-3) 594

FEMA Priority Substances Respiratory Health and Safety in the Flavor Manufacturing Workplace

Ethanol (CAS 64-17-5)	Low priority

US state regulations

US. Massachusetts RTK - Substance List

1,2,4-Trimethylbenzene (CAS 95-63-6)
Benzene (CAS 71-43-2)
Butane (normal, iso and butylene) (CAS 106-97-8)
Cumene (CAS 98-82-8)
Cyclohexane (CAS 110-82-7)
Ethanol (CAS 64-17-5)
Ethylbenzene (CAS 100-41-4)
Hexane (Other Isomers) (CAS 96-14-0)
n-Heptane (CAS 142-82-5)
n-Hexane (CAS 110-54-3)
Octane (All isomers) (CAS 111-65-9)
Pentane (mixed isomers) (CAS 109-66-0)
Toluene (CAS 108-88-3)
Xylene (o, m, p isomers) (CAS 1330-20-7)

US. New Jersey Worker and Community Right-to-Know Act

1,2,4-Trimethylbenzene (CAS 95-63-6)
Benzene (CAS 71-43-2)
Butane (normal, iso and butylene) (CAS 106-97-8)
Cumene (CAS 98-82-8)
Cyclohexane (CAS 110-82-7)
Ethanol (CAS 64-17-5)
Ethylbenzene (CAS 100-41-4)
n-Heptane (CAS 142-82-5)
n-Hexane (CAS 110-54-3)
Octane (All isomers) (CAS 111-65-9)
Pentane (mixed isomers) (CAS 109-66-0)
Toluene (CAS 108-88-3)
Xylene (o, m, p isomers) (CAS 1330-20-7)

US. Pennsylvania Worker and Community Right-to-Know Law

1,2,4-Trimethylbenzene (CAS 95-63-6)
Benzene (CAS 71-43-2)
Butane (normal, iso and butylene) (CAS 106-97-8)
Cumene (CAS 98-82-8)
Cyclohexane (CAS 110-82-7)
Ethanol (CAS 64-17-5)
Ethylbenzene (CAS 100-41-4)
Gasoline (CAS 86290-81-5)
Hexane (Other Isomers) (CAS 96-14-0)
n-Heptane (CAS 142-82-5)
n-Hexane (CAS 110-54-3)
Octane (All isomers) (CAS 111-65-9)
Pentane (mixed isomers) (CAS 109-66-0)
Toluene (CAS 108-88-3)
Xylene (o, m, p isomers) (CAS 1330-20-7)

US. Rhode Island RTK

1,2,4-Trimethylbenzene (CAS 95-63-6)
Benzene (CAS 71-43-2)
Butane (normal, iso and butylene) (CAS 106-97-8)
Cumene (CAS 98-82-8)
Cyclohexane (CAS 110-82-7)
Ethanol (CAS 64-17-5)
Ethylbenzene (CAS 100-41-4)
n-Heptane (CAS 142-82-5)
n-Hexane (CAS 110-54-3)
Octane (All isomers) (CAS 111-65-9)
Pentane (mixed isomers) (CAS 109-66-0)
Toluene (CAS 108-88-3)
Xylene (o, m, p isomers) (CAS 1330-20-7)

California Proposition 65

WARNING: This product can expose you to chemicals including Benzene, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

California Proposition 65 - CRT: Listed date/Carcinogenic substance

Benzene (CAS 71-43-2)	Listed: February 27, 1987
Cumene (CAS 98-82-8)	Listed: April 6, 2010
Ethylbenzene (CAS 100-41-4)	Listed: June 11, 2004

California Proposition 65 - CRT: Listed date/Developmental toxin

Benzene (CAS 71-43-2)	Listed: December 26, 1997
Toluene (CAS 108-88-3)	Listed: January 1, 1991

California Proposition 65 - CRT: Listed date/Male reproductive toxin

Benzene (CAS 71-43-2)	Listed: December 26, 1997
n-Hexane (CAS 110-54-3)	Listed: December 15, 2017

US. California. Candidate Chemicals List. Safer Consumer Products Regulations (Cal. Code Regs, tit. 22, 69502.3, subd. (a))

1,2,4-Trimethylbenzene (CAS 95-63-6)
Benzene (CAS 71-43-2)
Butane (normal, iso and butylene) (CAS 106-97-8)
Cumene (CAS 98-82-8)
Cyclohexane (CAS 110-82-7)
Ethylbenzene (CAS 100-41-4)
Gasoline (CAS 86290-81-5)
n-Heptane (CAS 142-82-5)
n-Hexane (CAS 110-54-3)
Octane (All isomers) (CAS 111-65-9)
Pentane (mixed isomers) (CAS 109-66-0)
Toluene (CAS 108-88-3)
Xylene (o, m, p isomers) (CAS 1330-20-7)

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
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)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
Taiwan	Taiwan Chemical Substance Inventory (TCSI)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates this product complies 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 13-May-2013
Revision date 30-June-2020
Version # 06
NFPA ratings

References	CONCAWE
Disclaimer	The information in this Safety Data Sheet (SDS) was obtained from sources believed to be reliable and accurate, and is not represented as being absolutely complete. The end user of this product has the responsibility for evaluating the adequacy of the data for the intended application and conditions of use; for determining the safety, toxicity, regulatory requirements, and suitability of the product under these conditions; and for obtaining additional or clarifying data where uncertainty exists. The data serves as general guidance only, and is to be used in combination with professional judgement of persons experienced in a specific application, use or process; and additional data may be required. Valero Marketing & Supply Co., (Valero) provides this data without any warranty, expressed or implied regarding its correctness or accuracy; and does not assume any liability arising out of product handling, storage, use or disposal by others.

APPENDIX C

Heat Illness Prevention Program

HEAT ILLNESS
PREVENTION PROGRAM

CORPORATE HEALTH AND SAFETY DIRECTOR	:	**Brian Hobbs, CIH, CSP**
EFFECTIVE DATE	:	**10/2019**
REVISION DATE	:	**03/2025**
REVISION NUMBER	:	**4**

TABLE OF CONTENTS

1. PURPOSE

Roux Associates, Inc. and its affiliated companies, Roux Environmental Engineering and Geology, D.P.C, and Remedial Engineering (collectively, "Roux"), have established this heat illness prevention program to assist in preventing workplace accidents, injuries, and illnesses associated with temperature extremes. Roux is committed to taking every precaution to protect employees who might be exposed to heat stress, including establishing safe work practices, heat illness prevention controls, and emergency preparedness, which will be detailed in this plan.

2. SCOPE AND APPLICABILITY

Roux's Heat Illness Prevention Program applies to all employees and subcontractors who may be exposed to heat stress in the field.

3. ROLES AND RESPONSIBILITIES

The Heat Illness Prevention Program Administrator for Roux is the Corporate Health and Safety Director (CHSD), Brian Hobbs, CIH, CSP. The daily administration of the program is delegated to the Operations Manager (OM) , Office Health and Safety Manager (OHSM), and Site Health and Safety Officer (SHSO). The CHSD has the authority, responsibility, and overall accountability for the comprehensive implementation of this program.

All managers and supervisors shall implement and maintain the heat illness prevention program in work areas where there is a potential for heat stress.

Management Responsibilities

Management (i.e., Project Managers, Project Principals, OM) must provide the following to promote compliance and foster a good safety culture:

- Comply with applicable standards.
- Inform employees of the provisions of the heat illness prevention program and ensure understanding.
- Provide sufficient water, shade, rest areas, and other heat illness controls for employees.
- Assist with establishing work practices to minimize heat stress risks, such as acclimatization, required rest periods, employee monitoring, and strategic scheduling.
- Encourage employees to report hazardous conditions or heat illness symptoms.
- Provide training to any employee who could possibly be exposed to the risk of heat illness.

Employee Responsibilities

Employees are expected to actively participate in the organization's heat illness prevention program, which includes the following responsibilities:

- Receive appropriate training with regard to heat stress.
- Understand core concepts of heat illness prevention and follow guidelines to mitigate risks.
- Recognize the signs and symptoms of heat illness and immediately report them.
- Cooperate with workplace inspections and incident investigations.

Effective Communication

All Roux employees shall be accountable for ensuring there is effective communication with both the field team and their subcontractors. Communication between Roux employees, project leads (e.g., Project Principal, Project

Managers), and subcontractors (if applicable) will be established and maintained so that employees can quickly contact should there be a change in condition or someone at the Site exhibits signs/symptoms of heat stress. These types of incidents would follow Roux's Incident Investigation and Reporting Management Program 2.12 and Roux's Injury Illness Prevention Program 2.22.

4. HAZARD IDENTIFICATION AND ASSESSMENT

Prior to scheduled fieldwork, the project team shall ensure a hazard assessment is conducted as it relates to heat stress. This will include a determination of how much heat and exertion employees are likely to be exposed to based on the work activity.

Factors that can increase heat stress include the following:

- Temperatures at the work site;
- Humidity;
- A lack of air movement or exchange;
- The amount of time employees spend working in the heat;
- The time of day work takes place;
- Sources of radiant heat (e.g., sunlight, fire, or hot furnace);
- Work activities that produce heat (e.g., welding);
- Physical contact with warm or hot objects or liquids;
- The clothing and PPE employees are required to wear; and/or
- Physically strenuous work.

Results of the hazard analysis should be used to determine appropriate controls for mitigating heat stress, whenever possible, for planning acclimatization, and for developing work schedules that rotate workers to limit employee exposure. Typically, the Site Supervisor (SS) or Site Health and Safety Officer (SHSO) shall conduct worksite observations to ensure all employees follow heat illness prevention procedures and that hazards are sufficiently controlled. However, all employees should be continuously evaluating work site conditions and be able to recognize heat stressors in order to prevent heat illnesses.

5. TRAINING

All Roux employees shall be trained on the topics listed below prior to beginning work, which may potentially expose workers to heat stress.

Training Topics

- The environmental, behavioral, and personal risk factors for heat illness, such as radiant heat sources, exertion, clothing and PPE, and use of alcohol or drugs.
- Types of heat illnesses, common symptoms, and appropriate emergency response for each.
- The knowledge that mild symptoms may quickly become more severe or life-threatening.
- The importance of immediately reporting any signs or symptoms of heat illness to the supervisor.
- The employer's responsibility to provide shade, water, access to first aid, and cool-down rests during work and the employee's freedom to exercise their rights under this standard without fear of retaliation.

- The employer's heat stress plan and its procedures:
  - Procedures for employees who are newly assigned to work in high-heat areas.
  - The organization's acclimatization methods, as applicable.
  - Heatwave procedures.
  - Heat illness and emergency response, including contact information.
- The importance of frequent consumption of water and the taking of rest breaks.
- How heat illness prevention applies to employees' specific tasks.

Increasing Training Effectiveness:

- The SS/SHSO will hold daily tailgates with the field team to go over daily work tasks and basic safety information, including Job Safety Analysis (JSA) review, as well as incorporate elements such as current weather and effects on the work activities for the day.
- If a heat wave or high heat is anticipated, OHSMs and/or OMs will provide communications to Roux employees prior to their shifts and remind them of any special high heat procedures.

6. DRINKING WATER

Employees shall be given access to potable drinking water. Access to water will be provided as near as possible to where employees are working, and there shall be enough locations so employees will have sufficient water. Water should be fresh and pure, free of taste or smell that would discourage employees from drinking, comfortably cool, and obtained from an approved source.

The recommendation is that during warm or hot weather, employees drink four 8-ounce glasses of water, or a total of one quart per hour, throughout the entire work shift. Easy access to sufficient potable drinking water throughout the work shift encourages employees to drink.

During a heat wave, water shall be replenished more often to keep it available and cool. Water containers (and all spouts and levers) must be kept clean. If able, provide single-use drinking cups with appropriate waste receptacles. Accessible sanitation facilities shall also be maintained at work Sites as appropriate.

SS/SHSO is responsible for the following:

- Drink sufficient water before, during, and after work shifts to maintain hydration.
- Encourage frequent drinking of small amounts of water throughout the shift. In high-heat environments, remind field staff and subcontractors that drinking extra water may be necessary.
- Discourage the choice of drinks with caffeine or sugar that may possibly dehydrate employees instead of water. Also, discourage the drinking of alcohol.
- Monitor the water supply.
- If employees become dehydrated and are unable to alleviate symptoms with the steps below, get them immediate medical attention.

Field Staff/Subcontractors are responsible for the following:

- Drink sufficient water before, during, and after work shifts to maintain hydration. Drink up to 4 cups of water per hour, especially during hot weather.
- Be aware that in high-heat situations, you may need to drink more water.

- Monitor yourself and others for signs of dehydration. If you feel dehydrated:
  - Follow Roux's Incident Notification Flowchart;
  - Rest in the shaded resting area; and
  - Drink water in small amounts, but frequently.

7. ACCESS TO SHADE

Access to shaded areas will be provided to Roux staff, as needed. Employees are encouraged to use these areas when they feel overheated. Roux's SS/SHSO shall oversee the proper implementation of shaded areas and will communicate these locations on a daily basis with the Field Team.

Depending on the Site, shaded areas can include the following:

- Pop-up Tents
- Canopies
- Umbrellas
- Structures mechanically ventilated or open to air movement
  - Garage
- Conex-mounted RV canopies
- Full and thick tree canopies that block direct sunlight
- Buildings
- Enclosed areas only if they provide cooling comparable to shade in open-air
  - Vehicles with air conditioning

Shaded Area Requirements

The shade shall be strong enough to cool employees down and other shadows should not be visible in the shade. The shade will be provided by Roux when the air temperature exceeds 80°F. If the temperature is less than 80°F, shade will be available and provided upon request. The SS/SHSO will monitor conditions to determine when the air will exceed (and is exceeding) 80°F. For most Sites, air will be monitored hourly and shade will be set up immediately if 80°F is exceeded.

Shade shall be located as close as practical to areas where employees are working and is easily accessible. These areas will be considered safe and free from other hazards. Shaded areas should be large enough to accommodate all employees who are on a break, resting, or recovering without crowding. Should natural vegetation be used for shade, the SS/SHSO will evaluate shade for effectiveness.

Field Staff Responsibilities

Field Staff should take ordinary rest breaks in the shaded areas and monitor themselves for signs of heat stress, and go to the shaded area when they need to cool down. Any issues or problems with shaded areas should be reported to the SS/SHSO for the Site.

If shaded areas are used for a preventative cool-down, the SS/SHSO will ensure the affected employees will remain in the shade until they begin to feel better. The SS/SHSO will continue to monitor the employees and ask them if

they are experiencing symptoms of a heat illness. Employees shall not be sent back to work before symptoms have ended and at a minimum at least 10 minutes of rest.

8. MONITORING AND SCHEDULING

Monitoring

The SS/SHSO and Field Team will continue to monitor themselves and others for signs of heat illness. The SS/SHSO will monitor when the air temperature exceeds 80°F. Throughout the summer, weather and temperature will be monitored at least two weeks ahead, and the work schedule will be planned to accommodate the expected weather.

Scheduling

Scheduling accommodations may include:

- Working during cooler hours of the day
- Working at night
- Stopping work early
- Rescheduling work activities
- Increasing frequency of breaks

In general, strenuous work activities shall be rescheduled to the coolest parts of the day.

Special precautions are required for temperatures above 80°F, 95°F, and heat waves. These precautions are provided in the sections below.

9. ACCLIMATIZATION AND NEW EMPLOYEE PROCEDURES

Roux requires employees to be acclimatized in order for them to better tolerate heat in the workplace. Acclimatization is the physical process of adapting to a different thermal environment, allowing a better toleration of heat. Acclimatization procedures require gradual exposure that gives the employee time to adjust to each level of exposure. Acclimatization is essential for new employees but is necessary for all employees when the temperature significantly changes. Heat stress is much more likely if these procedures are not followed.

The SS/SHSO is responsible for observing new employees during their first 14 days of employment in high-heat areas.

Re-acclimatization is necessary if employees are absent from high-heat environments for a week or more or the temperature increases significantly.

10. HEATWAVE AND EXTREME HEAT PROCEDURES

Heat Wave Procedures

A heat wave is defined as consistent temperatures over 80°F or if the temperature is 10° higher than the average daily temperatures in the preceding 5 days.

SS/SHSO and Project Management (e.g., PP, PM) shall closely observe and monitor employees during a heat wave. The Field Teams should institute a ratio of one SS to 20 or fewer employees, a mandatory buddy system, or

a consistent practice for supervisors to check on employees. Pre-shift meetings to review high-heat procedures with employees will be carried out to emphasize work-rest schedules, drinking water, shade, etc.

