REMEDIAL CONSTRUCTION WORK PLAN FOR OPERABLE UNIT 1 MAIN SUB-SLAB DEPRESSURIZATION SYSTEM EXPANSION

FORMER UNISYS SITE
LAKE SUCCESS, NEW YORK
NYSDEC Site ID #130045

Prepared for:
Lockheed Martin Corporation

Prepared by:
AMEC E&E, P.C.

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I, Stuart C. Pearson, certify that I am currently a NYS registered professional engineer as defined in 6 New York Codes, Rules, and Regulations (NYCRR) Part 375 and that this Remedial Construction Work Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10) and that all activities were performed in full accordance with the DER-approved work plan and any DER-approved modifications.

9/1/2021

Stuart Pearson, P.E. Date
Project Manager

P.E. Stamp

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ACRONYMS AND ABBREVIATIONS

µg/m3	micrograms per cubic meter
AMEC	AMEC E&E, P.C.
AOC	Area of Concern
BOL	Bill of Lading
CAMP	Community Air Monitoring Plan
CMMS	Computer Maintenance Management System
CQCP	Construction Quality Control Plan
EP	Extraction Point
GWTT	Ground/Water Treatment & Technology, LLC
GWTS	Groundwater Treatment System
HASP	Health and Safety Plan
NYSDEC	New York State Department of Environmental Conservation
ORR	Operational Readiness Review
Plan	Construction Work Plan
PM	Project Manager
ppm	parts per million
PVC	polyvinyl chloride
QC	quality control
RCRA	Resource Conservation and Recovery Act
RTO	Remediation Technical Operations
SOP	Standard Operating Procedure
SSD	Sub-slab Depressurization
Main SSDS	Main Building and Garage Sub-slab Depressurization System
SSV	Sub-slab Soil Vapor
VOC	Volatile Organic Compounds

SECTION 1
INTRODUCTION

AMEC E&E, P.C. (AMEC) has prepared this Construction Work Plan (Plan) for the proposed addition of two vapor extraction points (EPs) to the SSDS of the former main manufacturing building (main building). The construction work plan outlines logistical considerations associated with the construction and implementation of the sub-slab depressurization (SSD) expansion design described in the *Operable Unit 1 Sub-Slab Depressurization System Expansion 100% Design Report* (AMEC, 2021) (**Appendix A**). This document will be used for guidance to field personnel, subcontractors, and engineers during project construction to ensure safe, efficient, and quality construction activities. One EP will be located in the northwestern corner of the main building (EP-A1), and the other EP in the southwestern corner of the main building (EP-Q1). The two additional EPs will supplement the existing sub-slab depressurization system covering the main building and garage (Main SSDS) at the Former Unisys Site located at 1111 Marcus Avenue in Lake Success, New York (Site No. 130045). The two EPs will be installed horizontally from the exterior through the foundation wall just below the building slab. Piping from each EP will extend up the building façade from each point and then extend horizontally on the building roof to a location of existing SSDS piping where the piping will re-enter the building and tie into the existing Main SSDS. This Plan incorporates the following planning documents for the construction of the proposed Main SSDS expansion concurrent with the 100% design submittal.

- Traffic Control and Transportation Plan (**Section 3.0**)
- Security Plan (**Section 4.0**)
- Radioactive Material Contingency Plan (**Section 5.0**)
- Construction Management Plan (**Section 6.0**)
- Construction Quality Control Plan (**Section 7.0**)
- Site and Temporary Facilities Layout Plan (**Section 8.0**)
- Emergency Response Plan (**Section 9.0**)

- Health and Safety Plan (**Section 10.0**)
- Waste Management Plan (**Section 11.0**)

A separate Startup and Testing Plan detailing the startup and acceptance testing (performance testing) protocols and criteria for the new EPs will be provided under separate cover.

1.1 BACKGROUND

The former Unisys Site is located in the Village of Lake Success and the Town of North Hempstead, Nassau County, New York. The site is bounded by Marcus Avenue to the north, Union Turnpike to the south, Lakeville Road to the west, and Triad Office Park to the east. The site is approximately 90 acres in size. The property is fully developed, consisting primarily of the former main manufacturing building, various smaller support buildings, three recharge basins, and parking lots. The site has been redeveloped for commercial use and presently houses multiple tenants. The proposed northwestern EP is located in the Village of Lake Success, an incorporated Village in the Town of North Hempstead. The proposed southwestern EP is located solely in the Town of North Hempstead.

The Main SSDS (consisting of the active system covering the main building [except the front office building] and garage) currently extracts sub-slab soil vapor (SSV) from 60 vertical EPs and soil vapor from three SVE wells (**Figure 1**). The objective of the Main SSDS is to reduce the potential of SSV from entering the former main manufacturing building and former garage. The Main SSDS is designed to maintain at least a negative differential pressure of 0.004 inches of water column between the sub-slab and indoor air at all times within the footprint of the former main manufacturing building and former garage. A separate remediation target for the Resource Conservation and Recovery Act (RCRA) Area of Concern Number 9 (AOC 9) was established to maintain this area at a differential pressure of at least negative 0.10 inches of water column to remove additional mass within AOC 9 former plating vaults.

During the fourth quarter 2019 operational period, two sub-slab points (SS-A1 and SS-Q1R, see **Figure 1**) had measurements that periodically did not meet the -0.004 inches of water column differential pressure criterion between the building interior and the sub-slab. Actions were taken to increase vacuum and flow at nearby extraction points by opening valves at the extraction points and increasing the vacuum at the header. These sub-slab points, SS-A1 and SS-Q1R in the

northwest and southwest corners of the main building, respectively, continued to meet the differential pressure criterion less than 90% of the time.

Based on the challenges of consistently achieving vacuums from under the main building at these building corners, additional mitigation is needed to ensure that the northwest and southwest corners are under the required vacuum at all times. The proposed locations of two EPs (**Figure 1**), one at each of the western corners, have been decided and were proposed as part of a conceptual plan submitted to the New York State Department of Environmental Conservation (NYSDEC) in April 2020. More detail on the placement of the two EPs and connection to the existing Main SSDS is provided in the 100% SSDS Expansion Design (**Appendix A)**.

SECTION 2
SSDS EXPANSION CONSTRUCTION SCOPE OF WORK

This section provides a description of the proposed SSDS expansion construction. Further details are provided in subsequent sections of this Plan, as outlined in **Section 1.0**.

2.1 SCOPE OF WORK

The scope of work consists of the construction and connection of two EPs to the existing Main SSDS. The details of the proposed construction activities for the expansion of the Main SSDS are presented in the Sub-slab Depressurization System Expansion Design included in **Appendix A**. Permit applications have been submitted to both the Village of Lake Success and the Town of North Hempstead based on these documents to allow for the system installation.

Prior to mobilizing to the site, a combined two-hour construction kickoff meeting/operational readiness review (ORR) will be held (refer to **Appendix B** for ORR Forms). The AMEC Project Manager, Engineer of Record, and Construction Superintendent and the Main SSDS and AMEC's subcontracted Expansion Construction Subcontractor, Ground/Water Treatment & Technology, LLC (GWTT), will attend the meeting. AMEC will prepare an agenda for the meeting and distribute it to Lockheed Martin three days before the meeting and prepare and distribute meeting minutes within two days of completion of the meeting.

AMEC will have overall responsibility for implementing the design and will have authority over subcontractors that are delegated construction tasks. Construction will include execution of the following tasks under AMEC's responsibility, some of which may be delegated to GWTT under AMEC's oversight:

- Utility clearance documentation in the form of a Lockheed Martin Dig Permit and Checklist. This includes placing a location request with Dig Safely New York and engaging a private subsurface subcontractor to use ground-penetrating radar and other geophysical methods to locate underground utilities.

- Coordination of erosion control measures prior to the start of any earth-moving construction activities.

- Coordination of analysis and submission for approval to NYSDEC for proposed imported backfill material. Backfill material is anticipated to be provided by 110 Sand Company of Melville, New York. Material from this facility was analyzed by AMEC in 2020 and previously approved by NYSDEC for backfill. AMEC will collect and analyze a more recent sample if required by NYSDEC.

- Background radiation screening to establish baseline levels and radiation screening during excavation to monitor radiation safety.

- Implementation of the contractor quality control program (See **Section 7**).

- Daily safety tailgate meetings for the construction staff. Maintenance of sign-in sheets and active records of all training required (refer to **Appendix C**, Daily Logs for Daily Safety Briefing).

- Photo documentation showing the before and after pictures of the work areas disturbed and modified during this construction program, including access routes and egress.

- Installation of dust monitoring equipment consistent with the Community Air Monitoring Plan (CAMP).

- Construction daily reports including the day's activities, personnel and heavy machinery on-site, radiological screening activities completed, CAMP equipment set up description and/or sketch, weather, arrival and departure times, and progress photographs (refer to **Appendix C**, Daily Logs for Daily Construction Report template).

- Provision of daily time and material cards for any extra work documenting the number and hours (regular or overtime rate) for each tradesman that worked on the contract that day, number of materials installed that day and type, quantity, and number of hours for each equipment item used that day.

- Weekly progress reports during construction sent to the Lockheed Martin Project Lead and the Remediation Technical Operations (RTO; CDM Smith) to include all necessary details of activities conducted and anticipated activities/updated schedule. Weekly progress meetings will be conducted with the construction team, AMEC engineers, Lockheed Martin, and the RTO.

- Agendas and minutes of construction progress meetings, meetings with project stakeholders, as appropriate.

- Coordination of inspections by regulatory authorities as needed.

Construction Close-out will include the following:

- Preparation of a construction completion report. Project closeout documentation will include record drawings that accurately show the final as-built conditions. This report will include the results of inspections and testing of constructed system components. One neatly written, legible logbook and a complete set of the daily construction reports, including progress photographs, will be provided. A written record of off-site waste and material disposal, including receipts, truckload tickets, laboratory analytical results, and shipping papers, will be included in a waste handling summary report. The project closeout documentation draft will be submitted within four weeks of substantial completion, and the final draft of documentation will be submitted within one week of receipt of the draft version comments.

- Warranties, operation and maintenance data, spare parts, and maintenance materials. All spare parts will be entered into the Main SSDS JobPlus Computer Maintenance Management System (CMMS).

- All assets will be entered into the Main SSDS JobPlus CMMS.