Extreme Heat Procedures

When work-site temperatures equal or exceed 95°F, the employer will enact extreme heat procedures:

- Employees will be closely observed by the SS/SHSO for signs of heat illness. New employees will be supervised for acclimatization.
- Effective communication and monitoring will be ensured through the use of periodic check-ins via phone with the SS/SHSO. Communications between employees and Project Management (e.g., PP/PM) will be established and maintained. Mandatory 10-minute break periods are required for every two hours worked. SS/SHSO must enforce this rule.
- Pre-shift safety tailgate meetings will occur to review procedures and to remind employees to drink water and take cool-down rests if needed. SS/SHSO shall remind employees to rest and drink water. Employees should drink more water than usual.

11. EMERGENCY RESPONSE PROCEDURES

Roux is dedicated to providing prompt appropriate care for all employees who report or show symptoms of heat illness. If an employee shows signs of heat illness, they will be monitored and shall not be left alone or sent home without being offered first aid or emergency medical services. If on-site personnel require any medical treatment, the following steps will be taken:

1. Notify Roux's Project and Corporate Management Team for any work-related injury and/or illness occurrence, and communicate with the contracted Occupational Health Care Management Provider, AllOne Health (AOH), immediately following the notifications provided above.
2. Based on discussions with the Project Team, Corporate Management, and the AOH evaluation, if medical attention beyond onsite First Aid is warranted, transport the injured/ill person (IP) to the Urgent Care Center, or notify the Fire Department or Ambulance Emergency service and request an ambulance or transport the victim to the hospital, and continue communications with Corporate Management Team. An Urgent Care/Hospital Route map with locations and directions is provided within Site Specific Health and Safety Plans.
3. First aid medical support will be provided by onsite personnel trained and certified in First Aid, Cardio Pulmonary Resuscitation (CPR), Automatic External Defibrillation (AED), and Blood-Borne Pathogens (BBP) Awareness, until relieved by emergency medical services (EMS).
4. The SHSO and Project Manager will perform a Loss Investigation (LI), and the Project Team will complete the final Loss Report.

12. HEAT-RELATED ILLNESSES

Heat Stress

Heat stress is a significant potential hazard and can be associated with heavy physical activity and/or the use of personal protective equipment (PPE) in hot-weather environments. For these reasons, the company will provide potable drinking water and access to shade or other areas of relief (i.e., air-conditioned vehicles and work trailers). Supervisors, prior to supervising personnel in the field as well as all personnel involved with the fieldwork of a project, are trained in this HASP that includes preventing heat-related illnesses and the below procedures in response to heat-related symptoms and illness. Since much of our work is dependent upon environmental factors beyond our control, we must closely monitor air temperature and humidity and be aware of avoiding radiant heat sources and providing as much air circulation as possible wherever we work. Physical factors that need to be evaluated as part of our Job Safety Analysis (JSA) reviews include the level of physical activity and duration of work

and the type (i.e., color, weight breathability) of the clothing we select. In addition, personal factors such as age, weight, fitness, drug/alcohol use, and prior history of heat-related illness need to be considered.

Heat cramps are brought on by prolonged exposure to heat. As an individual sweats, water and salts are lost by the body, resulting in painful muscle cramps. The signs and symptoms of heat stress are as follows:

- Severe muscle cramps, usually in the legs and abdomen;
- Exhaustion, often to the point of collapse; and
- Dizziness or periods of faintness.

First aid treatment includes, but is not limited to, shade, rest, and fluid replacement. Typically, the individual should recover within one-half hour while being monitored constantly. If the individual has not improved substantially within 30 minutes and the body temperature has not decreased, the individual should be transported to a hospital for medical attention.

Heat Exhaustion

Heat exhaustion may occur in a healthy individual who has been exposed to excessive heat while working or exercising. The circulatory system of the individual fails as blood collects near the skin to rid the body of excess heat through transference. The signs and symptoms of heat exhaustion are as follows:

- Rapid and shallow breathing;
- Weak pulse;
- Cold and clammy skin with heavy perspiration;
- Skin appears pale;
- Fatigue and weakness;
- Dizziness; and
- Elevated body temperature.

First aid treatment includes, but is not limited to, cooling the victim, elevating the feet, and replacing fluids. If the individual is not substantially improved within 30 minutes and the body temperature has not decreased, the individual should be transported to the hospital for medical attention.

Heat Stroke

Heat stroke occurs when an individual is exposed to excessive heat and stops sweating. This condition is classified as a MEDICAL EMERGENCY requiring immediate cooling of the victim and transport to a medical facility. The signs and symptoms of heat stroke are as follows:

- Dry, hot red skin;
- Body temperature approaching or above 105 degrees F;
- Confusion, altered mental state, slurred speech;
- Seizures;
- Large (dilated) pupils; and
- Loss of consciousness – the individual may go into a coma.

First aid treatment requires immediate cooling and transportation to a medical facility. Heat stress is a significant hazard if any type of protective equipment (semi-permeable or impermeable) that prevents evaporative cooling is worn in hot-weather environments.

13. OTHER HEAT CONTROLS

Clothing and PPE

Employees should choose clothing that is reflective, light-colored, lightweight, loose-fitting, and breathable. Clothing should cover the exposed parts of the body. In direct sun, hard hats with a brim or bill may be helpful. Should specialized cooling garments be applicable, please consult with your OM/OHSM/CHSD.

Managing Employee Risk Factors

It is recommended that employees are aware of how their health can affect their risk of heat stress. The following increases personnel's risk for a heat-related illness:

- A poor level of physical fitness
- Obesity
- Chronic or acute illnesses
- Conditions such as diabetes, heart disease, or high blood pressure
- Certain medications, such as diuretics
- Age (60+)

Employees should:

- Maintain their health outside of work
- Be aware of the effects of medications
- Drink adequate amounts of water
- Eat light, cool meals during work shifts and save heavy meals until after the shift is over
- Do not skip meals: food helps replace electrolytes when sweating
- Take breaks as needed
- Do not consume alcohol prior to working in a hot environment

APPENDIX D

Personal Protective Equipment (PPE) Management Program

PERSONAL PROTECTIVE EQUIPMENT MANAGEMENT PROGRAM

CORPORATE HEALTH AND SAFETY DIRECTOR	:	**Brian Hobbs, CIH, CSP**
EFFECTIVE DATE	:	**01/2019**
REVIEW DATE	:	**03/2025**
REVISION NUMBER	:	**6**

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1. PURPOSE

Roux Associates, Inc. and its affiliated companies, Roux Environmental Engineering and Geology, D.P.C., and Remedial Engineering (collectively, "Roux"), have instituted the following program to establish guidelines for the selection of personal protective equipment (PPE) for use by Roux personnel performing field activities in hazardous environments. PPE is not meant to be a substitute for engineering, work practice, and/or administrative controls, but PPE should be used in conjunction with these controls to protect employees in the workplace. Clothing, body coverings, and other accessories designed to prevent worker exposure to workplace hazards are all types of PPE. To ensure adequate PPE,, employee-owned PPE is assessed on a case-by-case basis to ensure its adequacy, maintenance, and sanitation.

2. SCOPE AND APPLICABILITY

These guidelines apply to all PPE selection decisions to implement the Roux program. The foundations for this program are the numerous Occupational Health and Safety Administration (OSHA) standards related to PPE cited in 29 CFR 1910 Subpart I, 29 CFR 1926 Subpart E, and the hazardous environment work employee protection requirements under the OSHA Hazardous Waste Operations and Emergency Response (HAZWOPER) standard at 29 CFR 1910.120 and 1926.65 as well as California OSHA (Cal/OSHA) Title 8 5192 HAZWOPER. To ensure hazard assessments are documented, the levels of protection, types of protection, and tasks requiring protection are covered in site-specific Health and Safety Plans (HASPs) and Job Safety Analyses (JSAs).

3. PROCEDURES

Due to the varied nature of site activities and the different potential hazards associated with different sites, several aspects must be considered when selecting PPE. The following text describes PPE selection logic and provides guidelines and requirements for the appropriate selection and use of PPE.

3.1 Introduction

To harm the body, chemicals must first gain entrance. The intact skin and respiratory tract are usually the first body tissues that are exposed to chemical contaminants. These tissues provide barriers to some chemicals but, in many cases, are damaged themselves or are highly permeable by certain chemical compounds. PPE, therefore, is used to minimize or eliminate chemical compounds from coming into contact with these first barrier tissues.

Proper PPE selection is essential in preventing exposure. The Project Manager (PM) or health and safety personnel making the selection will have to consider several factors. The level of protection, type, and kind of equipment selected depends on the hazardous conditions. In some cases, additional selection factors include cost, availability, compatibility with other equipment, and performance. All these factors must be accurately assessed before work can be safely carried out.

3.1.1 Training

Training shall be provided to all field-based employees on how to properly use and care for PPE. Training shall include, but not be limited to, the initial 40-hour HAZWOPER training, annual 8-hour HAZWOPER refresher training, and site-specific PPE training. The training program includes when PPE is necessary, what types of PPE are required; how to don, doff, adjust, and wear PPE; the limitations of PPE; the proper care, maintenance, useful life, signs of PPE failure and emergency procedures to follow in the event of PPE failure and disposal of PPE. In addition, retraining shall be conducted when workplace changes require a change in PPE when an employee demonstrates a lack of knowledge or improper use of PPE is identified.

3.2 Types of PPE

The type and selection of PPE must meet certain general criteria and requirements as required under OSHA 29 CFR 1910.132 (General Industry) and 1926.95 (Construction). In addition to these general requirements, specific requirements and specifications exist for some types of PPE that form the basis of the protective clothing scheme. All manufacturer's recommendations for PPE care and use shall be followed. All PPE shall be maintained in a sanitary and reliable condition. Additionally, proper fit and size shall be evaluated to ensure adequate employee protection. Should PPE become defective, it shall be immediately removed from service and discarded.

The following is a list of the common types of specific PPE and the specific requirements for the PPE type, where applicable:

1. Hard Hats - Regulated by 29 CFR 1910.135 and 1926.100; and specified in ANSI Z89.1.
2. Face Shields and Safety Glasses - Regulated by 29 CFR 1910.133 and 1926.102; and specified in ANSI Z87.1.
3. Respiratory Protection - Regulated by 29 CFR 1910.134 and 1926.103.
4. Hand Protection - Regulated by 29 CFR 1910.138
5. Foot Protection - Regulated by 29 CFR 1910.136 and 1926.96; and specified in ANSI Z41.1.
6. Protective Clothing (e.g., fully encapsulated suits, aprons) - Specified in NFPA 1991/1992/1994.

3.2.1 PPE Inspection, Cleaning Maintenance, and Storage

The Office Health and Safety Manager (OHSM) or their designee is responsible for procuring PPE, in accordance with this management program. Single-use/disposable PPE should be purchased and used whenever practicable.

3.2.1.1 PPE Inspection

Roux employees must inspect PPE regularly, before and after each use, to check for defects and damage. Garments and other PPE in central storage must be inspected at least annually or as recommended by the manufacturer by the OHSM, Equipment Manager, and/or their designee. Defective or damaged equipment must be tagged as out-of-service, immediately removed from the work site, and discarded.

3.2.1.2 PPE Cleaning and Maintenance

All Roux employees are responsible for routine cleaning of their assigned PPE. Decontamination of PPE is addressed within Roux's Site Control and Decontamination Program as specified within site-specific health and safety plans. As appropriate, Roux employees should be issued single-use PPE when practicable to minimize the requirement for decontamination. When performing routine cleaning of reusable PPE:

- Always follow the manufacturer's recommendations to avoid damaging the PPE. For example, some cleaning solutions compromise the integrity of protective helmets shell.
- Clean and maintain PPE according to the manufacturer's recommendations. Before being re-issued, PPE should be thoroughly sanitized.
- Disassemble, wash and sanitize reusable respirators after each use. For more information, refer to Roux's Respiratory Protection Management Program.

Employees are not authorized to repair PPE without prior approval from the Health and Safety Department. Reusable PPE may require maintenance by the manufacturer to maintain integrity and certification. Many

manufacturers specify which repairs, if performed by the end-user, will void the product warranty. Therefore, Roux employees are not authorized to perform such maintenance or repairs.

3.2.1.3 PPE Storage

Certain equipment failures can be directly attributed to improper storage. The OHSM or Equipment Manager (or another designated person) is responsible for implementing procedures for appropriate PPE storage, for equipment that is centrally stored. Both central storage and dedicated PPE provided to employees should be stored using the following:

- Store goggles and safety glasses in protective cases.
- Store PPE (such as helmets, boots, etc.) in clean, dust-proof containers or bags out of direct sunlight.
- PPE should ideally be stored under climate-controlled conditions. PPE, stocked gear bags, and/or go-kits should not be stored in hot, cold, or other extreme environmental conditions, and they should not be stored in vehicles (government-owned or rentals) for even short periods of time. Do not store helmets on the rear window shelf of a vehicle.
- Store different kinds of clothing and gloves separately to prevent errors in selection.
- Hang or fold protective clothing in accordance with manufacturers' recommendations.
- Never store contaminated PPE near new protective clothing or street clothing. Potentially contaminated, reusable clothing must be stored (usually bagged) away from new PPE in a well-ventilated area with good airflow around each item until the garment is decontaminated or disposed.
- See Roux's Respiratory Protection Management Program for detailed respirator storage procedures.

3.3 Fitting, Donning, and Doffing PPE

Roux shall provide appropriately sized PPE for Roux employees. Improper fitting such as tight-fitting garments, can tear, especially at the knees, crotch, shoulders, back, and elbows due to movement. Protective clothing that is too large can easily snag and/or limit a user's dexterity. The Roux PM shall ensure site/project-specific PPE is kept in a sufficient stock of appropriately sized PPE (e.g., Level C ensembles). The OHSM, Equipment Manager, and/or their designee shall maintain a sufficient stock of appropriately sized PPE in central storage locations.

The Site Supervisor (SS)/Site Health and Safety Officer (SHSO) is responsible for ensuring that site-specific procedures for donning and doffing PPE are incorporated into site-specific HASPs. Donning and doffing procedures may differ depending on the type of PPE and clothing (e.g., Level D, Modified Level D, Level C) utilized. Figures 1-4, provide examples of procedures that can be used to don and doff Levels A through D and are provided as a reference. Site-specific conditions may warrant adjustments to such procedures. Consult the CHSD for additional information.

Site-specific donning and doffing procedures should include using an assistant where necessary. Donning and doffing certain types of PPE without assistance could risk failure or damage. Care must be taken to prevent the spread of contaminants on the PPE. Decontamination procedures should limit the potential for cross-contamination and may include gross decontamination of outer boots, gloves, and suits as necessary to prevent contaminants from tracking into the contamination reduction zone (CRZ) and clean zone(s).

3.4 Controlling Hazards Associated with PPE Use

PPE use can pose potential health and safety hazards, which range from minor discomfort to life-threatening height stroke. The magnitude of the potential hazard can vary and will depend on various factors, including an individual's fitness level, the type of PPE worn, the work demands, individual work practices, duration of work, and environmental conditions. The use of PPE can also lead to reduced efficiency and work performance.

Among hazards associated with PPE use, heat stress emerges as a prevalent and significant hazard. Particularly, the use of substantial and/or impermeable attire, such as heavy coveralls, Tyvek suits, splash suits, or Level A or B suits, alongside strenuous work, amplifies the risk of heat stress. Regular monitoring for indications of heat stress is imperative for workers operating in such conditions. Roux's Heat Illness Prevention Program lays out requirements for signs and symptoms as well as preventative measures to mitigate the potential for heat illness. In addition, cold environments can pose adverse risk, such examples include use of non-insulated steel-toe safety shoes in frigid conditions which has the potential to increase the risk of frostbite, while safety gloves worn for chemical protection may inadequately insulate hands from the cold.

It is the responsibility of Project Teams to integrate site-specific protocols to manage PPE hazards into such site-specific HASPs. These protocols can encompass considerations like work/rest ratios, crew rotations, and other accommodations for exceptionally demanding conditions.

The following measures are recommended for controlling hazards posed by PPE use:

- Prioritize through the hierarchy of controls with a focus on elimination, substitution, engineering, work practice and administrative control implementation rather than sole reliance on PPE. PPE shall be considered the last line of worker protection.
- Workers should maintain physical fitness to be able to withstand the potential physical strain of PPE use. A physically fit individual will endure less physiological strain, manifesting in a lower heart rate, reduced body temperature (indicating diminished retained body heat), more effective sweating, slightly lower oxygen consumption, and carbon dioxide production. Furthermore, acclimatization to extreme environmental conditions, such as high temperatures, can influence work performance and physical capacity.
- Understand the symptoms of PPE failure. Workers encountering any of these symptoms while donning PPE should promptly notify their onsite SHSO and/or SS:
    - Perception of odors when wearing a respirator
    - Skin irritation
    - Acute discomfort
    - Difficulty breathing
    - Unusual fatigue
    - Dizziness
    - Inability to see, hear, or speak clearly
    - Uncomfortable restriction of movement
    - Rapid pulse, nausea, or chest pain
- Implement a buddy system. Especially in situations where there is a need for increased level of protection (e.g., Level A-C) workers should work in pairs or teams, and are instructed to monitor the integrity of their team/partners gear and remain alert for symptoms of PPE failure.

3.5 PPE Selection

For site-specific work, the Project Manager, in consultation with the Health and Safety Department, has overall responsibility for coordinating the selection and distribution of PPE to field staff and for ensuring that the selected PPE is appropriate for the site-specific hazards. Generally speaking, Roux employees are not engaged in emergency response or perform work at uncontrolled hazardous waste sites; if this is the case, the CHSD shall be made aware of the work and consult with the Project Team on appropriate PPE selection. Most work falls under environmental sampling of low-concentration contaminants in water/soil/perimeter air. Therefore work is carried out in Level D PPE. Upgrades would be based on more information as it becomes available. The United States Environmental Protection Agency (EPA) has created Guidelines for PPE Ensemble Selection to assist workers in selecting PPE ensembles for specific activities and tasks and determining which ensembles and air monitoring equipment should be used to address specific chemicals. Guidelines to Ensembles for Specific Activities/Tasks Where Chemical Exposure is Possible is provided as a reference in Appendix A.

3.6 Protective Clothing Selection Criteria

3.6.1 Chemicals Present

The most important factor in selecting PPE is the determination of what chemicals the employee may be exposed to. The number of chemicals on field investigations may range from a few to several hundred. The exact chemicals or group of chemicals present at the site (certain groups tend to require similar protection) can be determined by collecting and analyzing air, soil, water, or other site media samples. When data are lacking, research into the hazardous materials used or stored at the site can be used to infer potential chemical exposures on the site.

The most appropriate clothing shall be selected once the known or suspected chemicals have been identified and considered based on the type of work to be performed.

Protective garments are made of several different substances for protection against specific chemicals. There is no universal protective material. All will decompose, permeate, or otherwise fail to protect under given circumstances. Fortunately, most manufacturers make guides to using their products (i.e., Dupont's Tyvek™ Permeation Guide). These guides are usually for gloves and coveralls and typically provide information regarding chemical degradation rates (failure of the material to maintain structural integrity when in contact with the chemical) and may provide information on the permeation rate (whether or not the material allows the chemical to pass through). When permeation tables are available, they shall be used with degradation tables to determine the most appropriate protective material for the specific chemical hazard(s).

During most site work, chemicals are usually in mixed combinations, and the protective materials are not in continuous contact with pure chemicals for long periods; therefore, the selected material may be adequate for the particular chemical of most concern and the type of work being performed, yet not the "best" protecting material for all site chemicals and activities. Selection shall depend upon the most hazardous chemicals based on their hazards and concentrations. Sometimes, layering (i.e., using several layers of protective materials) affords the best protection.

3.6.2 Concentration of the Chemical(s)

One of the major criteria for selecting protective material is the concentration of the chemical(s) in air, liquid, and solid state. Airborne and liquid chemical concentrations should be compared to the OSHA standards, American Conference of Governmental Industrial Hygienists (ACGIH) and National Institute for Occupational Safety and Health (NIOSH) guidelines to determine the level of skin or other absorptive

surface (e.g., eyes) protection needed. While these standards are not designed specifically for skin exposed directly to the liquid, they may provide skin designations indicative of chemicals known to have significant skin or dermal absorption effects. For example, airborne levels of PCBs on-site may be low because they are not very volatile, so the inhalation hazard may be minimal; however, PCB-containing liquid coming in direct contact with the skin may cause overexposure. Thus, PCBs have been assigned a skin designation in the OSHA and ACGIH exposure limit tables.

3.6.3 Physical State

The characteristics of a chemical may range from nontoxic to highly toxic, depending on its physical state. Inorganic lead in soil would not be considered toxic to site personnel unless it became airborne since it is generally not absorbed through the intact skin. However, organic lead in a liquid could be readily absorbed through the skin. Soil is frequently contaminated with hazardous materials. Concentrations will vary from a few parts per million to nearly one hundred percent by volume. The degree of hazard depends on the type of soil and concentration of the chemical. Generally speaking, “dry” soils that have not become airborne do not pose a hazard to site personnel if they take minimal precautions, such as wearing lightweight gloves.

3.6.4 Length of Exposure

The length of time a material is exposed to a chemical increases the probability of a breakthrough. Determinations of actual breakthrough times for short-term exposures indicate that several materials that would be considered inadequate under long-term exposures can be used. Different materials that would be considered inadequate under long-term exposures can be used. It should be kept in mind that during the manufacturer’s permeation testing, a pure (100% composition) liquid is usually placed in direct contact with the material, producing a worst-case situation.

3.6.5 Abrasion

When selecting protective clothing, the job the employee is engaged in must be taken into consideration. Persons moving drums or performing other manual tasks may require added protection for their hands, lower chest, and thighs. Using leather gloves and a heavy apron over other normal protective clothing will help prevent damage to the normal PPE and thus reduce worker exposures.

3.6.6 Dexterity

Although protection from skin and inhalation hazards is the primary concern when selecting PPE, the ability to perform the assigned task must be maintained. For example, personnel cannot be expected to perform work that requires fine dexterity if they must wear thick gloves. Therefore, the PPE selection process must consider the task being performed and provide PPE alternatives or techniques that maintain dexterity while still protecting the worker (e.g., wearing tight latex gloves over more bulky hand protection to increase dexterity).

3.6.7 Ability to Decontaminate

If disposable clothing cannot be used, the ability to decontaminate the materials selected must be taken into consideration. Once a chemical makes contact with the material, the PPE must be cleaned before reusing it. If the chemical has completely permeated the material, the clothing cannot be adequately decontaminated, and the material should be discarded.

3.6.8 Climactic Conditions

The human body works best with few restraints from clothing. Protective clothing adds a body burden by increasing weight, restricting movement, and preventing the body's natural cooling process. In severe situations, a modified work program must be used.

Some materials act differently when they are very hot and very cold. For example, PVC becomes almost brittle in frigid temperatures. If there are any questions about the stability of the protective materials under different conditions, the manufacturer should be contacted before using PPE in the field.

3.6.9 Work Load

Like climactic conditions, the type of work activity may affect work duration and personnel's ability to perform certain tasks. Similarly, the amount of protective materials a person wears will affect their ability to perform certain tasks. For example, a person in a total encapsulating suit, even at 72˚F, cannot work for more than a short period of time without requiring a break.

The work schedule should be adjusted to maintain the health of the employees. Modified work practices may include allowing more time for individual job tasks and implementing work/rest cycles per NIOSH and ACGIH thermal stress recommendations. Special consideration should be given to the selection of clothing that protects the worker and adds the least burden when personnel are required to perform strenuous tasks. Excessive bodily stress frequently represents the most significant hazard encountered during fieldwork.

3.6.10 Types of Protective Materials

1. Cellulose or Paper: suitable for nuisance dust and coarse fibers.
2. Natural and Synthetic Fibers
    a. Tyvek™: suitable small-sized hazardous particles, including lead, asbestos, and mold.
    b. Tychem™: is suitable for a variety of hazards, from light liquid splashes to heavy exposures to industrial chemicals and agents.
    c. Nomex™: is suitable for flame-resistance, radiation resistance, acids, alkalis, fluorocarbon refrigerants (CFCs), and non-polar solvents.
3. Elastomers
    a. Polyethylene: suitable for polar substances and solvents.
    b. Saran™ : suitable for flame-resistance, acids, alkalis, oils, and organic solvents.
    c. Polyvinyl Chloride (PVC): suitable for alcohols, oils, inorganic acids, alkalis, and salts.
    d. Neoprene: suitable for polar/non-polar substances, petroleum mixtures, and ≤ 200 F heat resistance.
    e. Butyl Rubber: suitable for polar substances and solvents.
    f. Viton: suitable for non-polar substances, petroleum mixtures, and ≤ 200 F heat resistance.
    g. Nitrile: suitable for polar/non-polar substances and petroleum mixtures.

3.7 Protection Levels

3.7.1 Level A Protection

Level A protection (a fully encapsulated suit) is used when skin hazards exist or when no known data positively rule out skin and other absorption hazards. Per the Roux Respiratory Protection Management Program, Roux employees are not authorized to enter an IDLH atmosphere; therefore, the program does

not allow supplied air respirators (SARs) or self-contained breathing apparatus (SCBA). At no time will Level A work be performed without the consent of the CHSD and OM.

The following conditions warrant the use of Level A protection:

- Hazardous substances have been identified and require the highest level of protection for skin, eyes, and the respiratory system;
- The atmosphere contains less than 19.5% oxygen or an atmosphere immediately dangerous to life and health (IDLH) that have not been ruled out;
- Site operations involve a high potential for splash, skin immersion, or exposure to suspected skin hazards;
- Direct-reading instruments indicate high levels of unidentified but potentially hazardous vapors or gases in the air (e.g., Total atmospheric readings on the Photoionization Detector (PID), Flame Ionization Detector (FID), and similar instruments indicate 500 to 1,000 ppm of unidentified substances); and
- Direct-reading instruments are not available to test the air and suspected highly toxic substances may be present.

It may be necessary to base the decision to use Level A protection on indirect evidence. Other conditions that may indicate the need for Level A protection include:

- Confined spaces;
- Sites containing known skin hazards;
- Sites with no established history to rule out skin and other absorption hazards;
- Site exhibiting signs of acute mammalian toxicity (e.g., dead animals, illnesses associated with past entry into the site by humans);
- Sites at which sealed drums of unknown materials must be opened;
- Visible indicators such as leaking containers or smoking chemical fires; and
- Extremely hazardous substances (e.g., cyanide compounds, concentrated pesticides, Department of Transportation Poison "A" materials, suspected carcinogens, and infectious substances) are known or suspected to be present, and skin contact is possible.

Table 1: Recommended Level A Ensemble Components

Component	Type	Manufacturer / Recommended Material	Notes
Respirator	Positive-pressure full-facepiece SCBA or positive-pressure supplied-air respirator with escape SCBA[1]	NIOSH approved respirator	See Roux's Respiratory Protection Program. Roux employees are not approved to utilize Supplied Air (SAR) and/or Self-contained breathing apparatus (SCBA).
Suit	Totally encapsulated chemical- and vapor-protective suit	DuPont® Tychem™ or Responder CSM™	Other material types may be substituted based on known contaminants.
Inner Gloves	Lightweight	Nitrile, Neoprene, PVC, or Viton®	Other material types may be substituted based on known contaminants.
Outer Gloves	An integral part of the suit	See Appendix A for additional information	Confirm chemical performance rating for suspected contaminants. Glove material may have different performance ratings than suit material. All fully-encapsulating suit materials must be compatible with substances involved.
Inner Boot	Integral Part of Suit	-	-
Outer Boot	HazMat boot[2]	–	Confirm chemical performance rating of outer boot for suspected contaminants. Provides slip/abrasion resistance.
Hard Hat	Standard[3]	-	-

[1] Must be NIOSH approved.
[2] Must meet NFPA 1991/NFPA 1994 requirements depending on the site hazard assessment.
[3] Must comply with the applicable ANSI standard.

3.7.2 Level B Protection

Level B protection is utilized when the highest level of respiratory protection is needed, but hazardous material exposure to the few unprotected areas of the body is unlikely. At no time will Level B work be performed by Roux personnel without the consent of the CHSD and OM.

The following conditions suggest a need for Level B protection:

- The type and atmospheric concentration of toxic substances have been identified, and they require the highest level of respiratory protection;

- IDLH atmospheres where the substance or concentration in the air does not present a severe skin hazard;
- The type and concentrations of toxic substances do not meet the selection criteria permitting the use of air-purifying respirators and
- It is highly unlikely that the work being done will generate high concentrations of vapors, gases, particulates, or splashes of materials that will affect personnel's skin.

Table 2: Recommended Level B Ensemble Components

Component	Type	Manufacturer / Recommended Material	Notes
Respirator	Positive-pressure full- facepiece SCBA or positive-pressure supplied-air respirator with escape SCBA[1]	NIOSH approved respirator	See Roux's Respiratory Protection Program. Roux employees are not approved to utilize Supplied Air (SAR) and/or Self-contained breathing apparatus (SCBA).
Suit	Chemical-resistant clothing (liquid-splash protective suit with integral boot and hood)[2]	DuPont® Tychem® CPF 3	Other material types may be substituted based on known contaminants.
Inner Gloves	Light/medium weight	Nitrile, Neoprene, PVC, Viton®, or PE/EVAL	Other material types may be substituted based on known contaminants.
Outer Gloves	Medium/heavy weight	Butyl MIL-G12223, Nitrile, Neoprene, PVC, Viton®, PE/EVAL, or heavy weight Nitrile or Neoprene	Confirm chemical performance rating. Other material types may be substituted based on known contaminants.
Inner Boot	Safety work boot	–	Other boot types may be substituted based on known contaminants and physical hazards. Puncture resistant shanks may be required.
Outer Boot	Heavy weight Latex booties or outer boots[2]	Latex booties are used to protect suit for light duty applications. NFPA-rated outer boots may be required based on anticipated site conditions and tasks.	Other outer boot coverings may be substituted based on known contaminants/anticipated tasks.
Hard Hat	Standard[3]	-	-

[1] Must be NIOSH approved.
[2] Must meet NFPA 1991/NFPA 1994 requirements depending on the site hazard assessment.
[3] Must comply with the applicable ANSI standard.

3.7.3 Level C Protection

Level C protection is utilized when skin and respiratory hazards are well defined, and the criteria for using negative pressure respirators have been fulfilled (i.e., known contaminants and contaminant concentrations, acceptable oxygen levels, approved filter/cartridge available, known cartridge service

life, etc.). Level C protection may require an emergency escape respirator during specific initial entry and site reconnaissance situations or when applicable after that.

Table 3: Recommended Level C Ensemble Components

Component	Type	Manufacturer / Recommended Material	Notes
Respirator	Full-face air-purifying respirator with appropriate cartridge[1]	NIOSH approved respirator	See Roux's Respiratory Protection Program for information about the brand, model, acceptable configurations, and specific care instructions for the standard issue respirator. Half-faced respirators may be donned if hazard assessment warrants.
Suit	Puncture/tear resistant suit material with boot and hood[2]	DuPont® Tychem® CPF 2/CPF 3 or Saranex	Other material types may be substituted based on known contaminants, if considered more appropriate.
Inner Gloves	Light weight	Nitrile, Neoprene	Other material types like Neoprene, PVC, Viton®, or PE/EVAL may be substituted based on known contaminants, if considered more appropriate.
Outer Gloves	Medium/heavy weight	Butyl, Nitrile, or other work glove	Confirm chemical performance rating. Other material types may be substituted based on known contaminants, if considered more appropriate.
Inner Boot	Safety work boot	–	Other boot types may be substituted based on known contaminants and physical hazards. Puncture resistant shanks may be required.
Outer Boot	Heavy weight Latex booties or outer boots[2]	Latex booties are used to protect suit for light duty applications. NFPA rated outer boots may be required based on anticipated site conditions and tasks.	Other outer boot coverings may be substituted based on known contaminants.
Hard Hat	Standard[3]	-	-
Eye Protection	Safety glasses/goggles[3,4]	-	-

1 Must be NIOSH approved.
2 Must meet NFPA 1991/NFPA 1994 requirements depending on the site hazard assessment.
3 Must comply with the applicable ANSI standard.
4 In the case a ½ face respirator is worn eye protection is required.

3.7.4 Level D Protection

Level D is the basic work uniform. Level D is worn when the atmosphere contains no known hazard. Work functions preclude splashes, immersion, potential for inhalation, or direct contact with hazard chemicals. For most Roux field jobs Level D is the standard minimum level of protection worn.

Table 4: Recommended Level D Ensemble Components

Component	Type	Manufacturer / Recommended Material	Notes
Respirator	None	-	-
Suit	Coveralls, street clothes, or disposable Tyvek suit	–	Other types may be substituted as appropriate.
Inner Gloves	N/A		
Outer Gloves	As appropriate for physical hazards and for comfort	–	-
Boot	Safety work boot	–	Roux's standard safety boot is 6", steel/composite safety toe, and electrical hazard (EH) rated.
Outer Boot Covering	As appropriate	–	–
Hard Hat	Standard[3]	-	-
Eye Protection	Safety glasses/goggles[3]	-	-
High Visibility Clothing	High Visibility Vest /Jacket[3]	-	ANSI Class 2 Safety Vests/Jackets are the standard. Class 3 Safety vests/jackets shall be worn in worksites with 50+ MPH traffic.
Hearing Protection	Ear muffs/plugs	-	Workers exposed to excessive noise shall don hearing protection. Refer to Roux's Hearing Conservation Program for more information.