- All maintenance tasks will be entered in the Main SSDS JobPlus CMMS to match vendor-recommended maintenance tasks and periodicities. A conference call will be held with Lockheed Martin and the RTO to discuss inconsistencies and divergences from the vendor's recommended periodicities.

Construction items implemented by GWTT with AMECs oversight and responsibility include the following for each extraction point:

- Prepare and submit equipment and material submittals.
- Finalize schedule and assist AMEC in producing a 30-day look ahead for required coordination for access and shutdowns.
- Take pre-construction photos and submit a portfolio.
- Install soil erosion and sediment controls.
- Import NYSDEC-approved backfill material to one of the on-site staging areas.
- Remove soils to 2.5 feet below grade around the work area and deeper as necessary to facilitate installation of the structural steel plate and core drill one 6-inch diameter hole through the 12-inch thick foundation wall. Collect spoils within construction privacy fencing and place in drums. Transport drums to one of the waste storage area at the OU1 Groundwater Treatment System (GWTS) pending analytical results, selection of proposed disposal facility, submission to and approval by NYSDEC of the disposal facility, and disposal.
- Vacuum excavate soils on the opposite side of the foundation wall and replace them with 1/8-inch minimum to 1/4-inch maximum pea gravel to create void space for increased communication of subsurface vacuum and protect point from fouling.
- Install 4-inch diameter stainless steel well screen (0.040 in. slot with male NPT threads) threaded at sub-slab end of concrete frost wall penetration to Schedule 80 polyvinyl chloride (PVC) pipe extending to the exterior of concrete frost wall.
- Install heat traced, insulated 4-inch diameter Schedule 10 galvanized steel riser extending to penetration on building roof and Main SSDS building interior connection.

- Backfill around exterior piping with imported clean soils to backfill the installation pit. 0.25 in chipped bentonite to be added during backfilling and wetted after completion surrounding penetration of the concrete frost wall. Restore in 6-inch hand compacted lifts.

- Install heat trace panel and wiring connected to existing rooftop system.

- PVC penetration of rooftop glass monitor and interior connection to Main SSDS piping.

- Startup and troubleshoot the two additional EPs, collect operational data, and perform routine and non-routine maintenance in accordance with the SSDS Expansion Startup and Testing Plan.

- Restore disturbed site areas to existing conditions.

Performance monitoring will be initiated during additional EP start-up and will consist of EP recording of flow and vacuum readings, and differential pressure measurements in accordance with the schedule included in the Performance Monitoring Plan provided in **Appendix D**. The particulate filter at EP-C03 will be cleaned or replaced prior to the testing. Flow and vacuum readings will be used to optimize vacuum setpoints for the new EPs to meet regulatory differential pressure in the building corners. Additional details will be provided in the Startup and Testing Plan to be provided under separate cover. If performance testing indicates that the vacuum criteria of -0.004 inches of water column are not met by the system, Lockheed Martin will implement contingency actions such as installing interior vertical extraction points or other NYSDEC-approved modifications.

SECTION 3
TRAFFIC CONTROL PLAN

This Section documents the traffic control plan to be used during the duration of the proposed construction activities.

A plan view of the traffic control plan is provided in **Appendix E**. The traffic control plan includes two scenarios for regular and heavy construction activity types with access route limitations, signage, and fencing required to harmonize safety and construction operations, as illustrated in the drawings. Construction activities have been characterized as either "normal" for the majority of light construction activities during normal working hours or "heavy, task-specific" for excavation work and EP installation during off-hours for the purpose of traffic control. Work conducted on the building façade and roof is considered a normal construction condition, conducted during normal day time working hours (with the potential exception of loading materials to the roof prior to 7 am), and does not require altering traffic. The roof will be accessed via manlift from the South and North sides of the building, and no manlift booms will extend above building entrances per tenant request. Off-hours for the west side building tenants are Monday through Friday nights between 7 pm and 7 am, Saturday, or Sunday. All entrances, walkways, and vehicle traffic lanes will remain open during normal construction activities.

The heavy, task-specific traffic control plans include the following restrictions. On the western side of each building corner, pedestrian traffic will be re-routed from the sidewalk into the northbound traffic lane, between a high visibility plastic traffic barricade and temporary construction fencing extending into the northbound traffic lane. Temporary chain link construction fencing will secure the perimeter of the work zone. One-lane bidirectional traffic will be permitted in the southbound lane at each building corner, with one-lane traffic signs and flagmen at each end of the one-lane section to facilitate the safe flow of traffic. Impact on traffic in this area is expected to be minimal, as one-lane bidirectional traffic will only be in effect during off-hours, and the one-lane segment will be short (approximately 50 feet) at each corner. Entrances at each building corner will remain open during most construction activities, except for during overhead work on the roof

at the southwest building corner. The remainder of the parking lot pathways and access roads will remain open. The southwest staging area will occupy nine parking spaces in the area shown in **Appendix E**. The northwest staging area will occupy nine parking spaces in the parking lot below the OU1 GWTS extraction/recovery wells EW-1 and RW-3.

As heavy construction activities for EP installation will be completed during off-hours, traffic flow during access disruption will be minimal. All other work will be performed during normal business hours. All active construction work will be contained within construction fencing, and pedestrian and vehicle pathways will be isolated from the work.

When EP installation activities are not occurring, barriers and fencing will be relocated to only areas shown on the "Normal Construction Activity Plan" for each building corner. Less heavy equipment and vehicle presence are required during normal construction activities, allowing GWTT to reduce work areas in trafficked areas. The normal construction activity scenario applies to all construction occurring during normal tenant business hours (Monday through Friday between 7 am and 7 pm). These are the hours when high traffic occurs in the construction area, and this plan does not disrupt any pedestrian or vehicle flow. This plan uses two fenced landscaped areas to stage equipment and materials used during EP installation without obstructing building access.

SECTION 4
SECURITY PLAN

This Section documents the security requirements and actions to be taken during the duration of the proposed construction activities.

4.1 SITE-SPECIFIC SECURITY REQUIREMENTS

The scope of work includes construction activities primarily outside of the Main SSDS building, along with the vertical extent of the building wall and on the building roof. However, heavy construction activities for EP installations are planned to occur during off-hours (Monday through Friday nights between 7 pm and 7 am) to minimize noise and traffic disruption to nearby tenants. Aboveground work related to the installation of the EPs, excluding work on the Main SSDS building roof, will be conducted during off-hours. The anticipated necessary access to restricted access or tenant-occupied space of the building will be for indoor air sampling per the CAMP, EP testing to perform differential pressure monitoring, installation of conveyance piping in the corridor directly east of the ambulatory surgery center, and access of the fan room stairwell through Northwell. A minimum notice time of 30 days will be necessary to access any tenant spaces within the main building.

Temporary privacy fencing will be installed around areas of excavation related to EP installation to isolate the work area from pedestrians until temporary and permanent installations are complete and the areas are restored. Additional temporary privacy fencing will be installed on a grassy median across the road from the building for the staging of additional equipment and materials. Two separate areas will be established, one ~500 feet north from the northwest building corner designated “Contractor Staging Area 1” and another ~500 feet west from the southwest building corner designated “Contractor Staging Area 2”. See **Appendix E** for staging area locations.

The Main SSDS garage facility bathrooms will be made available for use by construction personnel.

Additional details are provided in **Section 8.0** Temporary Facilities Layout Plan.

SECTION 5
RADIOACTIVE MATERIAL CONTINGENCY PLAN

Radioactive material is not anticipated to be encountered during excavation. However, soils will be screened by a qualified individual for gross gamma screening using a Ludlum Model 2221 Scaler/Ratemeter coupled with a Ludlum 44-10 2-inch by 2-inch sodium iodide (2x2 NAI) detector or approved equivalent method, such as Eberline equipment specified in the standard operating procedure (SOP) *Gross Gamma Radiation Screening for EP Installation Excavation* attached in the Project Specific Health and Safety Plan (HASP), **Appendix F**. If gamma count rate readings are consistently above the site reference background as defined in the SOP, work will stop and contingency plans will be developed based on the Area 21 RCRA Corrective Measures Implementation Radioactive Material Contingency Plan (AECOM, 2020).

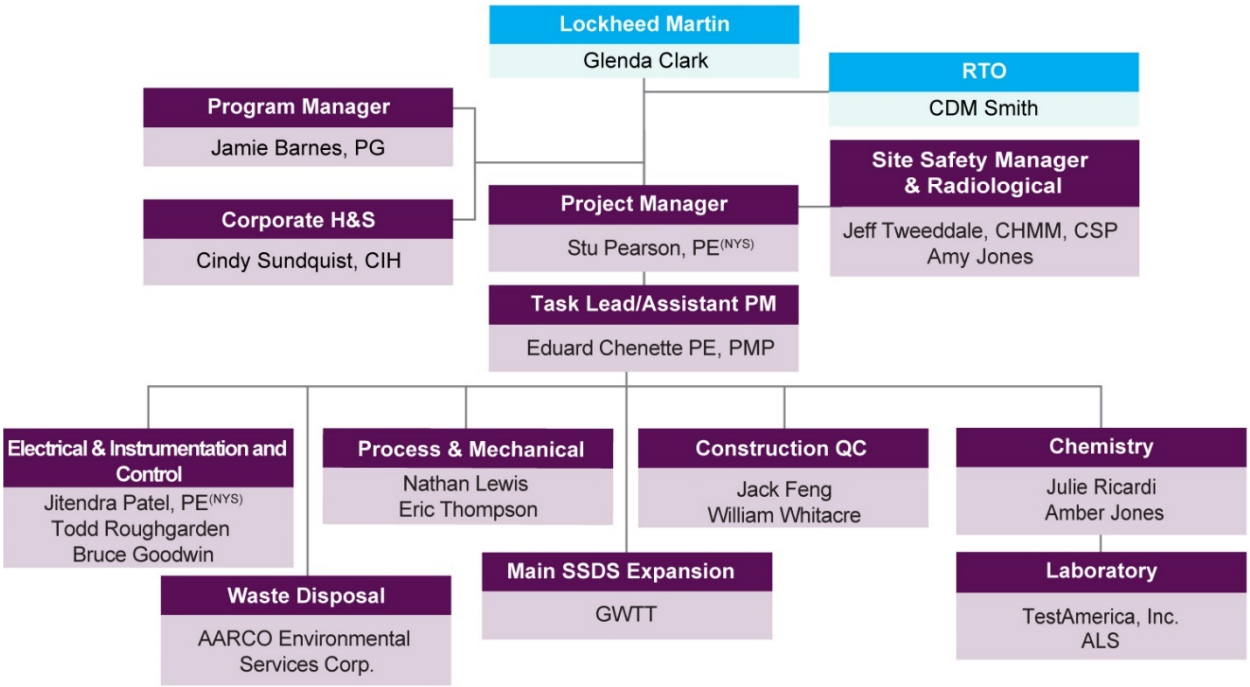
SECTION 6
CONSTRUCTION MANAGEMENT PLAN

This Section presents the construction management team roles and contact information.