[1] Must be NIOSH approved.
[2] Must meet NFPA 1991/NFPA 1994 requirements depending on the site hazard assessment.
[3] Must comply with the applicable ANSI standard.

3.7.5 Level E Protection

Level E protection is used when radioactivity above 10 millirems per hour (mrems/hr) is detected at the site. Personal protective equipment for Level E includes:

- Coveralls;
- Air purifying respirator (i.e., P100 or equivalent);
- Time limits on exposure;
- Appropriate dermal protection for the type of radiation present, and

- Radiation dosimetry and ambient monitoring.

3.7.6 Additional Considerations

Fieldwork will contain a variety of situations due to chemicals in various concentrations and combinations. These situations may be partially ameliorated by following the work practices listed below:

1. Foot protection is needed on every site. If the ground to be worked on is contaminated with liquid, and it is necessary to walk in the chemicals, some sort of protective shoe coverings or "booties" can be worn over the boots. Shoe coverings should be designed with soles to help prevent slips. Using disposable shoe coverings when contacting liquid contamination can on and reduce overall decontamination requirements. If non-liquids are to be encountered, a Tyvek™ bootie could be used. The advantage of booties is questionable if the ground contains any sharp objects. Boots should be worn with either cotton or wool socks to help absorb perspiration.
2. If the site requires hard hats, chin straps should be used if a person is stooping over where his/her hat may fall off. Respirator straps should not be placed over the hard hats, as this will affect the respirator's fit.

   Some types of protective materials conduct heat and cold readily. In cold conditions, natural material clothing should be worn under protective clothing. Protective clothing should be removed before allowing a person "to get warm." Applying heat, such as with a space heater, to the outside of the protective clothing may drive contaminant permeation. In hot weather, under clothing will absorb sweat. It is recommended that workers use all cotton undergarments.
3. Body protection should be worn and taped to prevent anything from running into the top of the boot. Gloves should be worn and taped to prevent substances from entering the top of the glove. Duct tape is preferred, but masking tape can be used. When aprons are used, they should be taped across the back for added protection. However, this should be done so that the person has mobility.
4. Atmospheric conditions such as precipitation, temperature, wind direction, humidity, wind velocity, and pressure determine the behavior of contaminants in air or the potential for volatile materials to become airborne. These parameters should be considered in determining the need for and the level of protection.
5. A program must be established for periodic air monitoring during site operations. Without an air monitoring program, any changes to air quality would go undetected and might jeopardize on-site personnel. Monitoring can be done with various types of air pumps and filtering devices, followed by laboratory analysis of the filtration media, personnel dosimeters, and periodic walk-throughs by personnel carrying real-time direct-reading survey instruments.
6. For operations in the exclusion zone, different levels of protection may be selected, and various types of chemical-resistant clothing may be worn. This selection should be based on the job function, reason for being in the area, and the potential for skin contact with, or inhalation of, the chemicals present.
7. Escape masks must be readily available when levels of respiratory protection do not include an SCBA and the possibility of an IDLH atmosphere exists. The use and placement of escape masks should be made on a case-by-case basis. Escape masks should be strategically located at the site in areas with a higher potential for vapors, gases, or particulates.

3.8 Decontamination of PPE

Roux prefers the use of single-use PPE to minimize the requirement for significant decontamination. The following procedures shall be considered should a field project require the need for decontamination of PPE. Roux has also developed a Site Control and Decontamination Management Program.

3.8.1 Site-Specific Decontamination Plans

The Project Manager (or another authorized individual) is responsible for formulating the site-specific PPE decontamination plan as an integral part of the Health and Safety Plan (HASP). The SHSO/SS' responsibilities include ensuring the plan's implementation and adapting it as site conditions evolve. Refer to Roux's Site Control and Decontamination Management program for additional requirements.

The decontamination plan, often created in conjunction with PPE selection, must be established prior to workers entering potentially contaminated areas. The plan should address the following key aspects:

- Decontamination Hazard Evaluation and Risk Assessment: Assessing risks associated with decontamination processes.
- PPE for Decontamination Line Assistants: Specifying appropriate PPE for personnel involved in decontamination.
- Roles and Responsibilities During Decontamination: Defining tasks and duties during the decontamination process.
- Layout and Quantity of Decontamination Stations: Determining the number and arrangement of decontamination stations, along with the designated PPE decontamination procedures at each station.
- Decontamination Equipment: Identifying the necessary equipment for effective decontamination.
- Decontamination Methods: Describing the methods and protocols for decontaminating personnel and equipment.
- Preventing Contamination of Clean Areas: Outlining procedures to prevent contamination of uncontaminated zones.
- Minimizing Contact with Contaminants During CPC Removal: Providing guidelines to reduce wearer exposure during the removal of Chemical Protective Clothing (CPC).
- Disposal Procedures for Inadequately Decontaminated Clothing and Equipment: Ensuring proper disposal practices for items that have not been adequately decontaminated.

The initial decontamination plan, which is developed in conjunction with the initial site hazard assessment, should be based on worst-case assumptions about the extent and type of contamination.

3.8.2 Emergency Decontamination of PPE

The designated SHSO/SS (or another authorized individual) assumes responsibility for addressing emergency decontamination within the site-specific Health and Safety Plan (HASP). Emergency decontamination may become necessary due to events such as fires, explosions, sudden violent storms, or medical emergencies. The emergency decontamination plan must clearly delineate emergency egress routes, as well as procedures for both decontamination and egress.

Some key points to consider regarding emergency decontamination.

- Immediate Notification: The SHSO/SS (or their designated counterpart) must be promptly informed of any circumstances requiring emergency decontamination. Additionally, they are accountable for tracking all personnel during the process.
- Urgent Medical Treatment: If urgent medical attention is necessary, decontamination of PPE may be delayed until the victim's condition stabilizes.
- Balancing Priorities: When feasible, decontamination should occur without hindering essential first aid. However, if a worker is exposed to an extremely toxic or corrosive substance, immediate decontamination is crucial to prevent severe injury or fatality.

- Heat-Related Illness: In cases of heat-related illness, protective clothing must be promptly removed (refer to Roux's Heat Illness Prevention Program).

Emergency Facilities:

- For workers potentially exposed to corrosive materials, quick drenching or flushing facilities must be provided in accordance with 29 CFR 1910.151(c) and 1926.50(g).
- Similarly, if workers face other hazards (such as splash or dust) that could harm the eyes or body, readily accessible wash stations are essential. These stations should be properly located and maintained, including regular water changes, as per the manufacturer's instructions.

3.8.3 Protection of Decontamination Line Assistants

Should work require a decontamination corridor the following shall be used as guidance. The SHSO/SS (or other designated person) must for ensuring that decontamination line assistants receive appropriate PPE and addressing their protection within the site-specific HASP. Key zones—namely, the Exclusion Zone (EZ), Contamination Reduction Zone (CRZ), and Clean Support Zone—must be clearly marked both in the field and within the site-specific HASP. The following should be considered when preparing for protection of decontamination line assistants.

1. Task Hazard Analysis: A thorough analysis must be conducted for line assistants to determine the optimal PPE level required. Factors influencing this decision include:
    - Expected or Visible Contamination on Responders
    - Type of Contaminant and associated respiratory and skin hazards
    - Total Vapor/Gas Concentrations in the CRZ
    - Presence of Particulates and specific inorganic or organic vapors in the CRZ
    - Results of Wipe Tests (refer to Section 5.4)
    - Slope and Configuration of the CRZ
2. PPE Levels: Depending on the situation:
    - Line assistants may need to wear the same PPE level as workers in the EZ.
    - Alternatively, line assistants may be adequately protected by using PPE one level lower (e.g., wearing Level C protection while decontaminating workers who are wearing Level B)."

3.8.4 Procedures to Minimize PPE Contamination

Proper work practices and procedures should be implemented at sites to minimize the potential for contact with chemicals of concern while onsite. The following guidance should be considered when developing site-specific procedures:

- Opt for single-use Personal Protective Equipment (PPE) when feasible to minimize decontamination needs.
- Ensure complete sealing of PPE closures and interfaces, including pockets, zippers, and other potential openings.
- Position gloves and boots underneath the sleeves and pant legs of outerwear to reduce exposure.
- Place hoods outside the collar if they are not already attached.
- Utilize disposable outerwear and equipment when suitable to facilitate easy disposal and reduce decontamination efforts.
- Secure all junctions with tape to block contaminants from entering gloves, boots, jackets, and suits.

- Adopt work practices that limit contact with hazardous substances, such as avoiding unnecessary exposure.
- Employ remote techniques for sampling, handling, and opening containers, like using drum grapples and pneumatic impact wrenches.
- Store monitoring and sampling devices in bags designed with openings for sample ports and sensors.
- Cover contaminant sources with plastic sheeting or overpacks to shield PPE from contamination.

3.8.5 PPE Disposal

The PM, in coordination with the field team, shall ensure the safe disposal of all wastes generated from PPE use. PPE must be placed in appropriate containers, labeled, and prepared for disposal separately from other forms of waste. Refer to Roux's General Waste Corporate Management Program for further guidance.

APPENDIX A
EPA's Emergency Responder Health and Safety Manual

APPENDIX E

Subsurface Utility Clearance Management Program

SUBSURFACE UTILITY CLEARANCE MANAGEMENT PROGRAM

CORPORATE HEALTH AND SAFETY DIRECTOR	:	**Brian Hobbs, CIH, CSP**
EFFECTIVE DATE	:	**01/2019**
REVIEW DATE	:	**03/2025**
REVISION NUMBER	:	**5**

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APPENDICES

1. PURPOSE

Roux Associates, Inc. and its affiliated companies, Roux Environmental Engineering and Geology, D.P.C., and Remedial Engineering (collectively, "Roux"), have instituted the following program for completing proper utility mark-outs and for conducting subsurface clearance activities. This establishes a method to ensure, to the greatest extent possible, that utilities have been identified and contact and/or damage to underground utilities and other subsurface structures will be avoided. For the purpose of this program, a structure is defined as any underground feature that may present a potential source(s) of energy, such as, but not limited to, utility vaults, bunkers, piping, electrical boxes, wires, conduits, culverts, utility lines, underground tanks, and ducts.

2. SCOPE AND APPLICABILITY

The Subsurface Utility Clearance Management Program applies to all Roux employees, as well as their contractors and subcontractors. Employees are expected to follow this program for all intrusive work involving Roux or other personnel (e.g., contractors, subcontractors) working for Roux, unless the client's requirements are more stringent. Intrusive work activities can include, but are not limited to, digging or scraping the ground surface, including, but not limited to, excavation; test pitting or trenching; soil vapor sampling or the installation of soil borings, soil vapor monitoring points and wells, or monitoring wells; and drilling within concrete slabs on grade.

Deviation from the program, regardless of the specific work activity or location, must be pre-approved based on the client's site knowledge, experience, site conditions, and additional documentation on the site. Any exceptions shall be documented through the Roux Subsurface Utility Clearance Variance Form, located within the Roux Health & Safety Online Application or via OKTA. Approval is required from the Project Principal (PP) and the Operations Manager (OM), in consultation with the Office Health and Safety Manager (OHSM) or Corporate Health and Safety Director (CHSD), prior to mobilization. Depending on the work location, more stringent federal, state, local, or client requirements may apply. It is the responsibility of the Project Team to identify such requirements prior to mobilization.

3. PROCEDURES

3.1 Before Intrusive Activities/Job Planning Process

Prior to intrusive work at a site, the Project Manager (PM) shall ensure that the notification of the State One Call or equivalent service (Nationwide-811) is completed a minimum of 48-72 hours (One-Call State Law Directory) before intrusive work activities (this timeline excludes Saturdays, Sundays, Legal Holidays and 811 observed holidays). This notification is required by law for all states. State-specific or local laws related to utility location may vary. The project team is responsible for understanding requirements that may affect their work site.

Obtain, review, and field verify relevant historical site data that may include: as-builts/site plans; easement/right-of-way information; historical aerial photos/development plans; local/state permitting records; previous site investigation/boring logs; and/or interviews with site representative/client. Interviews with site or client personnel should ask the following:

- Employee(s) Name and Relationship with the site;
- Types of utilities, including structure and location of utilities on-site;
- Depth of known utilities; and
- Any other relevant information as it pertains to the site.

Prior to intrusive work activities, information pertaining to the site should be included in Roux's Subsurface Utility Clearance Checklist and Utility Verification/Site Walkthrough forms. This form is located within the Roux Health & Safety Online Application or through OKTA.

If there is the potential for unexploded ordnances or munitions, consultation with your OM and CHSD is required prior to site operations.

3.1.1 Project Kick-Off Meeting

During the project kick-off meeting for intrusive activities, the PM will review the Roux Subsurface Utility Clearance Checklist, Utility Verification / Site Walkthrough Record (Appendix A) and the below bullet points with the project field team:

- Confirm that the State One Call or equivalent is received and that the ticket number is confirmed, reviewed, and valid for the time of work. If intrusive work activities are not conducted during this valid time period, the One Call ticket must be renewed, and the site must be remarked;
- Review the work scope to be performed with the site owner/tenant to determine if it may impact any utilities;
- Determine the need for utility owner companies to be contacted or to have their representatives on site;
- Where mark-outs terminate at the property boundary, consider the use of private utility locating / (e.g., Radio Frequency Detection, Electromagnetic Induction), Ground Penetrating Radar (GPR) , and other applicable geophysical inspection services. The use of private utility locating firms, however, does not eliminate the legal requirement for the subcontractor (e.g., driller, excavation firm) to submit a request for Public Utility Mark-outs. Also, the information provided by the service may be inaccurate and unable to locate subsurface utilities and structures in urban areas, landfills, urban fill areas, below-reinforced slabs, etc. They should not be relied upon as the only means of performing utility clearance;
    - A mark-out is defined as the process of contracting with a competent and qualified company to confirm the presence or absence of underground utilities and structures. This process will clearly mark out and delineate identified utilities so that intrusive work activities can be performed without causing disturbance or damage to the subsurface utilities and structures. After utility mark-outs are completed, soft Digging must completed prior to intrusive work. Section 3.4 Preferred Methods of Clearing the Subsurface (Pre-Clearing) outlines requirements for pre-clearing techniques in order of preference.
- Documented description of the dig site, which is included in the project's Health and Safety Plan (HASP), and one call report will be maintained in the field and distributed amongst Roux personnel, its contractors, and subcontractors; and
- Documentation of the actual placement of mark outs in the field shall be collected using dated pictures, videos, and/or sketches with distance from markings to fixed objects. All documentation shall be maintained within the project file.

3.2 Utility Mark Out

- Ensure the Mark-out / Stake-out Request Information Sheet (or one-call report) is complete and accurate for the site, including address and cross streets, and review for missing utilities. Ensure ticket life is still valid for work.
    - Note: Utility mark-out organizations do not have contracts with all utilities, and it is often necessary to contact certain utilities separately, such as the local water and sewer authorities, local transportation departments, and railroad operators. In the event the Project Teams

anticipate subsurface work will impact public utilities, railroad operations, or public roadways, coordination with the utility owners/operators is required.

- Have written confirmation prior to mobilizing to the site that the Project Team or Roux personnel performing the intrusive activity has correctly completed the mark-out notification process, including requesting mark-outs, waiting for mark-outs to be applied to ground surfaces at the site, and receiving written confirmation of findings (via fax or email) from utility operators for all known or suspected utilities in the proposed area of intrusive activity, and provided utility owner written confirmation to Roux personnel for review and project files documentation.
- Do not begin any intrusive activity until all utility mark-outs have been completed (i.e., Did all utilities mark-out the site?) and any unresolved mark-out issues are finalized. Perform a site walk to review the existing utilities and determine if the utility locators have located said utilities.

  (Note: The Tolerance Zone is defined as three feet from the outside edge of any subsurface structure.)
- For non-subscribing utility owners or if public one-call service is not available, perform due diligence and request further information regarding utility type, construction details, location, and burial depth directly from public service providers/utility owners. Request utility mark-out by each public service provider/utility owner as applicable. Confirm contact and response by each public utility owner on the Subsurface Utility Clearance Checklist.
- If utilizing a Private Mark out, ensure the contractor has a plan regarding what types of technology will be used based on Table 1 in Appendix B: Private Utility Technology Applications and Considerations. If possible, it is recommended that multiple technologies be used to sweep each location/work area. Use a tracer wire to locate the utility (when tracer wires are present). Record the results of the private utility mark-out on the Utility Verification/Site Walkthrough Record form.

3.3 Site Visit/Utility Walkthrough

Before mobilization with the subcontractor or during the pre-work safety tailgate with the subcontractor, perform a site walkthrough after utility mark-outs have been completed to determine whether additional potential hazards are present and look for visible signs of utilities that may be present. Outlined below are considerations regarding a site walk before intrusive activities. Before initiating any intrusive work, verify that the utilities marked on-site align with the information provided in the One Call response notification/ticket and with site plans and documents. If any discrepancies arise, address them promptly to ensure accuracy and do not start intrusive work until they are rectified.

- Identify overhead utilities that may impede equipment mobilization or work zones to ensure adequate Occupational Safety and Health Administration (OSHA) clearance distance(s), as specified within the site-specific Health and Safety Plan (HASP) and 29 CFR 1926.1408 Table A.

The presence of any of the following may indicate potential subsurface structures:

- Locations of buildings, equipment, and features like area lights, signs, sprinkler systems, phones, drains, natural gas meters, manholes, etc.;
- Warning tape, which is often a sign of underground services;
- Material like pea gravel, sand, or other non-native materials can indicate the presence of tanks or lines or any deviations from the established native soil or backfill conditions;
- Red concrete that is often used for electrical duct banks;
- Evidence of damaged utilities, such as piping materials, insulation, or odors present in the work area; and

- Other utilities, including fire hydrants, electrical transformers, pipeline markers, valve covers, steam lines, valve box covers, clean-outs, etc.

By observing the path between the main service line and the connection point (e.g., a utility meter at the exterior of the site building), it may be possible to determine the likely routing of on-site utilities. However, this method should not be relied upon solely, and proper risk mitigation strategies should be in place before proceeding with any ground disturbance activities. Look outside your work zone for other potential utilities that may cross through it.

For sites with potential underground storage tanks present (UST), the following guidance applies:

- Identify if the product piping is either rigid or flexible.
- Conduct a visual examination of the tank field, observation wells, dispensers, vent stacks, and UST fill points to determine their location.
- Locate and become familiar with the emergency shutoff button/switch, if present.
- Determine the orientation, arrangement, and location of the tanks, as well as their size and capacity, through the examination of visible features at grade, such as fill ports and extractor covers, and by consulting any available as-built drawings.

Before commencing any subsurface intrusive work, field staff should thoroughly address any discrepancies in utility company mark-outs or the absence of mark-outs.

3.3.1 Project Management - Field Personnel

Whenever possible, it is advisable to assign the same project personnel to both utility location and clearance tasks as well as intrusive activities. This continuity ensures that site knowledge and utility information gathered during the clearance phase remain up-to-date. Having this historical perspective helps minimize the risk potential of utility strikes.

In cases where maintaining the same personnel throughout the project is not feasible, a thorough knowledge transfer regarding site utilities, locations, clearance results, and proposed intrusive activities becomes essential. The PM must ensure that there is a successful handoff of information when there is a change in field personnel.

3.3.2 Utility Markings

The utility marking color code includes various uniform colors. The following APWA uniform color code (ANSI Z535.1) is provided below. While certain government agencies or large industrial facilities may use additional colors, Roux's policy is to consider any unlisted paint marking or pin flag color as a subsurface utility marking unless proven otherwise.

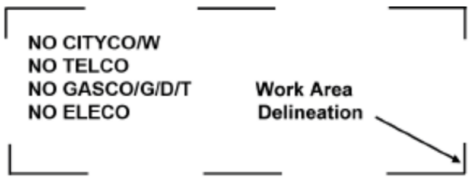
If utilities or subsurface anomalies are identified but their type or classification remains uncertain, it is advised to employ pink paint or pin flag (Temporary Survey Marking) for marking. Once the utility type is definitively established, the pink marks should be updated to represent the correct type of utility accurately.

White	Proposed Excavation
Pink	Temporary Survey Markings
Red	Electric 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	Sewers and Drain Lines

Understanding the markings left by locators during the 811 process is crucial for avoiding utility-related issues. Typically, these markings are done when Roux staff members are not physically present on-site. To enhance understanding/accuracy, it is advisable for staff to be present during the 811 process or engage in conversations with locators, both public and private, while on-site. Additionally, utility marks must adhere to the proper standards outlined in the Uniform Color Code.

Common Abbreviations *(Source: Common Ground Alliance)*

Facility Identifier		Underground Construction Descriptions		Infrastructure Materials	
CH	Chemical	C	Conduit	ABS	Acrylonitrile - Butadiene - Styrene
E	Electric	CDR	Corridor	ACP	Asbestos Cement Pipe
FO	Fiber Optic	D	Distribution Facility	CL	Cast Iron
G	Gas	DB	Direct Buried	CMC	Cement Mortar Coated
LPG	Liquefied Petroleum	DE	Dead End	CML	Cement Mortar Lined
PP	Petroleum Products	JT	Joint Trench	CPP	Corrugated Plastic Pipe
RR	Railroad Signal	HP	High Pressure	CMP	Corrugated Metal Pipe
S	Sewer	HH	Hand Hole	CU	Copper
SD	Storm Drain	MH	Manhole	CWD	Creosote Wood Duct
SS	Storm Sewer	PB	Pull Box	HDPE	High Density Polyethylene
SL	Street Lighting	R	Radius	MTD	Multiple Tile Duct
STM	Steam	STR	Structure (vaults, junction inlets, lift station)	PLA	Plastic (conduit or pipe)
SP	Slurry System	T	Transmission Facility	RCB	Reinforced Concrete Box
TEL	Telephone			RCP	Reinforced Concrete Pipe
TS	Traffic Signal			RF	Reinforced Fiberglass
TV	Television			SCCP	Steel Cylinder Concrete Pipe
W	Water			STL	Steel
W	Reclaimed Water "Purple"			VCP	Vitrified Clay Pipe



3.4 Preferred Methods of Clearing the Subsurface (Pre-Clearing)

At least one of the methods listed below shall be carried out during pre-clearing activities. The Project Team is responsible for evaluating risks associated with the Scope of Work to determine which method is selected.

If none of the following pre-clearing activities are performed, a Subsurface Utility Clearance Variance must be submitted to the OM. This Subsurface Utility Clearance Variance must provide clear lines of evidence that there are no utilities present within the intrusive work zone. Examples include demolition permits of the site, utility closure documents indicating no live utilities on-site, as-builts, site history, etc.

The following approaches shall be considered and implemented based on the Scope of Work.

- ***Soft Digging***
  - This is the preferred method of utility clearance when clearing higher-risk utilities. Soil should be cleared through the use of a vacuum truck/equivalent, an accompanying air knife (preferred), or a water lance to break up and loosen the soil for removal with the vacuum.
- ***Hand Digging***
  - Soil should be broken up and removed using a shovel or other appropriate hand tools without excessive force. Limit the use of dig bars or other tools that, if used incorrectly, can significantly damage utilities.
- ***Hand Augering***
  - The hand auger must be turned slowly using even hand pressure without excessive force. Rounded-edge augers are preferred. Hand augers should not be used in pea stone/pea gravel where utilities may be present and could potentially be damaged by the hand auger. The abrupt absence of soil recovery in a hand auger could indicate utilities as pea gravel or sand may have spilled out of the auger (exception: native soil conditions that typically result in poor hand auger recoveries). If any resistance is encountered while operating the hand auger for pre-clearance, the equipment will be removed, and the exploratory test hole will be visually inspected by onsite personnel for any obstructions or indications of subsurface structures.

3.4.1 Guidance for Tools and Equipment

Personnel performing pre-clearance activities shall keep tools and equipment in safe working order and be properly inspected before use. If tools or equipment are broken, they will be tagged and removed from service. The following specify additional guidelines regarding tools and equipment:

- Hand-digging tools must have a non-conductive handle, such as fiberglass, wood, or composite, or fully insulated handles and potential contact surfaces.
- Blades on shovels and post-hole diggers should have rounded or blunt edges.
- Pick axes or pointed spades should not be used for physical clearance.
- Crowbars, pinch-bars, or pry bars should not be used to break hardened soil or backfill except when authorized by the Site Supervisor (SS). This should only be used to loosen materials like bricks or larger stones.
- Electric-powered equipment must have ground-fault protection.
- Should there be refusal or difficulty with advancing hand tools, the contractor shall stop work and notify the Roux SS or Site Health and Safety Officer (SHSO) immediately.

3.5 During Intrusive Activities

3.5.1 Concrete/Paving Surface Removal

Remove any surface coverings (i.e., pavement, brush, debris, etc.) to ensure workers have clear visibility of the work area and subsurface conditions. Avoid mechanical jackhammering over known lines unless they are de-energized, locked-out/tagged-out, and potential repairs are planned or if the utility has been completely disconnected prior. When cutting or coring, go only as far as needed to penetrate the surface cover. When removing a large surface area, begin at the perimeter of the removal zone. This initial step helps identify any utilities passing through the work zone. For extensive areas, using a concrete saw might not be practical. Instead, heavy equipment is often employed. During this process, a designated spotter should guide the heavy equipment. Their role is to watch for warning signs of utilities. It is crucial that the heavy equipment does not have “teeth” that could potentially pass through the surface and damage utilities.

3.5.2 Pre-Clearance Procedures

Install pre-clearance exploratory test holes using one of the techniques, as outlined in Section 3.4, for the first 5-ft below land surface (BLS) at each location before conducting intrusive mechanized activities. Should utilities be located at a greater depth than 5-ft BLS consult with the OM, OHSM and CHSD regarding adjustments to the pre-clearance requirements to go greater than 5-ft BLS. Some Clients may require greater than 5-ft BLS for pre-clearance test holes; Project teams should be aware of such Client requirements prior to work.

Pre-clearance exploratory test holes should be defined in the SOW/proposal provided to the client to prevent project delays and to allow adequate time for the PM and PP to evaluate alternative approaches for the project. Alternative approaches will need to be pre-approved by the OM through a Subsurface Utility Clearance Variance.

Both single-point and three-point clearance are acceptable as long as the following criteria are met below. For single-point clearance, the exploratory test hole is advanced at the exact location of the proposed borehole. If three-point clearance is performed, it must be done in a triangular pattern around the proposed borehole and in a configuration that would not allow utilities to enter the borehole.

- The size of the pre-clearance exploratory test hole should be, at a minimum, twice the diameter of any downhole tool or boring device.
- For direct push applications (CPT, Geoprobe®, etc.), the borehole clearance diameter shall be at least 125% of the diameter of the largest tool being pushed through the subsurface (e.g., tip, rod, sampler, etc.), to the minimum required depth.
- For excavations, all utilities need to be marked and then exposed by soft-digging or by hand, following the protocols in this program. Pre-clearing for excavations may be performed by the “moat” technique (i.e., soft Digging around the perimeter). In these cases, dig in small lifts (<12” for first 5 feet using a dedicated spotter.
- For Tolerance Zone work, unless otherwise agreed upon with the Utility Operator, work within the tolerance zone requires verification by means of pre-clearance test holes specified in Section 3.4 to expose the utility. Once structures have been verified, a minimum clearance of three feet must be maintained between the utility and any powered equipment. If considered a high-risk utility, additional requirements may be necessary and required by the Operator of the utility. Consultation with the OM and CHSD may be appropriate.

The PM, field team lead, or personnel performing oversight is to:

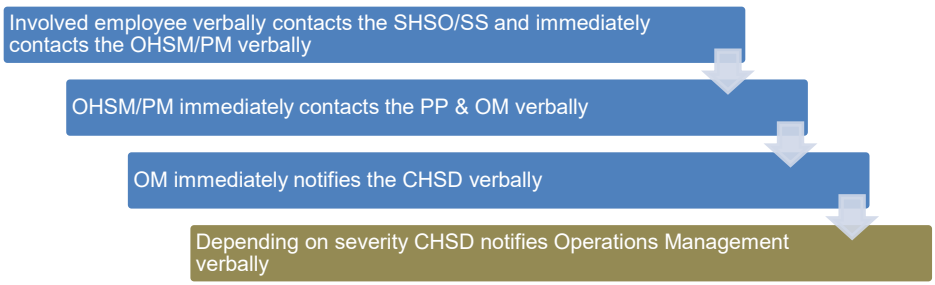
- Ensure the mark-out remains valid. (In certain states, there are limits regarding the duration of time after the mark-out was applied to the ground surface work can be started or interrupted.) Additionally, the mark-outs must be maintained, documented, and in many cases, refreshed periodically to be considered valid. This will be accomplished through calls to the one call center.
- Ensure intrusive activities are only performed within the safe boundaries of the mark-out as detailed in the One-Call Report.
- Halt all work if intrusive activities have resulted in the discovery of an unmarked utility. Roux personnel shall notify the facility owner/operator and the one call center. All incidents such as this will be reported as per Roux Incident Investigation and Reporting Management Program.
- Halt all work if intrusive activities must take place outside of the safe boundaries of a mark-out and only proceed after new mark-outs and subsurface utility clearance are performed.
- Halt the intrusive activities and immediately consult with the PP if an unmarked utility is encountered.
- Complete any loss reports associated with subsurface utility strikes, as necessary.
- If a utility cannot be found as marked, Roux personnel shall notify the facility owner/operator directly or through the one-call center. If the facility operator is not responsive, then the one-call center must be notified. Following notification, the excavation/mechanical intrusive work may continue unless otherwise specified in state law.
- Contractors/subcontractors must contact the one-call center to refresh the ticket when the excavation continues past the life of the ticket. State law dictates ticket life. Project teams must be aware of their state-specific requirements.

3.6 Stop Work Authority

Each Roux employee has Stop Work Authority that he or she will execute upon determination of any imminent safety hazard, emergency situation, or other potentially dangerous situation, such as hazardous weather conditions. This Stop Work Authority includes subsurface clearance issues such as the adequacy of a mark-out or identification during intrusive operations of an unexpected underground utility. Authorization to proceed with work will be issued by the PM/PP in consultation with the OHSM after such action is reviewed and resolved. The PM will initiate and execute all management notifications and contact emergency facilities and personnel when this action is appropriate.

3.7 Reporting Utility Incidents

Roux field personnel engaged in any utility strike (e.g., subsurface/aboveground) must promptly stop work, shutdown any equipment and get to a safe location at the Site. Then notify the PM to discuss the incident. In case of injuries, field personnel must call 911 or the local emergency services number and then inform the PM. Additional notifications shall follow Roux's Incident Notification Process. Depending on the utility strike additional notifications shall be made to utility operators and/or clients/site contacts.



Appendix A
Roux Subsurface Utility Clearance Checklist

Appendix A

Roux Subsurface Utility Clearance Checklist/Utility Verification/Site Walkthrough Record

Roux Subsurface Utility Clearance Checklist ***Date of Revision: 3/2024***

Work site set-up and work execution

ACTIVITY	Yes	No	N/A	COMMENTS INCLUDING JUSTIFICATION IF RESPONSE IS NO OR NOT APPLICABLE
Daily site safety meeting conducted, SPSAs performed, JSAs reviewed, appropriate work permits obtained (if applicable).				
HASP is available and reviewed by site workers / visitors.				
Subsurface Utility Clearance Procedure has been reviewed with all site workers.				
Mechanical intrusive work activities may not be performed at any location without authorization from the Roux Site Supervisor (SS). Clearance activities may not be performed at any location unless the SS is physically present.				
Work area secured; traffic control established as needed. Emergency shut-off switch located. Fire extinguishers / other safety equipment available as needed.				
Utility mark-outs (public / private) clear and visible. Provide Excavator's Stake-Out Reference Number / Request Date / Time.				
Tolerance zone work identified. Intrusive work activities cannot be performed in areas that are in direct conflict with any markings made by public or private locators.				
Unless the PP & OM authorizes it, all boreholes and test pit locations must be physically cleared before using mechanized equipment. Required minimum physical clearance depths and diameters are as follows: • Physically clear to a depth of 5 feet bls. • The size of the pre-clearance exploratory test hole must be, at a minimum, twice the diameter of any downhole tool or boring device. • For direct push applications (CPT, Geoprobe®, etc.) the borehole clearance diameter shall be at least 125% to the diameter of the largest tool being pushed through the subsurface (e.g., tip, rod, sampler, etc.).				
Work execution plan reviewed and adhered to (ground disturbance methods, clearance depths, any special utility protection requirements, or any other execution requirements; especially for Tolerance Zone work).				

Mechanical intrusive work is prohibited within 3-feet distance in all directions from subsurface structures that will be intentionally exposed during pre-clearance. Any removal of material within 3-feet of the subsurface structure may only proceed by hand using non-conductive tools/compressed air if authorized by state law and the owner/operator of the utility.				
All equipment onsite must maintain the appropriate horizontal distance from any point on the equipment to the nearest overhead electrical power line. Refer to site-specific HASP and local/utility company requirements.				
Verbal endorsement received from Roux PM and OM for any required field deviations to work execution plan.				