6.1 CONSTRUCTION MANAGEMENT ORGANIZATION

AMEC will maintain consistent communication with the Lockheed Martin Project Lead, Glenda Clark, and CDM Smith, Lockheed Martin's RTO contractor (Bill Glynn, Erika Parsons, Jason Maskaly, and Nathan Jones), regarding the status of the work and any issues to be resolved by Lockheed Martin. AMEC will conduct weekly progress meetings by phone, conference call, or site and provide written meeting notes. In addition, AMEC will monitor and maintain the project budget and schedule and oversee the implementation of this Work Plan throughout the duration of the project. The below Org Chart for AMEC E&E represents all project-related staff organized by project role.

Exhibit 1. AMEC E&E, PC's Organization Chart



The anticipated construction schedule is provided in **Appendix G**.. AMEC will provide daily project reports via e-mail to project distribution and weekly progress reports to Lockheed Martin and CDM Smith during construction. The below Construction Management Organization Contact Information Table provides a contact list for construction management-related personnel involved in this project.

Construction Management Organization Contact Information			
Name	**Title/Role**	**Telephone**	**E-mail**
Stuart Pearson	Project Manager/Engineer of Record	O: 207-828-3426 C: 207-776-4251	Stuart.Pearson@woodplc.com
Eduard Chenette	Task Lead/Assistant PM	O: 207-828-3282 C: 207-710-4602	Eduard.Chenette@woodplc.com
William Whitacre	Offsite Support/ Construction QC	O: 609-689-6771 C: 646-831-5662	William.Whitacre@woodplc.com
Jack Feng	On-site Health and Safety Officer/Construction QC	C: 646-392-5252	jack.feng@woodplc.com
Jeff Tweeddale	Site Safety Manager and Radiological	O: 860-529-7191	Jeffery.Tweeddale@woodplc.com
Kevin Marchut	GWTT – Project Manager	O: 973-983-0901 C: 973-513-5812	kmarchut@gwttllc.com
Mike VanVliet	GWTT – Site Superintendent	O: 973-983-0901 C: 973-903-2945	mvanvliet@gwttllc.com

Construction Management Organization Contact Information			
Name	**Title/Role**	**Telephone**	**E-mail**
Ayman Hashem	GWTT – Assistant PM	O: 973-983-0901 C: 973-756-5151	ahashem@gwttllc.com
Tony Lo	GWTT – Project Engineer	C: 917-822-2833	tlo@gwttllc.com
Roger Huth	GWTT – Health and Safety Director	O: 973-983-0901 C: 201-274-3041	rhuth@gwttllc.com

SECTION 7
CONSTRUCTION QUALITY CONTROL PLAN

This Section presents the construction quality control plan (CQCP) during the execution of the subject work.

7.1 QUALITY CONTROL ORGANIZATION

Project personnel will be responsible for reporting issues that could adversely affect the safety, scope definition, cost control, schedule performance, and/or the expected level of quality. The quality control (QC) staff will maintain a close working relationship with project management and will keep management advised of situations that, if not corrected or controlled, could adversely affect the delivery of the expected level of quality of the project. This section describes the organization and authority for the development, approval, and implementation of the CQCP, including verification of work activities.

AMEC and its primary subcontractor, GWTT, are qualified to perform the project's work by following the contract-specific requirements and the requirements of this CQCP. **Section 6.0** presents a Project Organizational Chart (Exhibit 1) that identifies key personnel and their roles of responsibility within AMEC's project management structure and QC organization. GWTT roles and responsibilities are provided in the Construction Management Organization Contact Information provided at the end of **Section 6.0**. All work completed by GWTT will be conducted under AMEC supervision and oversight.

It is the responsibility of all personnel involved in project activities that may affect the quality of construction to be aware of and implement quality policies and practices set forth by the CQCP.

AMEC will also control quality through inspecting and testing and will document testing results as defined in the SSDS Expansion Startup and Testing Plan (provided under separate cover). This will include quality control checks on work products provided to AMEC by GWTT, such as redline as-built construction drawings and construction reports.

SECTION 8
SITE AND TEMPORARY FACILITIES LAYOUT PLAN

This Section presents the proposed site and temporary facilities layout during the execution of the subject work.

8.1 CONSTRUCTION ACTIVITIES AND STAGING

Drawing C-2 (refer to **Appendix A**) presents the work areas and equipment installation locations. The installation of the southwestern EP will be completed before work starts on the northwestern EP on the northern side of the Main building. Disruptive site work, including earthwork, will occur outside of normal tenant occupancy hours (Monday through Friday nights from 7 am to 7 pm, Saturday, or Sunday) to minimize disruption. Materials not immediately ready for installation will be staged within temporary fencing until needed. Access to restrooms for field personnel will be provided in the Main SSDS Building Garage. Any staging of materials outside of the Main SSDS building will be constrained to the areas protected by the construction fencing.

SECTION 9
EMERGENCY RESPONSE PLAN

This Section presents the Emergency Response Plan for the subject work.

9.1 GENERAL EMERGENCY RESPONSE REQUIREMENTS

The execution of work in accordance with this Plan will conform with the (HASP) for Site-Wide Activities at the Lockheed Martin Corporation Former Unisys Site, Lake Success, New York, Section 2.0 "Emergency Action Plan". Task-specific emergency response requirements also conform to the Project Specific HASP included as **Appendix F**. Additional Emergency Response considerations related to tasks associated with the subject work are provided in the following subsections.

9.2 TASK-SPECIFIC EMERGENCY RESPONSE REQUIREMENTS

The Main SSDS Expansion construction will involve the following tasks that require additional emergency response planning:

1. Excavation near and penetration of the concrete foundation sub-slab below the Main building; and
2. Work along the vertical extent of the Main building exterior and roof to connect to the Main SSDS conveyance piping.

9.2.1 Emergency Response Requirements for Excavation and Foundation Penetrations Air Monitoring

Excavations and foundation penetrations will be advanced during off-hours when the facility is closed. Real-time organic vapor monitoring and determinations on the need to vacate the premises will be implemented under the HASP and CAMP (refer to **Appendix F** for more detail). Continuous monitoring is planned for the workspace air within the excavation and near the foundation penetration using a photoionization detector. If monitoring indicates sustained organic vapor levels exceeding the threshold (VOCs reading at least 5 parts per million (ppm) above

background in worker breathing zone for more than 15 minutes, or), the foundation penetration will be temporarily sealed, and all field personnel will vacate the excavation area only returning intermittently to monitor organic vapor levels until the situation is evaluated with the project manager (PM) and Site Safety Manager, following the procedure outlined in the CAMP. Additionally, if sustained organic vapor levels within 20 feet of the building exceed 1.0 ppm, an indoor air sample in the same location as the pre-excavation air sample will be collected to confirm no impact on indoor air quality. Sample results will be reviewed by the PM and Health and Safety Officer to determine if any further action will be taken. If total volatile organic compounds (VOCs) remain above 1.0 ppm, then assessment for vinyl chloride with Draeger tube or Chip Measurement System will be done. If vinyl chloride is detected at or above 0.5 ppm, the work will be stopped, and workers will leave the work area.

CAMP equipment will be established for monitoring and logging/documentation of PM_{10} and VOCs. Excavations will be performed sequentially, so only one set (3 locations) of CAMP monitoring equipment is necessary to monitor conditions at each excavation. Each of the 3 CAMP monitors will be dispersed immediately adjacent to the building, upwind and downwind of the excavation area within the construction fencing. Field personnel are responsible for ensuring continuous monitoring and data logging from CAMP monitors. Dust suppression techniques will be implemented if the particulate concentration exceeds 100 $\mu g/m^3$ above the upwind background concentration or if visible dust is observed migrating beyond the construction fencing. Work activities will be halted and reassessed if dust suppression is insufficient.

9.2.2 Emergency Response Requirements for Building Façade/Roof Work

During construction, the field personnel will monitor weather reports for high winds and heavy rains. If these events are in the forecast, field personnel will take the necessary actions to secure the construction site. Façade/roof work will cease should any of the following weather conditions arise:

1. Poor visibility.
2. Precipitation severe enough to impair safe movement on the aerial lift.
3. Lightning in the immediate area.
4. Excessive winds.
5. Other unsafe conditions as determined by any of the on-site personnel.

SECTION 10
HEALTH AND SAFETY PLAN

This Section presents the Project-Specific HASP attached as **Appendix F**. This HASP was prepared to provide project-specific requirements and is consistent with the *Health and Safety Plan Site Wide Activities Rev 5* (AMEC, 2021) at the Lockheed Martin Corporation Former Unisys Site, Lake Success, New York, which was prepared in accordance with Lockheed Martin's Remediation Contractor's Environmental Safety and Health, dated June 5, 2020, Revision 6 (ESH Handbook).

10.1 PROJECT-SPECIFIC HEALTH AND SAFETY PLAN

Health and safety is the primary responsibility of all the companies and personnel working on this project. AMEC's Project-Specific HASP is provided in **Appendix F**.

All personnel are required to read and sign off on the HASP and attend initial orientation and daily site safety briefings, which will be documented for the project file. All personnel are also required to use the COVID-19 daily declaration form to confirm the absence of symptoms related to COVID-19 each day upon arrival at the Site. Completed COVID-19 forms (along with all other logs and field notes) will be stored at the Main SSDS garage facility and scanned and saved digitally with Main SSDS expansion project files. Also included with the HASP are the community air monitoring program, daily construction report template, and gamma screening SOP, which aid in managing the safe operation and procedure of construction activities.

SECTION 11
WASTE MANAGEMENT PLAN

This Section presents the plan for handling, characterization, disposal, and documentation of wastes generated during the execution of the subject work.