Key Reminders for Execution

The Subsurface Utility Clearance Protocol should be referenced to determine all requirements while executing subsurface work. The bullet points below are intended as general reminders only and should not be relied upon solely.

- The size of the pre-clearance exploratory test hole must be at a minimum twice the diameter of any downhole tool or boring device to minimum required depth of 5 feet bls.
- For direct push applications (CPT, Geoprobe®, etc.) the borehole clearance diameter shall be at least 125% of the diameter of the largest tool being pushed through the subsurface (e.g., tip, rod, sampler, etc.), to the minimum required depth of 5 feet bls.
- The tolerance zone is defined as three feet plus half of the diameter or half of the greatest dimension (for elliptical sewers, duct banks, and other non-cylindrical utilities) of a utility and three feet from the outside of any subsurface structure.
- For excavations, all utilities need to be marked and then exposed by hand, following the protocols in this program. Pre-clearing for excavations may be performed by the “moat” technique (i.e., soft digging around the perimeter). In these cases, dig in small lifts (<12” for first five feet) using a dedicated spotter.) For Tolerance Zone work, unless otherwise agreed upon with the Utility Operator, work within the tolerance zone requires verification by means of hand-dug test holes to expose the utility. Once structures have been verified, a minimum clearance of three feet must be maintained between the utility and any powered equipment.

Utility Verification/Site Walkthrough Record

Employee Name:_____

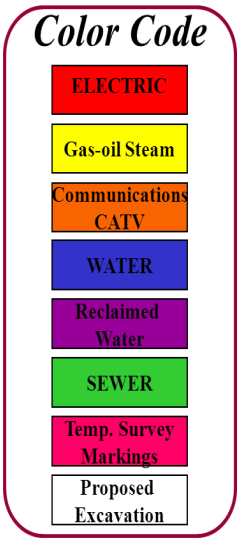
Date: _____

Instructions: For each utility suspected at the job site, indicate the location on the job site, approximate burial depth, and means of detecting the utility. Leave blank if that utility is not believed to be present.

Utility	Description of Utility Location Identified Onsite	Approx. Depth (bls)	Method / Instrumentation used to determine Utility Location	Utility Owner Response (Date/Time)	Mark Out Indicates (Clear / Conflict)
Electrical Lines					
Gas Lines					
Pipelines					
Steam Lines					
Water Lines					
Sanitary and Stormwater Sewer lines					
Pressured Air-Lines					
Tank Vent Lines					
Fiber Optic Lines					
Underground Storage Tanks					
Phone Lines/ Other					

* bls - below land surface

Site Sketch Showing Utilities:



Other Comments / Findings:

Completed by: _____

Signature: _____ Date: _____

Appendix B
Private Utility Technology Applications and Considerations

Appendix B – Private Utility Technology Applications and Considerations

Technology ⇒ Utility/Object ⇓	Radio Frequency Electro-Magnetic Detector (connection to utility, or induction without connection)	Radio Frequency Electro-Magnetic Detector (passive sweep)	Ground Penetrating Radar (GPR)⊙	Acoustic Plastic Pipe Locator	Beacon, Sonde or Conductive Rodder Insertion	EM-61 (time domain electromagnetics) Ξ	
Power/Instrument Line (Energized/Signaled) □	❋ G	G	G	R	R	G	
Power Line (Non-energized) □	❋ G	R	G	R	R	G	
Sewer/Water Line (Metallic) □	❋ G	Y	G	Y	G	G	
Sewer/Water Line (Non-metallic)	R	R	G	G	❋ G	R	
Instrument / Telecomm Lines (Non-energized)	❋ G	R	G	R	R	Y Only if metallic	
Hydrocarbon Transmission Line (Pipeline)◆ □	❋ G	R	G	R	R	G	
Metallic/Non-Metallic Line (with Tracer Wire)	❋ G	Y	G	Y	Y	G metallic	Y non-metallic
Metallic/Non-Metallic Line (without Tracer Wire)	G metallic	R non-metallic	R	❋ G	Y	Y	G metallic	R non-metallic
Metal or Fiberglass UST	R	R	❋ G	R	R	G metallic	R non-metallic

Additional Considerations

Technology ⇒ Variable ⇓	Radio Frequency Electro-Magnetic Detector	Ground Penetrating Radar (GPR)⊙	Acoustic Pipe Locator	Beacon, Sonde, or Conductive Rodder Insertion	EM-61 Ξ
Moist Soil	G	Y	G	G	G
Dry Soil	Y	G	Y	G	G
Clay	Y	R	G	G	G
Concrete w/Rebar	R	Y	G	G	R
Long Horizontal Profile	G	G	G	G	G
Short Horizontal but Deep Vertical Profile	Y	G	R	R	G
Access to Line✚	G	N/A	G	G	G
No Access to Line✚	G (induction or passive)	G	R	R	G
	R (direct connect)				G
Ferrous Metal	G	G	G	G	G
Non-ferrous Metal	Y	G	G	G	G
Adjacent or crossing conductive utility(ies)	Y	N/A	N/A	N/A	Y

Each site will be unique. Do not use this table as the sole criteria for technology selection. Use it as a starting point to assess available, applicable technology(s).

❋ Indicates best technology for given object. Site structures, rebar in concrete, shallow groundwater tables, perched storm water, etc. can significantly affect performance and reliability of any electro/magnetic method. Other utilities which cross or are adjacent to the target line can cause the EM signal to bleed or jump to the other utility line.

□ Metallic lines that have power running through them or can be connected to a tracer signal generator.

◆ Natural gas pipeline locating technicians must be trained/certified (in the U.S. requires DOT and Office of Pipeline Safety standards, other regions may have similar certification or requirements).

⊙ Most sensitive to interpretation. The skill, training and experience of operator are critical.

Ξ Emerging technology with limited availability.

✚ Access: induce unique electronic signature, apply acoustical impulse or insert conductive rodder/beacon/sonde.

Green Generally, an applicable technology **Yellow** May or may not be applicable **Red** Not generally applicable

APPENDIX F

Heavy Equipment Exclusion Zone Management Program

HEAVY EQUIPMENT EXCLUSION ZONE MANAGEMENT PROGRAM

CORPORATE HEALTH AND SAFETY DIRECTOR	:	**Brian Hobbs, CIH, CSP**
EFFECTIVE DATE	:	**01/2019**
REVIEWED DATE	:	**03/2025**
REVISION NUMBER	:	**4**

TABLE OF CONTENTS

1. PURPOSE

The Exclusion Zone Management Program aims to establish the minimum clearance distance that must be maintained between workers and heavy equipment while the equipment is in operation (i.e., engaged or in motion). The intent is to have no personnel or equipment entering the Exclusion Zone while the equipment is in operation or moving to ensure that Roux and Subcontractor employees are unnecessarily exposed to the hazards of the equipment.

2. SCOPE AND APPLICABILITY

This Management Program applies to all Roux Associates, Inc. and its affiliated companies, Roux Environmental Engineering and Geology, D.P.C., and Remedial Engineering (collectively, "Roux") employees and their subcontractors performing fieldwork and are potentially exposed to heavy equipment. Heavy equipment includes, but is not necessarily limited to, excavation equipment, drill rigs, vacuum trucks, forklifts, lull telehandlers, man lifts, bobcats, delivery trucks, etc.

3. PROCEDURES

As specified in the following sections of this program, Exclusion Zones must be established and maintained during activities involving the movement/operation of heavy equipment. The Exclusion Zone requirements apply to all personnel on the site but are primarily focused on personnel required to work near the equipment. The exclusion zone is in effect when heavy equipment is moving or engaged (e.g., movement of an arm or bucket of an excavator, rotation of an auger, lifting of a load with a forklift, raising/lowering of a man lift, etc.).

1. The Exclusion Zone must meet the following minimum requirements:
   - A minimum distance of 10 feet from all heavy equipment and loads being moved by the equipment;
   - Greater than the swing/reach radius of any moving part on the heavy equipment (i.e., for large equipment, this may mean an exclusion zone distance larger than 20 feet);
   - Greater than the fall zone of equipment and their contents; and
   - Greater than the tip-over distance of the heavy equipment.

   The size of the Exclusion Zone will need to be determined on a task-specific basis considering the size of the heavy equipment in use and the task being performed. Prior to all heavy equipment operations, the Exclusion Zone(s) distance must be specifically identified in the Job Planning Process and incorporated in the pre-job tailgate meeting with the subcontractor(s), including any updates to our Job Safety Analysis (JSA).
2. The spotter (or another authorized individual) is responsible for enforcing the Exclusion Zone and not conducting any other task. The spotter should be positioned immediately outside of the Exclusion Zone within a clear line of sight of the equipment operator. The spotter must signal the operator to stop work if anyone or anything has the potential to enter or compromise the Exclusion Zone. The operator should stop work if the spotter is not within their line of sight. If a spotter must be within the Exclusion Zone, they must be in a designated area outside the swing/tip radius, fall zone, line of fire of lifted loads, etc. If multiple pieces of equipment are being used, one spotter may be adequate so long as there is a clear line of sight and the spotter can control the zone(s). Radios would be required since hand signals would not be adequate if two pieces of equipment are in operation at the same time in the Exclusion Zone.

3. If an individual must enter the Exclusion Zone, the designated Spotter must signal the Equipment Operator to stop the equipment. Once the equipment is no longer moving (e.g., movement of an arm of an excavator is STOPPED, lifting of a load with a forklift STOPPED, raising/lowering of a man lift is STOPPED, etc.), the operator must bring the boom/arm to the ground ensuring a “Zero Energy State” and DISENGAGE THE CONTROLS and STOP and SIGNAL BY “SHOWING HIS HANDS.” This signal will indicate that it is safe for the person to enter the limits of the Exclusion Zone to perform the required activity. The equipment must remain completely stopped/disengaged until all personnel exited the Exclusion Zone's boundaries and the designated Spotter has signaled by “SHOWING HIS HANDS” to the Equipment Operator that it is safe to resume operations.
4. When entering the limits of the Exclusion Zone, personnel must, at a minimum:
    - Establish eye contact with the operator and approach the heavy equipment in a manner that is in direct line of sight to the Equipment Operator;
    - Never walk under any suspended loads or raised booms/arms of the heavy equipment; and
    - Identify a travel path free of Slip/Trip/Fall hazards.
5. The Exclusion Zone should be delineated using cones with orange snow fences or solid poles between the cones, barrels, tape, or other measures. For work in rights-of-way, rigid barriers, such as Jersey barriers or temporary chain link fences, should be used. For certain types of widespread or moving/mobile equipment operations, such delineation may not be practicable around equipment or individual work areas. In such instances, it is expected that the entire operation will be within a larger secure work area or that additional means will be utilized to ensure the security of the work zone.

All subcontractors who provide heavy equipment operations to field projects must implement a program that meets or exceeds the expectations described above, as well as any additional requirements that may be required on a client or site-specific basis. Logistics involving heavy equipment should be understood and discussed prior to the field event during the job planning phase.

3.1 Exceptions

It is recognized that certain heavy equipment activities may require personnel to work within the limits of the Exclusion Zone as specified in this program. Such activities may include certain excavation clearance tasks, drill crew activities, or construction tasks. However, any such activity must be pre-planned, emphasizing limiting the amount and potential exposure of any activity required within the zone. The critical safety steps to mitigate the hazards associated with working within the Exclusion Zone must be defined in the JSA and potentially other project-specific plans (i.e., critical lift plans, etc.), and approved by the Roux Project Principal (PP), Office Health and Safety Manager (OHSM) and client representative, if required, prior to implementation.

4. TRAINING

Many Roux projects have different requirements that are client-specific or site-specific in nature. However, all Roux employees are provided initial training, as well as annually thereafter, on our Heavy Equipment Exclusion Zone policy.

5. STOP WORK AUTHORITY

All Roux employees and their subcontractors have stop-work authority. Upon initial hire, all Roux employees are provided initial safety orientation, including stop work authority. All Roux employees and subcontractors are encouraged to stop work whenever any task or operation presents an unreasonable risk or employees

are unsure how to carry out work safely. This includes upon observing any questionable safety-related behavior or condition, they are to stop work immediately and discuss the behavior or condition with the individual(s) involved. Upon stopping work, the following actions will be taken:

- Notify the affected parties to include the Project Manager (PM) and Site Health and Safety Officer (SHSO);
- Work to correct the situation or not proceed until the situation is corrected by the PM or SHSO;
- Resume work only when told to proceed by either the PM or SHSO;
- The SHSO will document the Stop-Work intervention in the field logbook;
- Stop-Work interventions will be reported to the PP for review to ensure the interventions are closed; and
- The PP will share learnings from the interventions, as appropriate, throughout the firm, to demonstrate the importance of the Stop-Work interventions.

Please note: Any form of retribution or intimidation directed at any individual or company for exercising their right to issue a stop work authority will not be tolerated.

APPENDIX C

Community Air Monitoring Plan (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.

Attachment A

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 reflect 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 should be considered to prevent exposures related to the work activities and to control dust and odors. Consideration should be given to implementing the planned activities when potentially exposed populations are at a minimum, such as during weekends or evening hours in non-residential settings.

- If total VOC concentrations opposite the walls of occupied structures or next to intake vents exceed 1 ppm, monitoring should occur within the occupied structure(s). Depending upon the nature of contamination, chemical-specific colorimetric tubes of sufficient sensitivity may be necessary for comparing the exposure point concentrations with appropriate pre-determined response levels (response actions should also be pre-determined). Background readings in the occupied spaces must be taken prior to commencement of the planned work. Any unusual background readings should 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 mcg/m^3, work activities should be suspended until controls are implemented and are successful in reducing the total particulate concentration to 150 mcg/m^3 or less at the monitoring point.

- Depending upon the nature of contamination and remedial activities, other parameters (e.g., explosivity, oxygen, hydrogen sulfide, carbon monoxide) may also need to be monitored. Response levels and actions should be pre-determined, as necessary, for each site.

Special Requirements for Indoor Work With Co-Located Residences or Facilities

Unless a self-contained, negative-pressure enclosure with proper emission controls will encompass the work area, all individuals not directly involved with the planned work must be absent from the room in which the work will occur. Monitoring requirements shall be as stated above under "Special Requirements for Work Within 20 Feet of Potentially Exposed Individuals or Structures" except that in this instance "nearby/occupied structures" would be adjacent occupied rooms. Additionally, the location of all exhaust vents in the room and their discharge points, as well as potential vapor pathways (openings, conduits, etc.) relative to adjoining rooms, should be understood and the monitoring locations established accordingly. In these situations, it is strongly recommended that exhaust fans or other engineering controls be used to create negative air pressure within the work area during remedial activities. Additionally, it is strongly recommended that the planned work be implemented during hours (e.g. weekends or evenings) when building occupancy is at a minimum.

APPENDIX D

Master Erosion Control Plan

Master Erosion Control Plan

North Aud Block
NYSDEC Site No. C915406
P/O 130 Main Street
Buffalo, New York 14202

February 2026

Prepared for:

North Aud Owner LLC

Prepared by:

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Attachments

1. Introduction

1.1 Background

The Site consists of a 1.87-acre portion of a greater parcel addressed at 130 Main Street (SBL No. 111.17-14-11), Buffalo, Erie County, New York. The Site is mostly vacant and covered with grass, light vegetation, and stone. The southern portion of the Site is developed with three structures associated with the Ice at Canalside, including a 2,012-square-foot (SF) building used as a ticketing office and ice skate rental facility, a 143-SF metal outbuilding used as restrooms and a 156-SF metal outbuilding used as a snack shack. Small areas of the Site are covered with concrete sidewalks/stairs associated with the adjacent ice rink. A wooden/sheet pile retaining wall is located proximate to the north, east, and west boundaries of the Site and a smaller concrete wall is located near the western Site boundary. A chain link fence surrounds the majority of the Site (excluding the southern portion associated with the adjacent ice rink), which restricts access.

Historic Site uses and the presence of fill material remaining at the Site from unknown origins have resulted in environmental impacts at the Site, representing a source of contamination. Specifically, previous investigation activities indicated the presence of impacted urban fill material, as evidenced by the widespread presence of black sand, cinders, ash, and an unknown black material intermingled with the fill across the Site. The investigations also noted significantly elevated concentrations of polycyclic aromatic hydrocarbons (PAHs) and metals in fill samples.

1.2 Purpose and Scope

This Master Erosion Control Plan (MECP) was prepared to provide guidance during remedial action activities since erosion control will be a critical component of preventing the potential migration of contaminants off-site during excavation activities.

2. Potential Erosion and Sediment Control Concerns

Potential areas and items of concern during remedial action activities may include the following:

- Remediated areas or off-site properties adjacent to unremediated parcels need protection so they do not become impacted by Site operations.
- Runoff from soil stockpiles, if any, will require erosion controls.
- Surface slopes need to be minimized as much as practical to control sediment transfer.
- Soil/fill excavated will require proper handling and disposal.

3. Erosion and Sediment Control Measures

3.1 Background

Standard soil conservation practices need to be incorporated into remedial activities to mitigate soil erosion damage, off-site sediment migration, and water pollution from erosion. These practices combine vegetative and structural measures, many of which will be permanent in nature and become part of the completed project (i.e., grading). Other measures will be temporary and serve only during the construction stage. Selected erosion and sediment control measures will meet the following criteria:

- Incorporate temporary and permanent erosion control measures.
- Remove sediment from sediment-laden storm water before it leaves the Site.

3.2 Temporary Measures

Temporary erosion and sedimentation control measures and facilities will be used during construction. These temporary measures will be installed and maintained until they are either no longer needed or until such time as permanent measures are installed and become effective. Erosion and sediment controls shall be installed in accordance with the standards and specifications presented in Attachment 1. At a minimum, the following temporary measures will be used:

- Stabilized Construction Entrance
- Silt fencing, tubular silt socks
- Cautious placement, compaction, and grading of stockpiles

3.2.1 Stabilized Construction Entrance

Prior to initiation of remedial activities, a stabilized construction entrance will be constructed to allow truck access to the Site.

3.2.2 Silt Fence/Silt Sock

Remedial activities may result in surface water flow to drainage ditches and adjacent properties. Silt fencing or tubular silt socks will be the primary sediment control measure used in these areas. Prior to extensive soil excavation or grading activities, silt fences or silt socks will be installed along the perimeter of all construction areas. The orientation of the fencing will be adjusted as necessary as the work proceeds to accommodate changing site conditions.

If necessary, intermediate fencing/socks will be used upgradient of the perimeter fencing/socks to help lower surface water runoff velocities and reduce the volume of sediment to perimeter fencing/socks. Stockpiles will also be surrounded with silt fencing/socks.

As sediment collects, the silt fences/socks will be cleaned as necessary to maintain their integrity. Removed sediment will be used elsewhere on-site as general fill. Sediment to be used as backfill on the site will comply with import and/or reuse criteria. All perimeter silt fences/socks will remain in place until construction activities in an area are completed and cover has been established.

3.2.3 Cautious Placement of Stockpiles

Excavation activities may produce stockpiles of soil and subgrade soil/fill materials. Careful placement and construction of stockpiles will be required to control erosion. Stockpiles will be placed no closer than 50 feet from storm water inlets and parcel boundaries. Additionally, stockpiles will be graded and compacted as necessary for positive surface water runoff and dust control. Stockpiles will be secured with proper erosion controls to minimize runoff and dust generation.

Soil stockpiles will be continuously encircled with silt socks. Stockpiles will be kept covered with polyethylene sheeting. Polyethylene sheeting will also be placed underneath stockpiles to prevent cross-contamination. Stockpiles will be routinely inspected and damaged tarp covers will be promptly replaced. Stockpiles will be inspected at a minimum once each week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the site and available for inspection by the NYSDEC.

3.3 Permanent Control Measures during Site Redevelopment

Permanent erosion and sedimentation control measures and structures will be installed as soon as practical during construction for long-term erosion protection. Examples of permanent erosion control measures could include:

- Minimizing the potential contact with, and migration of, subsurface soil/fill through the placement of crushed stone in areas not covered with structures, roads, parking areas, sidewalks, etc.
- Planting and maintaining vegetation.
- Limiting runoff flow velocities to the extent practical.

4. Construction Management Practices

4.1 General

The following general construction practices should be evaluated for erosion and sedimentation control purposes during remedial activities:

- Clearing and grading only as much area as is necessary to accommodate the construction needs to minimize disturbance of areas subject to erosion (i.e., phasing the work).
- Covering exposed or disturbed areas of the Site as quickly as practical.
- Installing erosion and sediment control measures before disturbing the Site subgrade.
- Eliminating both on-site and off-site tracking of soil by vehicles by using routine entry/exit routes. When on-site and off-site tracking of soil is evident, use of a truck wash station will be evaluated.

4.2 Monitoring, Inspection and Maintenance

All erosion and sedimentation controls described in this Plan will be inspected by a qualified representative of the Site Owner within 24 hours of a heavy rainfall event (defined as more than 0.5 inches of precipitation in a 24-hour period) and repaired or modified as necessary to effectively control erosion or sediment problems. Inspections should include areas under construction, stockpile areas, erosion control devices (i.e., silt fences, silt socks, etc.) and locations where vehicles enter and leave the site. Routine inspections of the entire Site should also be made on a weekly basis during development.

If inspections indicate problems, corrective measures should be implemented within 24 hours. A report summarizing the scope of the inspection, name of the inspector, date, observations made, and a description of the corrective actions taken should be completed. Attachment 2 includes the Inspection and Maintenance Report Form.

4.2.1 Implementation

Erosion controls and features shall, at all times, be properly constructed, operated, and maintained in accordance with regulatory requirements and good engineering and construction practices. Erosion control measures and activities will be conducted in accordance with currently accepted Best Management Practices (BMPs).

Erosion control monitoring, inspection, and maintenance are an integral part of Site storm water and erosion control. The key elements of the monitoring effort include the following:

- Site inspections and maintenance
- BMPs monitoring
- Recordkeeping
- Review and modifications
- Certification of compliance

4.2.2 Site Inspections and Maintenance Practices

The temporary erosion control features will be maintained until no longer needed or permanent erosion control methods are installed. Site inspections are required every seven days or within 24 hours of a rainfall of 0.5 inches or greater. All disturbed areas, areas for material storage, locations where vehicles enter or exit the site, and all of the erosion and sediment controls identified as part of this Plan must be inspected. Controls must be in good operating condition until the affected area they protect has been completely stabilized and the construction activity is complete. If a repair is necessary, it must be completed within 24-hours of receipt of a report or notice, if practical. Inspection for specific erosion and sediment controls will include the following:

- Silt fence/silt socks will be inspected to determine the following:
    - Depth
    - Condition of fabric
    - That the fabric is attached to the posts
    - That the fence posts are firmly in the ground
- The silt fences/silt socks will be inspected weekly and within 24 hours of a 0.5 inch or greater storm event.
- Temporary and permanent seeding and planting will be inspected for bare spots, washouts, and other potential erosion control problems.
- The Contractor shall designate individual(s) that will be responsible for erosion control, maintenance, and repair activities. The designated individual will also be responsible for inspecting the site and filling out the inspection and maintenance report.
- Personnel selected for inspection and maintenance responsibilities will receive training as directed by the Engineer. They will be trained in all the inspection and maintenance practices necessary for keeping the erosion and sediment controls used on-site in good working order.

The individual inspecting the Site must record any damages or deficiencies on the Inspection and Maintenance Report Form in Attachment 2. This form can be used to request maintenance and repair and to document inspection and maintenance activities. Damages or deficiencies must be corrected as soon as possible after the inspection. Any changes that may be required to correct deficiencies in this Plan should also be made as soon as possible, but in no case later than seven days after the inspection.

4.2.3 Recordkeeping

A copy of the MECP and inspection and maintenance records will be included in the weekly reports to NYSDEC and must be kept at the Site from the time construction activities begins until the Site is stabilized. These documents will be made available upon request to regulatory agency representatives or members of the public.

4.2.4 Modifications to the Storm Water Management and Erosion Control Plan

During the course of construction, unanticipated changes may occur that affect this MECP such as schedule changes, phasing changes, staging area modifications, off-site drainage impacts, and repeated failures of designed controls. Any changes to the activities and controls identified in this Plan must be documented and the Plan revised accordingly. Certification of revisions to this plan shall be included at the end of the document.

ATTACHMENTS

1. Sediment and Erosion Control Details
2. Inspection and Maintenance Report Form

ATTACHMENT 1

Sediment and Erosion Control Details

STANDARD AND SPECIFICATIONS FOR SILT FENCE

Definition & Scope

A **temporary** barrier of geotextile fabric installed on the contours across a slope used to intercept sediment laden runoff from small drainage areas of disturbed soil by temporarily ponding the sediment laden runoff allowing settling to occur. The maximum period of use is limited by the ultraviolet stability of the fabric (approximately one year).

Conditions Where Practice Applies

A silt fence may be used subject to the following conditions:

1. Maximum allowable slope length and fence length will not exceed the limits shown in the Design Criteria for the specific type of silt fence used ; and
2. Maximum ponding depth of 1.5 feet behind the fence; and
3. Erosion would occur in the form of sheet erosion; and
4. There is no concentration of water flowing to the barrier; and
5. Soil conditions allow for proper keying of fabric, or other anchorage, to prevent blowouts.

Design Criteria

1. Design computations are not required for installations of 1 month or less. Longer installation periods should be designed for expected runoff.
2. All silt fences shall be placed as close to the disturbed area as possible, but at least 10 feet from the toe of a slope steeper than 3H:1V, to allow for maintenance and roll down. The area beyond the fence must be undisturbed or stabilized.
3. The type of silt fence specified for each location on the plan shall not exceed the maximum slope length and maximum fence length requirements shown in the following table:

		Slope Length/Fence Length (ft.)		
Slope	Steepness	Standard	Reinforced	Super
<2%	< 50:1	300/1500	N/A	N/A
2-10%	50:1 to 10:1	125/1000	250/2000	300/2500
10-20%	10:1 to 5:1	100/750	150/1000	200/1000
20-33%	5:1 to 3:1	60/500	80/750	100/1000
33-50%	3:1 to 2:1	40/250	70/350	100/500
>50%	> 2:1	20/125	30/175	50/250

Standard Silt Fence (SF) is fabric rolls stapled to wooden stakes driven 16 inches in the ground.
Reinforced Silt Fence (RSF) is fabric placed against welded wire fabric with anchored steel posts driven 16 inches in the ground.
Super Silt Fence (SSF) is fabric placed against chain link fence as support backing with posts driven 3 feet in the ground.

4. Silt fence shall be removed as soon as the disturbed area has achieved final stabilization.

The silt fence shall be installed in accordance with the appropriate details. Where ends of filter cloth come together, they shall be overlapped, folded and stapled to prevent sediment bypass. Butt joints are not acceptable. A detail of the silt fence shall be shown on the plan. See Figure 5.30 on page 5.56 for Reinforced Silt Fence as an example of details to be provided.

Criteria for Silt Fence Materials

1. Silt Fence Fabric: The fabric shall meet the following specifications unless otherwise approved by the appropriate erosion and sediment control plan approval authority. Such approval shall not constitute statewide acceptance.

Fabric Properties	Minimum Acceptable Value	Test Method
Grab Tensile Strength (lbs)	110	ASTM D 4632
Elongation at Failure (%)	20	ASTM D 4632
Mullen Burst Strength (PSI)	300	ASTM D 3786
Puncture Strength (lbs)	60	ASTM D 4833
Minimum Trapezoidal Tear Strength (lbs)	50	ASTM D 4533
Flow Through Rate (gal/ min/sf)	25	ASTM D 4491
Equivalent Opening Size	40-80	US Std Sieve ASTM D 4751
Minimum UV Residual (%)	70	ASTM D 4355

2. Fence Posts (for fabricated units): The length shall be a minimum of 36 inches long. Wood posts will be of sound quality hardwood with a minimum cross sectional area of 3.5 square inches. Steel posts will be standard T and U section weighing not less than 1.00 pound per linear foot. Posts for super silt fence shall be standard chain link fence posts.

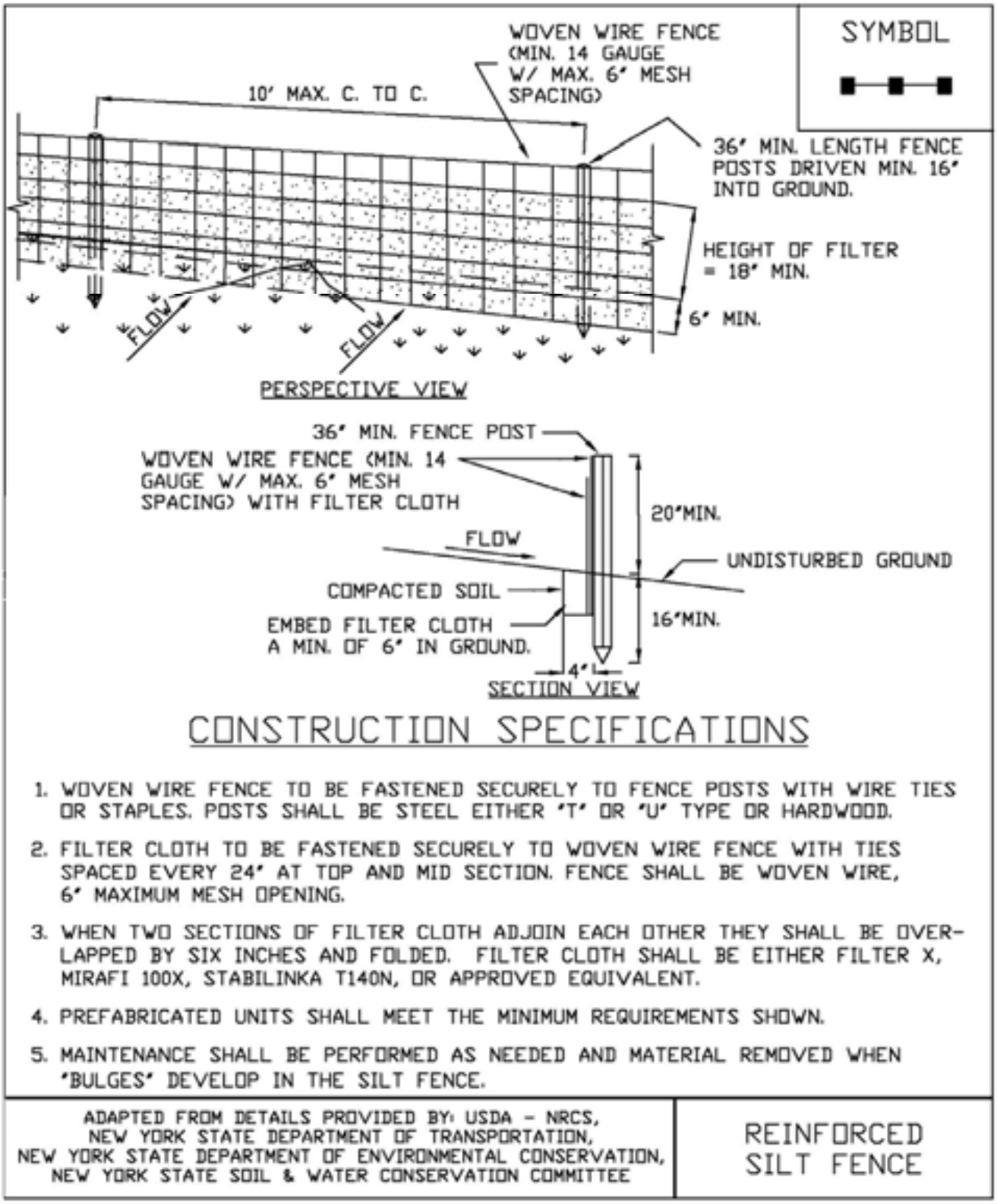
3. Wire Fence for reinforced silt fence: Wire fencing shall be a minimum 14 gage with a maximum 6 in. mesh opening, or as approved.

4. Prefabricated silt fence is acceptable as long as all material specifications are met.

Super Silt Fence

Reinforced Silt Fence

Figure 5.30
Reinforced Silt Fence



STANDARD AND SPECIFICATIONS FOR COMPOST FILTER SOCK

Definition & Scope

A **temporary** sediment control practice composed of a degradable geotextile mesh tube filled with compost filter media to filter sediment and other pollutants associated with construction activity to prevent their migration offsite.

Condition Where Practice Applies

Compost filter socks can be used in many construction site applications where erosion will occur in the form of sheet erosion and there is no concentration of water flowing to the sock. In areas with steep slopes and/or rocky terrain, soil conditions must be such that good continuous contact between the sock and the soil is maintained throughout its length. For use on impervious surfaces such as road pavement or parking areas, proper anchorage must be provided to prevent shifting of the sock or separation of the contact between the sock and the pavement. Compost filter socks are utilized both at the site perimeter as well as within the construction areas. These socks may be filled after placement by blowing compost into the tube pneumatically, or filled at a staging location and moved into its designed location.

Design Criteria

1. Compost filter socks will be placed on the contour with both terminal ends of the sock extended 8 feet upslope at a 45 degree angle to prevent bypass flow.

2. Diameters designed for use shall be 12" – 32" except that 8" diameter socks may be used for residential lots to control areas less than 0.25 acres.