11.1 WASTE HANDLING AND DOCUMENTATION

Anticipated wastes include excess materials (e.g., piping), concrete slab cores, and soil removed from the sub-slab to create a suction cavity at each extraction point piping penetration location. AMEC will perform radiation screening during soil excavations for signs of radiation above the background in accordance with the Radioactive Material Contingency Plan (**Section 5.0**). AMEC's subcontractor will be responsible for removing all excess materials from the site. Concrete and soil waste generated will be managed in drums and moved to the fence waste storage area at the OU1 GWTS. Waste soils and debris will be sampled for characterization (refer to **Subsection 11.2** below), and the disposal plan submitted to NYSDEC for approval. Excavated material removed from the Site will be transported and disposed off-site in a permitted facility in accordance with all local, state, and federal regulations. Wastes will be managed in drums until disposal.

It is not anticipated that any materials generated at the site will be hazardous or special waste material. Per the Lockheed Martin Energy Environment, Safety, and Health Remediation Operating Procedure No. EROP-03 (LMC, 2009), Remediation Waste Management requirements, if the waste is determined non-hazardous, then only Elements D (Shipping Requirements) and E (Post Shipment Requirements – Records) as described in **Section 4.1**, Waste Management Plan, are required. AMEC's project-specific plan to meet these requirements is summarized below:

- Waste will be shipped to a NYSDEC-approved non-hazardous waste disposal facility in one shipment unless analytical data indicates a different classification is required.
- Tickets and copies of the bill of lading (BOL) will be provided to AMEC within 24 hours of shipment. All waste streams from the site will be shipped under a BOL regardless of

material or type. AMEC will provide all waste transportation and disposal records to Lockheed Martin Corporation at the completion of the project.

- No vehicle will be allowed to leave the site unless it is clean and free of loose dirt and soil material on tailgates, sideboards, wheel axles, and tires to prevent foreign object debris from being released onto local or state highways. No container or waste vehicle will be allowed to leave the site unless covered to prevent blowing and or material drops off the load.
- AMEC on-site management and technical support staff have individual training in the elements identified in EROP-03. For non-hazardous waste, this only includes the Occupational Health and Safety Administration hazardous waste operations training and an annual refresher if applicable. AMEC has extensive experience in waste management, characterization, and transportation requirements, as well as additional safety training completed by site personnel outlined in the Project Specific HASP, **Appendix F**.

AMEC has subcontracted AARCO Environmental Services Corp. to provide waste transportation and disposal at Lockheed Martin and NYSDEC-approved facilities.

11.2 WASTE CHARACTERIZATION AND PROFILING

AMEC will sample waste soils and debris and submit the samples to TestAmerica for the following analyses:

- Solid 8260C TCL VOCs
- Solid 8270D TCL BNAs
- Solid 8082A PCBs
- Solid 8260C TCLP VOCs
- Solid 1311 TCLP Volatile Extraction
- Solid 8270D TCLP Semivolatile Organic Compounds
- Solid 6010D TCLP Metals
- Solid 1311 TCLP Extraction
- Solid 7470A TCLP Mercury
- Solid 901.1 NORM Target List + TICs
- Solid A-01-R isotopic Thorium and Uranium

SECTION 12
REFERENCES

AECOM, 2020. *Area 21 RCRA Corrective Measures Implementation Radioactive Material Contingency Plan.* August.

AMEC, 2021. *Health and Safety Plan Site Wide Activities Rev 6.* August.

_____, 2021. *Operable Unit 1 Sub-Slab Depressurization System Expansion 100% Design Report*. August.

Lockheed Martin Corporation (LMC) Corporate Energy, Environment, Safety, & Health, 2009. *ESSH Remediation Operating Procedure No: EROP-03 Rev 4.* April 17.

FIGURES

Figure 1 Proposed Expansion System EP Locations Map

SSDS Expansion North

SSDS Expansion South

SECURITY
VACANT LL07
VACANT LL10B
VACANT LL28
CAFE/STORAGE
BLUE MOON CLEANING LL29
DOOR 11B
DOOR 1A
PUBLIC ACCESS TV LL27
DOOR 11A
NORTHWELL VACANT L25
NORTHWELL HEALTH HUMAN RESOURCES LL26
VACANT LL26
VACANT LL25
VACANT C9
HUNTER ROBERTS M66
KEY POINT PARTNERS MANAGEMENT/LEASING M23
NORTHWELL SPMO B7
DOOR 1B
DOOR 2
DOOR 2A
DOOR 3
DOOR 3A
DOOR 4
DOOR 4A
DOOR 4B
DOOR 5
DOOR 5A
DOOR 5B
DOOR 6
DOOR 6A
DOOR 4C
SS-A1
SS-A3
SS-A5R
VACANT AREA (FORMER GYN ONCOLOGY)
SS-A7
SS-A9R3
SS-A11
NORTHWELL VACANT M03
SS-A15
SS-A17
NORTHWELL VACANT M10B
SS-A19R
SS-B1.7
SS-C1
SS-C4
EP-C03
MONTER CANCER CENTER M36
EP-C05
SS-C6
EP-C07
SS-C8
EP-C09
NORTHWELL VACANT C4
SS-C10
EP-C11
SS-C11
SS-C12
EP-C13
SS-C14
EP-C15
SS-22
SS-C16
NORTHWELL REVENUE CYCLE B-3
RSM-C16
EP-C17
SS-C18
NORTHWELL VACANT M10A
SS-E2
EP-E04
SS-E3.3
SS-E5
RADIATION ONCOLOGY M36
EP-E06
SS-E7
EP-E08
SS-36
SS-E9
EP-E10
SS-E11
SS-37
ELITE MARKETING M60
SS-B2B3
EP-E12
SS-E13
RSM-E13
EP-E14
SS-E15
EP-E16
SS-20
RSM-E17
SS-E19
EP-E18
SS-F1.5
EP-G03
SS-G4
EP-G05
SS-G6
EP-G07
SS-G8
EP-G09
SS-G9
SS-38
EP-G11
SS-G11
SV VG10.5
SS-F12
EP-G13
SS-G14
SS-G15
RSM-F16
EP-G15
SS-G16
EP-G17
SS-41
SS-15
SS-F18
EP-G18
SS-G19
SS-G09.5
SVE-H09P
SVE-G11
SVE-H11P
SS-G12
UROLOGY CENTER - VIVO HEALTH, CAFE AND STORAGE SHELL SPACE M36
SS-I1
SS-I3
EP-I04
SURGICAL ONCOLOGY M36
SS-5R
EP-I06
SS-I7
NORTHWELL BIOSKILLS LAB M36
EP-I08
DISPLAY TECHNOLOGIES M68
SS-H09.5
SS-I9
EP-I10
SS-H10.5
1111 MARCUS AVE CAFE M29
SS-I11
NORTHWELL VACANT M27
EP-I12
SS-I13
EP-I14
SS-I15
EP-I16
SS-4
SS-3
GSA M14
SS-J19
EP-J18
SS-J9
SS-J11
ANTECH M28B
SS-33
EP-K03
SS-K4
EP-K05
RSM-K04
LOBBY
SS-K6
SS-K7
EP-K07
RSM-K08
SS-K8
EP-K09
SS-K10
EP-K11
RSM-K12
SS-K12
EP-K13
SS-K14
EP-K15
SS-K16
EP-K17
SS-K19
SS-2
NORTHWELL VACANT M21
VACANT AREA
DIAGNOSTIC IMAGING M36
SS-M1
SS-M3
EP-M04
SS-M5R
EP-M06
SS-M7R
EP-M08
SS-N9R
CORE LABS
EP-M10
SS-M11
RSM-M11
ANTECH DIAGNOSTICS M28
EP-M12
SS-M13
EP-M14
EP-M16
SS-M15
SS-M17R
NORTHWELL CCMC M15
EP-M18
SS-M19
RSM-N18
SS-N2
EP-O03.5
SS-O4.5R
EP-O05
EP-O07
SS-O6R
SS-O8R
EP-O09
SS-O10
SS-O12
EP-O11
LOADING DOCK/ MAILROOM
EP-O13
SS-O14
EP-O15
RSM-O16S
SS-O16R
RSM-O16P
EP-O17
SS-O18R
SS-O19
EP-P18
SS-P2
SS-P3
SS-Q1F
SS-Q3.5
SS-Q5R
SS-Q7R
SS-Q9
SS-Q11
SS-P15
SS-Q17
AMBULATORY SURGERY M36
NORTHWELL HEALTH HR ADMINISTRATION M17
NORTHWELL VACANT M15
SS-A5F
SS-B2.4
SS-C01FR
EP-C5F
RSM-LA01
SS-C4F
SS-C7F
SS-E10FR
SS-D13F
SS-C20F
SS-D1F
SS-D5F
LA FITNESS
SS-E16F
EP-E2F
SS-E2F
SS-D3F
SS-E21.5F
SS-F13F
SS-G5FR
SS-G18F
PARKING LOT
BASEMENT AREA
SS-H21F
SS-POW-1
SS-POW-2
SS-POW-3
POWERHOUSE
SS-POW-4
SS-24
EP-GAR01
SS-23R
SSDS FACILITY M50
SS-NYTM-3
SS-NYTM-2
EP-GAR02
RSM-GAR1
RSM-GAR2

LEGEND

EP-K17	EXISTING EXTRACTION POINT
SS-O16	EXISTING SUB-SLAB MONITORING POINT
RSM-N18	EXISTING ROOM STATUS MONITOR
SS-16	SUB-SLAB MONITORING POINT EXCLUDED FROM QUARTERLY MONITORING DUE TO PROXIMITY TO EXTRACTION POINTS
	PASSIVE VENT EXHAUST
	PASSIVE VENT INLET
	AREA OF CONCERN NUMBER 9
	POTENTIAL AREA FOR DEVELOPMENT

NOTE:
1. OCCUPIED TENANT AREAS ARE SHOWN IN GRAY.
2. NORTHWELL VACANT M10B AND NORTHWELL VACANT M10A WILL BE UNDER RENOVATIONS DURING Q1 ANDQ2 2021 (PINK BORDER AREA).

0 150 300
SCALE IN FEET

TITLE: **SSDS Expansion Locations**

LOCATION: **Former Unisys Facility Site #130045**
Lake Success, New York 11042

APPROVED	ERC	FIGURE 1
DRAFTED	BRT	
PROJECT#	3617187445	
DATE	06-28-21	

amec

P:\PROJECTS\LOCKHEED\3617187445 - SSDS O&M\8.0 DRAWINGS\GW REPORTS\2021 2Q\SHEETS\FIG 2 SITE PLAN.DWG

APPENDICES

Appendix A - SSDS Expansion 100% Design

OPERABLE UNIT 1 MAIN SUB-SLAB DEPRESSURIZATION SYSTEM EXPANSION 100% DESIGN REPORT

FORMER UNISYS SITE
LAKE SUCCESS, NEW YORK
NYSDEC Site ID #130045

Prepared for:
Lockheed Martin Corporation

Prepared by:
AMEC E&E, P.C.

August 2021

Submitted to:
New York State Department of Environmental Conservation

Revision: 1

Stuart C. Pearson, P.E. Project Manager

Eduard Chenette, P.E., PMP Design Lead

I, Stuart C. Pearson, certify that I am currently a NYS registered professional engineer as defined in 6 New York Codes, Rules, and Regulations (NYCRR) Part 375 and *that this Design Report was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10) and that all activities were performed in full accordance with the DER-approved work plan and any DER-approved modifications.*

08/17/2021

Stuart Pearson, P.E. Date
Project Manager

P.E. Stamp

TABLE OF CONTENTS

LIST OF FIGURES

APPENDICES

ACRONYMS AND ABBREVIATIONS

AMEC	AMEC E & E, P.C.
AOC 9	Area of Concern Number 9
AROD	Amendment to the Record of Decision
booster system	two sub-slab depressurization booster systems
EP	extraction point
GW	groundwater
in. WC	inches of water column
IRM	interim remedial measure
Lockheed Martin	Lockheed Martin Corporation
Main SSDS	main building and garage sub-slab depressurization system
MCP	Master Control Panel
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
OIT	operator interface terminal
OU	operable unit
PLC	Programmable Logic Controller
RCRA	Resource Conservation and Recovery Act
ROD	Record of Decision
SCADA	Supervisory Command and Data Acquisition
scfm	standard cubic feet per minute
sch.	schedule
Site	Former Unisys Site
SSD	sub-slab depressurization
SSDS	sub-slab depressurization system
SSV	sub-slab vapor
SVE	soil vapor extraction
TCE	Trichloroethylene

VOC	volatile organic compounds

SECTION 1
INTRODUCTION

AMEC E & E, P.C. (AMEC) has prepared this Design Report for the proposed construction of two additional vapor extraction points (EPs) to be located in the northwestern and southwestern corners of the main building to expand the existing sub-slab depressurization system (SSDS) covering the main building and garage (Main SSDS) at the Former Unisys Site (Site) located at 1111 Marcus Avenue in Lake Success, New York (New York State Department of Environmental Conservation [NYSDEC] Site No. 130045). The Site is listed by the NYSDEC as a Class 2, Inactive Hazardous Waste site.

The Design Report for the booster system includes the following:

Section 2 – Background: Briefly describes the Site's remediation history, including the Main SSDS.

Section 3 – Basis of Design: Presents the technical approach used to design the EPs.

Section 4 – Permitting: Summarizes the permits required to perform the work.

Section 5 – Construction Cost Estimate: Presents an estimate of construction costs.

Section 6 – References: Lists the references used in this design document.

SECTION 2
BACKGROUND

2.1 SITE LOCATION AND DESCRIPTION

The Site is located at 1111 Marcus Avenue in the Village of Lake Success and the Town of North Hempstead in Nassau County, New York. Marcus Avenue binds the Site itself to the north, Union Turnpike to the south, Lakeville Road to the west, and Triad Business Park to the east. The Site is a former manufacturing facility of mainly electronic components for military and commercial applications. The Site was an active facility from 1941 through 1995, when manufacturing activities ceased; some assembly, integration, prototype development and testing, and engineering and administrative activities continued through 1999. The facility was originally designed and built by the United States government and was operated under contract with the Sperry Gyroscope Company from 1941 to 1951. In 1951, the property was sold to Sperry Gyroscope Company, which merged with Burroughs in 1986 to form the Unisys Corporation. In 1995, Loral Corporation acquired assets of Unisys Defense Systems, a division of Unisys Corporation. In early 1996, Lockheed Martin Corporation (Lockheed Martin) purchased the electronics and systems integration businesses of Loral Corporation. In April 2000, Lockheed Martin sold the Site for redevelopment, and it is used as commercial space. Lockheed Martin retained access easements in several areas of the Site for remedial activities.

2.2 HISTORICAL INTERIM ACTIONS AND REMEDIAL ACTIVITIES

In 1991, Unisys Corporation (previous Site owner) entered into an Administrative Order on Consent requiring the completion of a Remedial Investigation and Feasibility Study, including the implementation of interim remedial measures (IRMs) for soil and groundwater (GW). The GW IRM was initiated in April 1993 and was composed of a series of northern boundary and source area recovery wells, liquid-phase activated carbon absorbers, low-profile air strippers, and southern boundary diffusion wells. The soil IRM was installed in January 1994 and consisted of a soil vapor extraction system in the dry well area by the southeast corner of the main building (previously identified as the source of volatile organic compound [VOC] contamination at the Site) to recover residual VOCs in the soil. The Site was divided into two operable units (OUs) in 1995:

OU1 consists of the 90-acre Site property, and OU2 is defined as the off-site area where contaminants in groundwater have migrated northward from the Site.

In response to the publication of the New York State Department of Health's (NYSDOH) *Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York* (NYSDOH, 2006), the NYSDEC requested that Lockheed Martin evaluate indoor air and sub-slab soil vapor concentrations at the main building. In accordance with the NYSDEC-approved work plan, Lockheed Martin began indoor air and sub-slab soil gas monitoring in March 2007. The Main SSDS was subsequently installed between 2012 and 2014 and began operations in September 2014.

An Amendment to the OU1 Record of Decision (AROD) was issued in January 2015 (NYSDEC, 2015) requiring the continued operation of the Main SSDS, the passive basement air venting system at the former foundry (LA Fitness building), and groundwater treatment system at the property along with the installation of a supplemental extraction well as required in the OU2 Record of Decision (ROD). After the issuance of the AROD, an active SSDS was installed in the northwest portion of the LA Fitness Building (LA Fitness SSDS) to address concentrations of trichloroethene (TCE) that exceeded NYSDOH mitigation criteria revised in May 2017.

2.3 EXISTING MAIN SSDS

The Main SSDS currently extracts sub-slab soil vapor (SSV) from 60 EPs located throughout the main building (except front office building) and garage and soil vapor from three soil vapor extraction (SVE) wells (**Figure 1**). The objective of the Main SSDS is to reduce the potential of SSV from entering the main building and garage. The Main SSDS is designed to provide a total flow rate up to 6,000 standard cubic feet per minute (scfm) and manifold vacuum up to 100 inches of water column (in. WC) and to maintain at least a negative differential pressure of 0.004 in. WC between the sub-slab and indoor air at all times within the footprint of the main building and garage. A separate remediation target for the Resource Conservation and Recovery Act (RCRA) Area of Concern Number 9 (AOC 9) was established to maintain this area at a differential pressure of at least negative 0.10 in. WC to remove additional mass within the AOC 9 former plating vaults. The Main SSDS flow rate ranged between 4,200 scfm to 4,600 scfm, and the manifold vacuum ranged from 70 in. WC to 72 in. WC during the first quarter 2021 monitoring period.

Process equipment for the Main SSDS is located in a portion of the garage referred to as the Main SSDS Facility. Each EP and SVE well is equipped with flow and pressure monitoring devices. Each EP and SVE well also has a motorized control valve to monitor and control flow and vacuum at each EP and SVE well via a Programmable Logic Controller (PLC) located in the Master Control Panel (MCP). The MCP is located in the Main SSDS Facility electrical room. Adjustments to the EP and SVE control valves are normally made through operator interface terminals (OIT) located in the Main SSDS Facility control room. Each OIT allows the operators to access the supervisory control and data acquisition (SCADA) system, which interfaces with the MCP's PLC. The EPs and SVE wells are connected through header pipes (on the main building roof) and eventually to a 24-inch conveyance pipe to four 150-horsepower vacuum blowers in the Main SSDS Facility. In addition to the blowers, a moisture separator, condensate storage tank, air/water heat exchanger, water chiller, condenser, two vapor phase granular activated carbon vessels in series, and miscellaneous condensate transfer pumps are also located in the Main SSDS Facility. Ten of the EPs (EP-C03, EP-M06, EP-M08, EP-O05, EP-O07, EP-O09, EP-J18, EP-K17, EP-G17, and EP-G18) are equipped with particulate filters.

Two sub-slab points, SS-A1 and SS-Q1R in the northwest and southwest corners of the main building, respectively, have shown vacuum readings that have intermittently failed to meet the differential pressure criterion even after additional actions were taken to increase vacuum and flow at nearby EPs. The effectiveness of the Main SSDS at these locations is not consistent, and fluctuations above and below the criterion have been observed.

A letter report was submitted to the NYSDEC on December 27, 2019, detailing these conditions and troubleshooting results. NYSDEC and NYSDOH recommended additional steps to address these conditions, including the addition of EPs near monitoring points SS-A1 and SS-Q1R. Lockheed Martin submitted a conceptual plan to NYSDEC in April 2020 that proposed installing two stand-alone sub-slab depressurization booster systems. NYSDEC approved this approach at that time and requested that the installation be operational before the 2020-2021 heating season. Additional development of the conceptual plan in coordination with the property owner resulted in the decision to tie the additional EPs into the Main SSDS as outlined herein instead of providing stand-alone systems.

SECTION 3
BASIS OF DESIGN

The scope of this design includes the installation of two new EPs, one each at the northwest and southwest building corners (**Figure 2**) connected to the Main SSDS through existing header pipes routed to the 24-inch conveyance pipe on the roof of the main building. This design relies on similar equipment to the design and installation of existing Main SSDS EPs at the Site. Design drawings are provided in **Appendix A**. Technical specifications are provided in **Appendix B**.