3. The flat dimension of the sock shall be at least 1.5 times the nominal diameter.

4. The **Maximum Slope Length** (in feet) above a compost filter sock shall not exceed the following limits:

Dia. (in.)	Slope %						
	2	**5**	**10**	**20**	**25**	**33**	**50**
8	225*	200	100	50	20	—	—
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
* Length in feet							

5. The 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. The physical parameters of the compost shall meet the standards listed in Table 5.2 - Compost Standards Table. **Note: All biosolids compost produced in New York State (or approved for importation) must meet NYS DEC's 6 NYCRR Part 360 (Solid Waste Management Facilities) requirements. The Part 360 requirements are equal to or more stringent than 40 CFR Part 503 which ensure safe standards for pathogen reduction and heavy metals content. When using compost filter socks adjacent to surface water, the compost should have a low nutrient value.**

6. The compost filter sock fabric material shall meet the

7. Compost filter socks shall be anchored in earth with 2" x 2" wooden stakes driven 12" into the soil on 10 foot centers on the centerline of the sock. On uneven terrain, effective ground contact can be enhanced by the placement of a fillet of filter media on the disturbed area side of the compost sock.

8. All specific construction details and material specifications shall appear on the erosion and sediment control constructions drawings when compost filter socks are included in the plan.

Maintenance

1. Traffic shall not be permitted to cross filter socks.

2. Accumulated sediment shall be removed when it reaches half the above ground height of the sock and disposed of in accordance with the plan.

3. Socks shall be inspected weekly and after each runoff event. Damaged socks shall be repaired in the manner required by the manufacturer or replaced within 24 hours of inspection notification.

4. Biodegradable filter socks shall be replaced after 6 months; photodegradable filter socks after 1 year. Polypropylene socks shall be replaced according to the manufacturer's recommendations.

5. Upon stabilization of the area contributory to the sock, stakes shall be removed. The sock may be left in place and vegetated or removed in accordance with the stabilization plan. For removal the mesh can be cut and the compost spread as an additional mulch to act as a soil supplement.

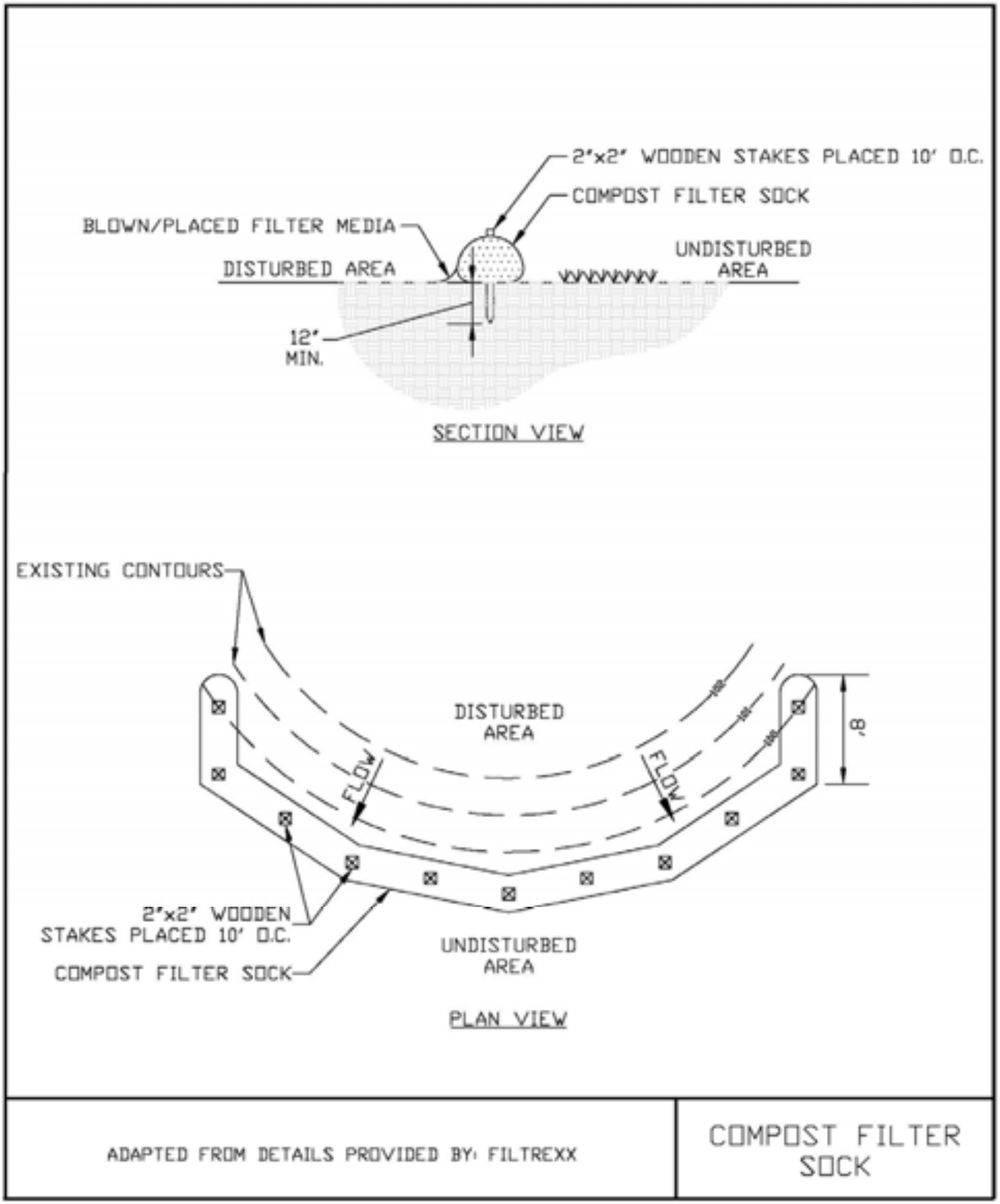
Table 5.1 - Compost Sock Fabric Minimum Specifications Table

Material Type	3 mil HDPE	5 mil HDPE	5 mil HDPE	Multi-Filament Polypropylene (MFPP)	Heavy Duty Multi-Filament Polypropylene (HDMFPP)
Material Characteristics	Photodegradable	Photodegradable	Biodegradable	Photodegradable	Photodegradable
Sock Diameters	12" 18"	12" 18" 24" 32"	12" 18" 24" 32"	12" 18" 24" 32"	12" 18" 24" 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 5.2 - Compost Standards Table

Organic matter content	25% - 100% (dry weight)
Organic portion	Fibrous and elongated
pH	6.0 – 8.0
Moisture content	30% - 60%
Particle size	100% passing a 1" screen and 10 - 50% passing a 3/8" screen
Soluble salt concentration	5.0 dS/m (mmhos/cm) maximum

Figure 5.2
Compost Filter Sock



STANDARD AND SPECIFICATIONS FOR STABILIZED CONSTRUCTION ACCESS

Definition & Scope

A stabilized pad of aggregate underlain with geotextile located at any point where traffic will be entering or leaving a construction site to or from a public right-of-way, street, alley, sidewalk, or parking area. The purpose of stabilized construction access is to reduce or eliminate the tracking of sediment onto public rights-of-way or streets.

Conditions Where Practice Applies

A stabilized construction access shall be used at all points of construction ingress and egress.

Design Criteria

See Figure 2.1 on page 2.31 for details.

Aggregate Size: Use a matrix of 1-4 inch stone, or reclaimed or recycled concrete equivalent.

Thickness: Not less than six (6) inches.

Width: 12-foot minimum but not less than the full width of points where ingress or egress occurs. 24-foot minimum if there is only one access to the site.

Length: As required, but not less than 50 feet (except on a single residence lot where a 30 foot minimum would apply).

Geotextile: To be placed over the entire area to be covered with aggregate. Filter cloth will not be required on a single-family residence lot. Piping of surface water under entrance shall be provided as required. If piping is impossible, a mountable berm with 5:1 slopes will be permitted.

Criteria for Geotextile: The geotextile shall be woven or nonwoven fabric consisting only of continuous chain polymeric filaments or yarns of polyester. The fabric shall be inert to commonly encountered chemicals, hydro-carbons, mildew, rot resistant, and conform to the fabric properties as shown:

Fabric Properties[3]	Light Duty[1] Roads Grade Subgrade	Heavy Duty[2] Haul Roads Rough Graded	Test Method
Grab Tensile Strength (lbs)	200	220	ASTM D1682
Elongation at Failure (%)	50	60	ASTM D1682
Mullen Burst Strength (lbs)	190	430	ASTM D3786
Puncture Strength (lbs)	40	125	ASTM D751 Modified
Equivalent	40-80	40-80	US Std Sieve
Opening Size			CW-02215
Aggregate Depth	6	10	-

[1]Light Duty Road: Area sites that have been graded to subgrade and where most travel would be single axle vehicles and an occasional multi-axle truck. Acceptable materials are Trevira Spunbond 1115, Mirafi 100X, Typar 3401, or equivalent.

[2]Heavy Duty Road: Area sites with only rough grading, and where most travel would be multi-axle vehicles. Acceptable materials are Trevira Spunbond 1135, Mirafi 600X, or equivalent.

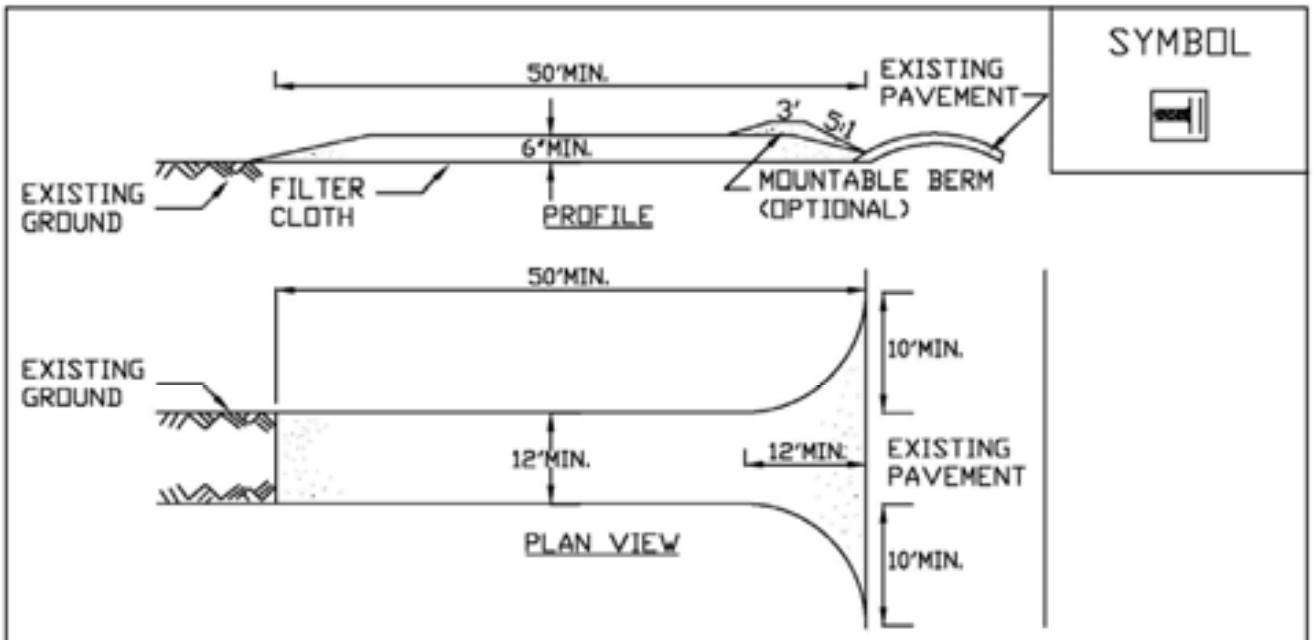
[3]Fabrics not meeting these specifications may be used only when design procedure and supporting documentation are supplied to determine aggregate depth and fabric strength.

Maintenance

The access shall be maintained in a condition which will prevent tracking of sediment onto public rights-of-way or streets. This may require periodic top dressing with additional aggregate. All sediment spilled, dropped, or washed onto public rights-of-way must be removed immediately.

When necessary, wheels must be cleaned to remove sediment prior to entrance onto public rights-of-way. When washing is required, it shall be done on an area stabilized with aggregate, which drains into an approved sediment-trapping device. All sediment shall be prevented from entering storm drains, ditches, or watercourses.

Figure 2.1
Stabilized Construction Access



CONSTRUCTION SPECIFICATIONS

1. STONE SIZE - USE 1-4 INCH STONE, OR RECLAIMED OR RECYCLED CONCRETE EQUIVALENT.
2. LENGTH - NOT LESS THAN 50 FEET (EXCEPT ON A SINGLE RESIDENCE LOT WHERE A 30 FOOT MINIMUM LENGTH WOULD APPLY).
3. THICKNESS - NOT LESS THAN SIX (6) INCHES.
4. WIDTH - TWELVE (12) FOOT MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS. TWENTY-FOUR (24) FOOT IF SINGLE ENTRANCE TO SITE.
5. GEOTEXTILE - WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE.
6. SURFACE WATER - ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ACCESS SHALL BE PIPED BENEATH THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.
7. MAINTENANCE - THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY, ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.
8. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON A AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
9. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE

STABILIZED CONSTRUCTION ACCESS

ATTACHMENT 2

Inspection and Maintenance Report Form

MECP: INSPECTION & MAINTENANCE REPORT FORM

TO BE COMPLETED EVERY 7 DAYS AND WITHIN 24 HOURS OF A RAINFALL EVENT OF 0.5-INCHES OR MORE

Project:	Date:
Client:	Report No.:
Job No.:	Personnel:
Rainfall (approx. inches):	Rainfall Event Personnel:

Contractor Activities	OK	NO	N/A	Notes
Are construction onsite traffic routes, parking and storage of equipment and supplies restricted to areas specifically designated for those uses?				
Are locations of temporary soil stockpiles of construction materials in approved areas?				
Is there any evidence of spills and resulting cleanup procedures?				
GENERAL EROSION & SEDIMENT CONTROLS				
Are sediment and erosion BMPs installed in the proper location and according to the specifications set out in the SWPPP?				
Are all operational storm drain inlets protected from sediment inflow?				
Do any seeded or landscaped areas require maintenance, irrigation, fertilization, seeding or mulching?				
Is there any evidence that sediment is leaving the site?				
Is there any evidence of erosion or cut fill slopes?				
PERIMETER ROAD USE				
Does much sediment get tracked on to the perimeter road				
Is the gravel clean or is it filled with sediment?				
Does all traffic use the perimter road to leave the site?				
Is maintenance or repair required for the perimeter road?				
REFER TO STABILIZATION MEASURES REPORT				

PREPARED BY: **DATE:**

MECP = Master Erosion Control Plan

APPENDIX E

Project Documentation Forms

ROUX

DAILY LOG	DATE			
	REPORT NO.			
	PAGE		OF	

CORRECTIVE MEASURES REPORT

Date:

Project:

Job No:

Location:

CQA Monitor(s):

Client:

Contractor:

Contractor's Supervisor:

WEATHER CONDITIONS:

Ambient Air Temp. - A.M.:

Ambient Air Temp. - P.M.:

Wind Direction:

Wind Speed:

Precipitation:

Corrective Measures Undertaken (reference Problem Identification Report No.)

Retesing Location:

Suggested Method of Minimizing Re-Occurrence:

Approvals (initial):

CQA Engineer:

Project Manager:

Signed:

CQA Representative

ROUX

DAILY LOG	DATE			
	NO.			
	SHEET		OF	

FIELD ACTIVITY DAILY LOG

PROJECT NAME:	PROJECT NO.
PROJECT LOCATION:	CLIENT:
FIELD ACTIVITY:	
DESCRIPTION OF DAILY ACTIVITIES AND EVENTS:	

TIME	DESCRIPTION

VISITORS ON SITE:	CHANGES FROM PLANS AND SPECIFICATIONS, AND OTHER SPECIAL ORDERS AND IMPORTANT DECISIONS:
WEATHER CONDITIONS: A.M.:	IMPORTANT TELEPHONE CALLS:
P.M.:	
PERSONNEL ON SITE:	
SIGNATURE	DATE:

ROUX

DAILY LOG	DATE			
	REPORT NO.			
	PAGE		OF	

PROBLEM IDENTIFICATION REPORT

Date:

Project:

Job No:

Location:

CQA Monitor(s):

Client:

Contractor:

Contractor's Supervisor:

WEATHER CONDITIONS:

Ambient Air Temp. - A.M.:

Ambient Air Temp. - P.M.:

Wind Direction:

Wind Speed:

Precipitation:

Problem Description:

Problem Location (reference test location, sketch on back of form as appropriate):

Problem Causes:

Suggested Corrective Measures or Variances:

Linked to Corrective Measures Report No. *or Variance Log No.*

Approvals (initial):

CQA Engineer:

Project Manager:

Signed:

CQA Representative