3.1 EXTRACTION POINTS

The design calls for the installation of two new sub-slab EPs located on the west side of the building near monitoring points SS-A1 and SS-Q1R in the northwest and southwest corners of the main building, respectively. The proposed EP locations were selected based on structural analysis of the perimeter of the main building, the location of known existing subsurface utilities, the impact of main building geometry on extraction efficiency, the impact of excavation and trenching on facility operation, and input from the building stakeholders. Locations will be finalized based on field utility clearance confirmation. Each extraction point will be a horizontal point cored from the outside of the building through the foundation wall with a short (~1 ft) well screen beneath the slab. No penetration of the slab will be made in the interior spaces of the main building. A shallow excavation at each EP location will be conducted to expose the foundation wall. After installing a steel reinforcing plate, the concrete foundation wall will be cored approximately two feet below the top of the slab. The soil beneath the slab will be removed and replaced with a minimum ¼" washed pea gravel to expand the available extraction surface area. A 4-inch schedule (SCH) 80 PVC pipe with a threaded 4-inch stainless steel 0.040" slotted well screen and stainless steel welded cap will then be installed through the building foundation and sealed against the foundation wall. All below-grade piping will be stainless steel or schedule 80 PVC to minimize corrosion and transition to SCH 10 galvanized steel 6” above grade. All sections of pipe above grade will be insulated and jacketed to protect against freezing. Mulch will be installed around the extraction points to reduce the need for lawn care activities to take place in the vicinity of the risers.

3.2 EXTRACTION POINT PIPING

The 4-inch SCH 80 PVC piping from each EP will turn up 90 degrees and extend 6 inches above the ground surface and will connect using flanged connections to an SCH 10 galvanized steel spool piece, which will include a lockable 4-inch butterfly valve, vacuum gauge, and a ½" sample tap with stainless steel ball valve. The spool piece will connect via a flanged connection to a 4-inch SCH 10 roll grooved galvanized steel riser extending to the roof of the adjacent wall. The riser will have three anchor points along the vertical section of the pipe using pipe clamps connected to Power-Strut or approved equivalent fastened to the wall with lag bolts. All riser hardware will be stainless steel. From the rooftop, the piping will continue horizontally east along the valley between monitors and tie into the Main SSDS system adjacent to existing extraction points, as shown in the drawings. Horizontal piping will be SCH 10 galvanized steel pipe sized and configured to handle the target extraction flow rate of up to 120 scfm at 20 feet per second (fps) per EP.

The connection to the Main SSDS will be made inside the main building to the 4" extraction lines directly above the existing instrumentation spool pieces for EP-C05 in the northern and EP-O03.5 in the southern portion of the building as detailed in the design drawings in **Appendix A**. Piping from each EP will penetrate the glass block wall at the monitor wall close to the connection location to minimize the interior work.

A spool piece with instrumentation and valves will be installed in the vertical section of the pipe adjacent to the existing EP tie-in location for flow and vacuum monitoring and control as described in the following subsection. The above-grade exterior piping will be insulated and heat traced to minimize the formation of condensate. In addition, the piping will be sloped at a minimum of 0.5% so that if condensation forms, it will either drain back or forward to an EP. See design drawings in **Appendix A** for additional details on EP construction.

3.3 ELECTRICAL, INSTRUMENTATION, AND CONTROLS

The control spool piece installed before manifolding with other points will consist of a series of valves/instruments as follows:

- a lockable butterfly valve for isolation
- an actuated butterfly valve for flow/vacuum control
- an orifice plate flow measurement instrument (similar to other extraction points) with a transmitter to communicate with the SCADA
- a vacuum measurement instrument with a transmitter to communicate with the SCADA
- a lockable butterfly valve for isolation

The proposed control spool piece will generally be the same configuration as the spool pieces for existing EPs. The head loss calculations are provided in **Appendix D**.

The control signals and power for the spool pieces will be sourced from existing remote control panels (RP-01 and RP-02) within the main building that provides service to existing EPs. A review of existing record drawings indicates both RPs contain sufficient pre-wired I/O terminations to accommodate the new EPs. Power and control wiring will be routed to the valve actuator and instrumentation at the spool piece for each new EP through two new galvanized steel conduits at each location. EP controls will communicate back to the Main SSDS SCADA system for EP monitoring and alarm notifications. The SCADA computer screens will be updated to include the new EPs for the operator interface. See design drawings in **Appendix A** for additional details on electrical routing, instrumentation, and controls.

Heat tracing in above-grade piping will be operated seasonally to minimize condensate formation and is self-regulating to maintain temperature during operation. Indicator lights located at eye height near each new EP will provide confirmation that the system is active. Power for heat tracing will be connected to existing facility 480/277-volt, 3-phase panelboards in fan house 4S to serve the southern portion of new piping, and fan house 4N for the northern part of new piping. Control panels for the heat tracing will be located in the respective fan house. A 3-pole circuit breaker will be provided at each location in an existing space/spare within the 480/277-volt panelboard to supply a new heat trace control panel. These feeders will include Emon watthour submetering equipment for demand monitoring. The heat trace control panels and heating cables will be a turn-key vendor selected, designed, and submitted by the contractor according to the actual installation of piping and associated fittings. The system will include 30 mA ground fault protection, circuit status indicators, remote temperature sensors, and multiple output heating cable circuits as necessary to support the installation at no greater than 8 W per foot.

SECTION 4
PERMITTING

The main building spans the town line between the Town of North Hempstead and the Village of Lake Success. The proposed northwestern EP is located in the Village of Lake Success, an incorporated Village in the Town of North Hampstead. The proposed southwestern EP is located solely within the Town of North Hempstead. Construction permits need to be obtained from both the Village of Lake Success and the Town of North Hempstead. Refer to the Permit Compliance Plan (AMEC, 2021) for a detailed account of relevant state and local requirements for performing the work.

SECTION 5
CONSTRUCTION COST ESTIMATE

A Design Construction Cost Estimate (target of +20%/-10%) has been prepared. The estimated cost for the construction of the Main SSDS expansion is $. Cost estimate backup and calculations are provided in **Appendix C**.

SECTION 6
REFERENCES

AMEC E&E, PC (AMEC), 2021. OU1 SSD Booster System Permit Compliance Plan, Former Unisys Site, Lake Success, New York, NYSDEC Site ID# 130045. Prepared for the Lockheed Martin Corporation (Lockheed Martin). Prepared by AMEC. May 2021.

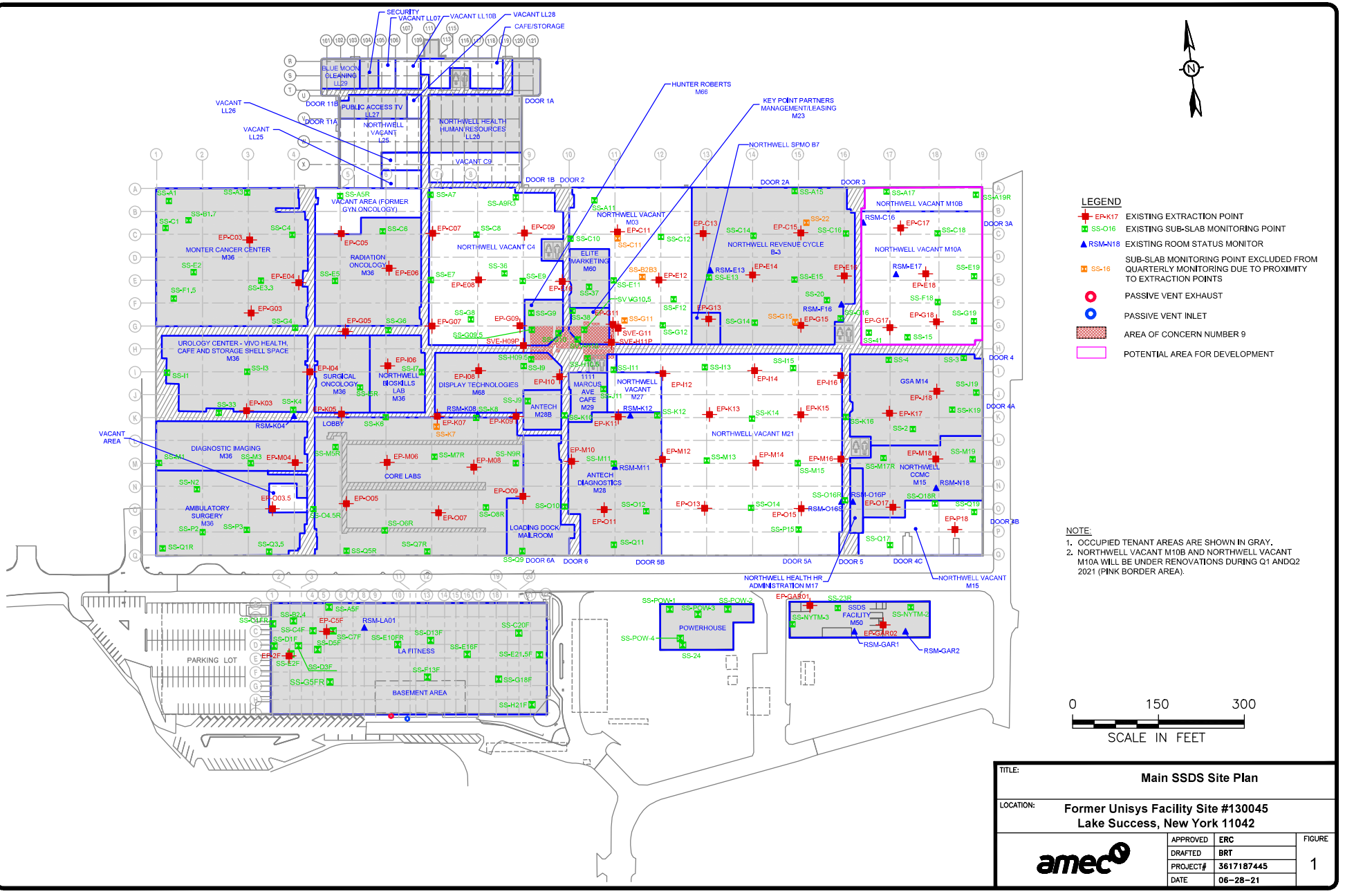
New York State Department of Environmental Conservation (NYSDEC), 2015. Amendment to the Record of Decision. Unisys Corporation, Operable Unit Number 01: On-Site Remedial Program, State Superfund Project. Lake Success, Nassau County. Site Number 130045. NYSDEC. January 2015.

New York State Department of Health (NYSDOH), 2006. Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York. Prepared by NYSDOH. October 2006.

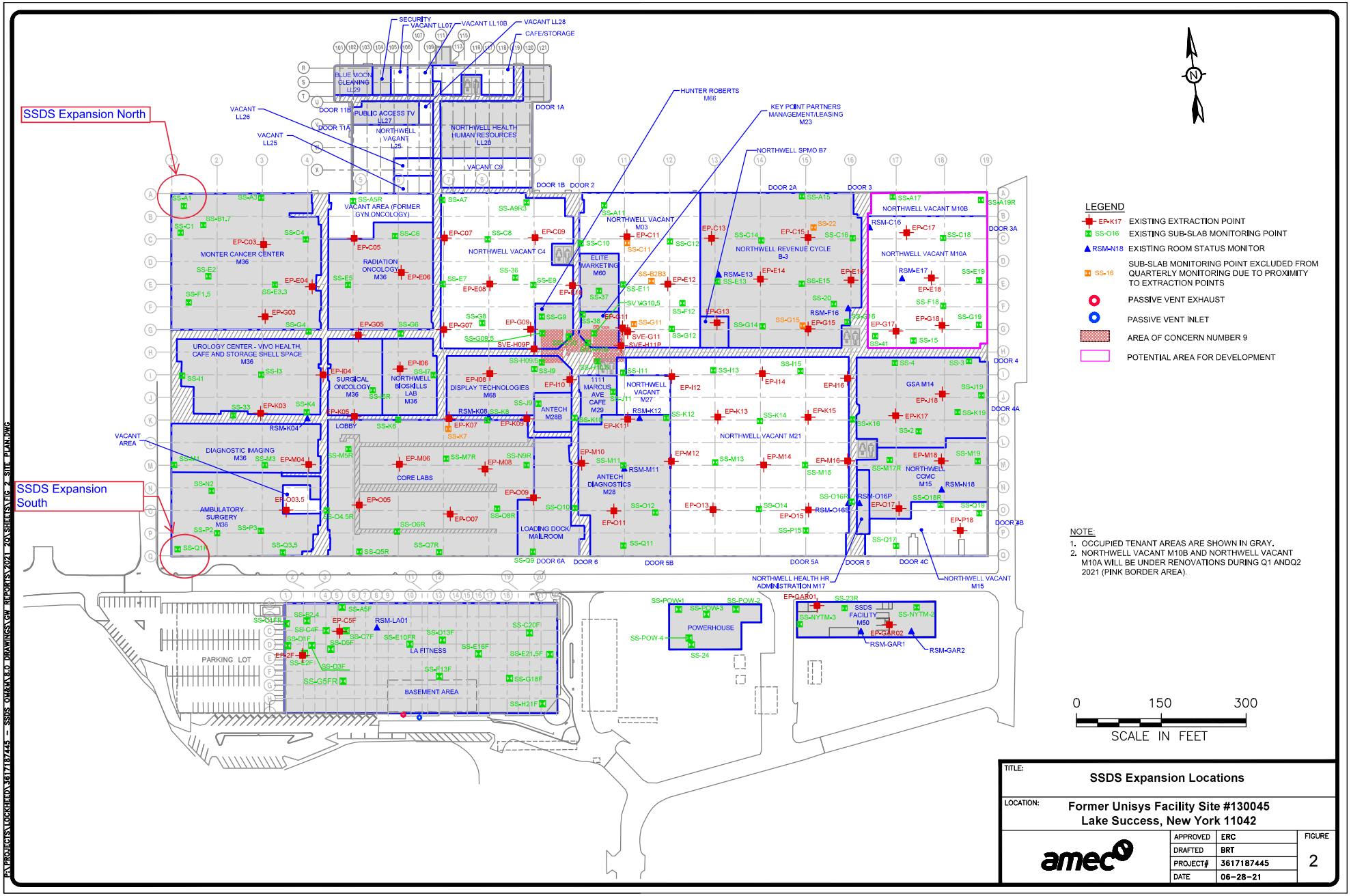
FIGURES

Figure 1 Main SSDS Site Plan

Figure 2 Proposed SSDS Expansion Map



P:\PROJECTS\LOCKHEED\3617187445 – SSDS OMM&O\DRAWINGS\CW_REPORTS\2021 2Q\SHEETS\FIG 2 - SITE PLAN.DWG



TITLE: **SSDS Expansion Locations**

LOCATION: **Former Unisys Facility Site #130045**
Lake Success, New York 11042

APPROVED	ERC
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PROJECT#	3617187445
DATE	06-28-21

FIGURE 2

amec

P:\PROJECTS\LOCKHEED\3617187445 - SSDS OM&M 5.0 DRAWINGS\CW_REPORTS\2021_2Q\SHEETS\FIG 2_SITE PLAN.DWG

APPENDIX A – DESIGN DRAWINGS

G-1	Cover Sheet
C-1	Site Plan
C-2	Traffic, Staging, and Contractor Laydown Plan
M-1A	Roof Piping Routing and Tie In Locations
M-4N	Extraction Point and Piping Details
M-5S	Glass Block Penetration Details
S-10C	Rooftop Piping and Support Details
S-10D	Rooftop Piping Elevations
E-1	Legend, Abbreviations, and General Notes
E-2E	Southwest Electrical and Instrumentation Plan
E-2F	Northwest Electrical and Instrumentation Plan
E-6A	One Line Diagram
E-20	Control/Instrumentation Interconnect
IC-1	Legend, Abbreviations, and General Notes
IC-2	Piping and Instrumentation Diagram
IC-3	Process Flow Diagram
IC-7	Piping and Instrumentation Diagram
IC-7A	Piping and Instrumentation Diagram

Note:
Drawing numbering is coordinated for eventual incorporation into the Main SSDS record drawing set

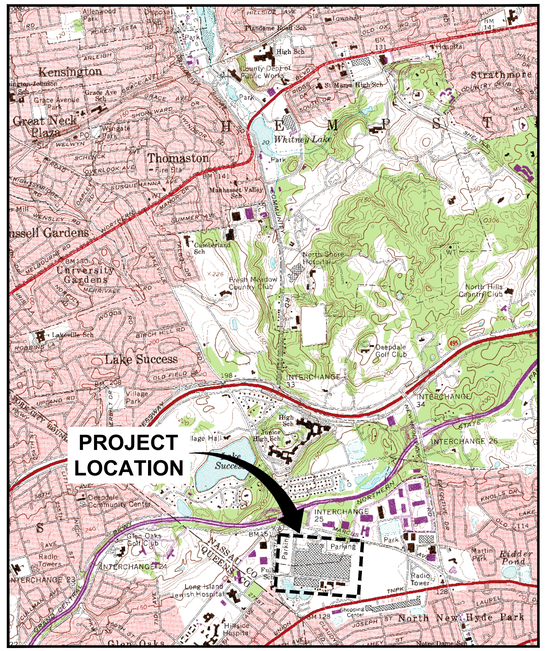
100% DESIGN DRAWINGS
OU1
SSDS EXPANSION SYSTEM DESIGN

AUGUST 2021

LOCKHEED MARTIN CORPORATION

FORMER UNISYS SITE 130045 - GREAT NECK REMEDIATION SITE

LAKE SUCCESS, NEW YORK



REFERENCE: BASE MAP USGS 7.5 MINUTE QUADRANGLE.,
SEA CLIFF, NY, 1968 (PHOTOREVISED 1979)

LOCATION MAP

0 2000' 4000'

GRAPHIC SCALE

DRAWING LIST			
INCLUDED THIS SUBMITTAL	SHEET NUMBER	DISCIPLINE NUMBER	DRAWING TITLE
●	01	G-1	COVER SHEET
●	02	C-1	SITE AND LAYDOWN PLAN
●	03	C-2	TRAFFIC AND STAGING PLAN
●	04	M-1A	ROOF PIPING ROUTING AND TIE IN LOCATONS PLAN
●	05	M-4N	EXTRACTION POINT AND PIPING DETAILS
●	06	M-5S	GLASS BLOCK PENETRATION DETAILS
●	07	S-10C	ROOFTOP PIPING AND SUPPORT DETAILS
●	08	S-10D	ROOFTOP PIPING ELEVATIONS
●	09	E-1	LEGEND, ABBREVATIONS, AND GENERAL NOTES
●	10	E-2E	SOUTHWEST ELECTRICAL AND INSTRUMENTATION PLAN
●	11	E-2F	NORTHWEST ELECTRICAL AND INSTRUMENTATION PLAN
●	12	E-6A	ONE LINE DIAGRAM
●	13	E-20	CONTROLS, INSTRUMENTATION AND INTERCONNECT
●	14	IC-1	LEGEND, ABBREVATIONS, AND GENERAL NOTES
●	15	IC-2	PIPING AND INSTRUMENTATION DIAGRAM
●	16	IC-3	PROCESS FLOW DIAGRAM
●	17	IC-7	PIPING AND INSTRUMENTATION DIAGRAM
●	18	IC-7A	PIPING AND INSTRUMENTATION DIAGRAM

THESE DESIGN DRAWINGS HAVE BEEN NUMBERED FOR EVENTUAL MERGING WITH THE UNISYS SITE NO. 130045 - SSDS CONSOLIDATED DRAWINGS, DATED 03.21.17. RECORD DRAWINGS FROM IMPLEMENTATION OF THIS DESIGN WILL EITHER REPLACE OR SUPPLEMENT DRAWINGS IN THE PREVIOUS CONSOLIDATED DRAWINGS SET.

KEY CONTACTS:

PROJECT SITE:
1111 Marcus Avenue
Lake Success, NY 11040

PROJECT MANAGER: Stuart Pearson
TELEPHONE: 207-828-3426

OWNER:

STUART C. PEARSON

STATE OF NEW YORK * STUART C. PEARSON * LICENSED PROFESSIONAL ENGINEER

NO.	DATE	REVISION	BY	APVD
0	08/17/21	100% DESIGN ISSUED FOR CONSTRUCTION	RJR	SCP

DSGN EWT DR RJR CHK SCP APVD SCP

100% DESIGN DRAWINGS
OU1 SSDS EXPANSION SYSTEM DESIGN
LOCKHEED MARTIN CORPORATION
FORMER UNISYS SITE 130045 - GREAT NECK REMEDIATION SITE
1111 MARCUS AVENUE
LAKE SUCCESS, NEW YORK 11042

DRAWING STATUS
100% DESIGN SUBMISSION

GENERAL
COVER SHEET

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214-25 42nd Avenue Suite 3R,
Bayside, NY, 11361

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	AUGUST 17, 2021
PROJ	3617-20-7521
DWG	G-1
SHEET	1 OF 18

NORTHWEST EXTRACTION SYSTEM (SEE SHEET C-2)

CONTRACTOR STAGING AREA #1

TEMPORARY CONSTRUCTION FENCE

EXTRACTION POINT LOCATION (EP-A01)

SOUTHWEST EXTRACTION SYSTEM (SEE SHEET C-2)

EXTRACTION POINT LOCATION (EP-Q01)

TEMPORARY CONSTRUCTION FENCE

CONTRACTOR STAGING AREA #2

LEGEND

- RSM–MO4 — EXISTING ROOM STATUS MONITOR POINT
- EP–MO4 — EXISTING EXTRACTION POINT
- SS–MO4 — EXISTING SUB-SLAB MONITORING POINT
- HVAC UNIT
- ROOF MONITOR
- PUBLIC HALLWAY
- MUNICIPAL BOUNDARY
- SANITARY SEWER
- STORM SEWER
- WATER
- COMMUNICATION
- ELECTRIC
- UTILITY MANHOLE
- ELECTRIC MANHOLE
- SANITARY SEWER MANHOLE
- STORM DRAIN MANHOLE
- CATCH BASIN, CURB INLET
- HYDRANT
- WATER VALVE
- LIGHT POLE, BUILDING MOUNTED LIGHT
- HEDGE, SHRUB

NOTES:

1. LOCATION NAMES AND APPROXIMATE FOOTPRINTS PROVIDED BY KEYPOINT PARTNERS.
2. EXTRACTION POINT TO BE LOCATED AS CLOSE TO LOCATION SHOWN AS FIELD CONDITIONS ALLOW. GROUND PENETRATING RADAR AND FIELD OBSERVATIONS WILL BE UTILIZED FOR DETERMINATION OF FINAL LOCATION.

0 30 60 120
SCALE IN FEET

STUART C. PEARSON
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8/17/21

NO.	DATE	DSGN	DR	CHK	APVD
0	08/17/21	EWT	RJR	SCP	SCP

100% DESIGN ISSUED FOR CONSTRUCTION

REVISION	BY	APVD
	RJR	SCP

100% DESIGN DRAWINGS
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REMEDIATION SITE
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LAKE SUCCESS, NEW YORK 11042

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100% DESIGN SUBMISSION

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SITE AND LAYDOWN PLAN

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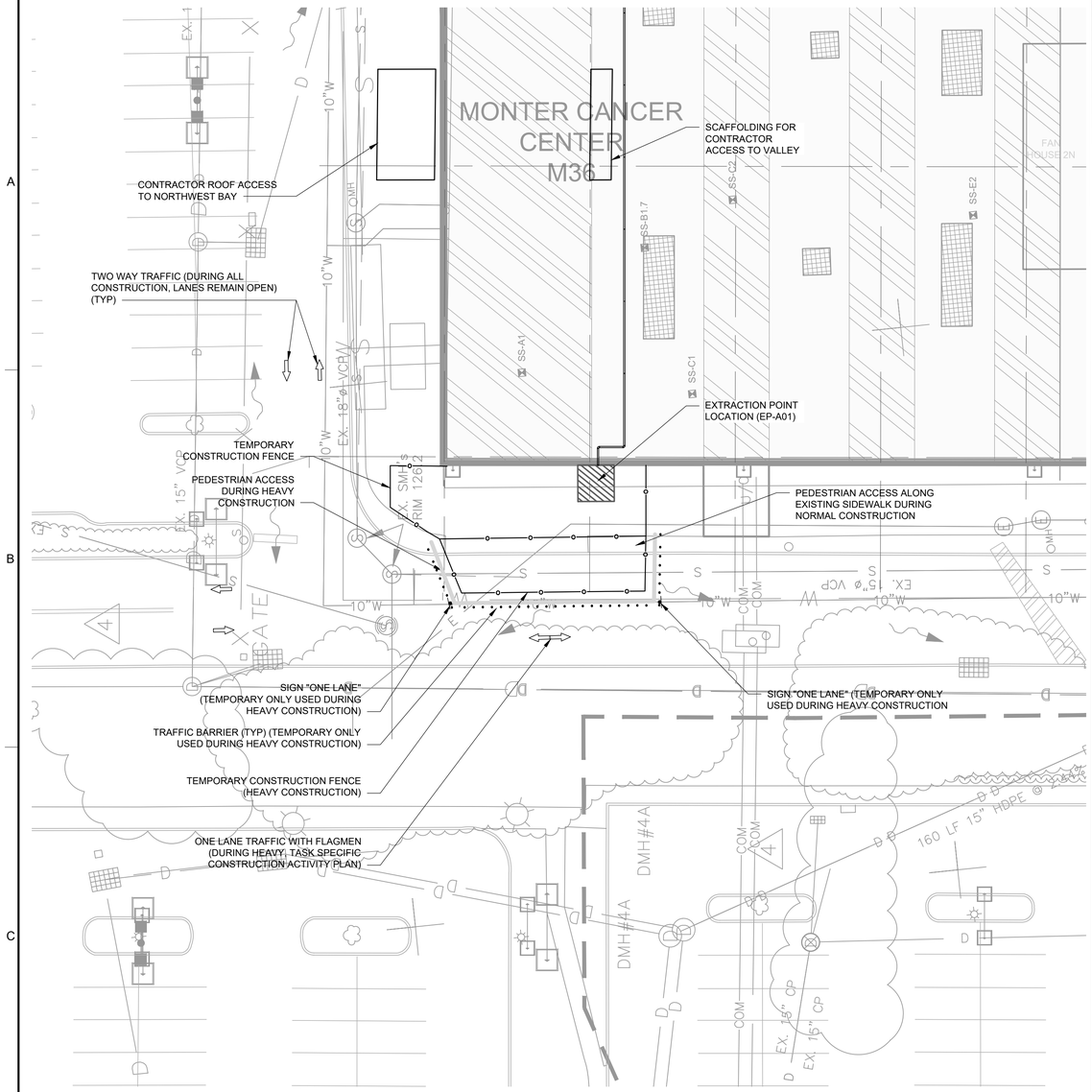
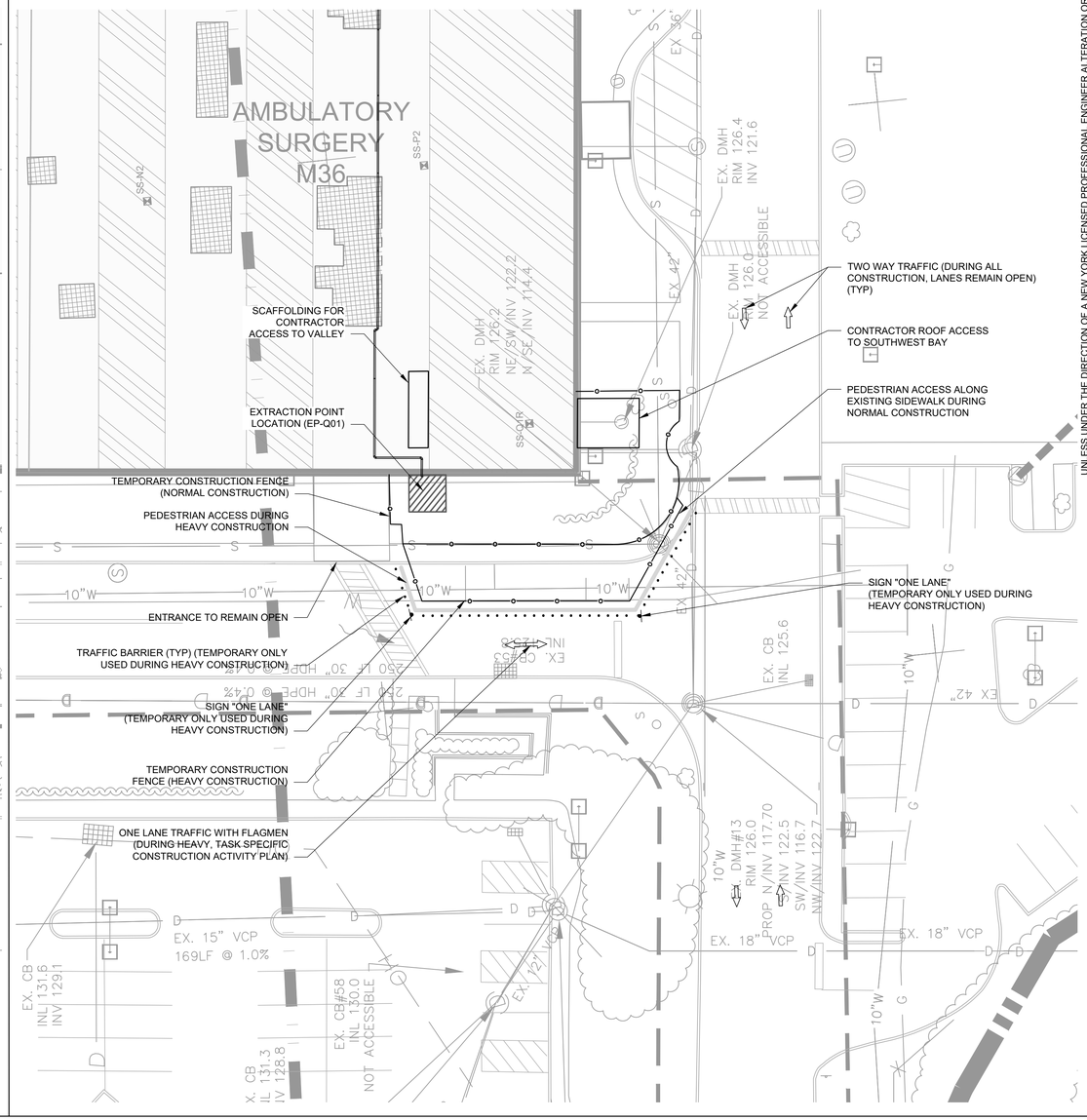
0 1"

DATE	AUGUST 17, 2021
PROJ	3617-20-7521
DWG	C-1
SHEET	2 OF 18





A NORTHWEST EXTRACTION POINT TRAFFIC CONTROL PLAN

1" = 20'

0 10' 20' 40'

B SOUTHWEST EXTRACTION POINT TRAFFIC CONTROL PLAN

1" = 20'

0 10' 20' 40'

LEGEND

- RSM–M04 ▲ EXISTING ROOM STATUS MONITOR POINT
- EP–M04 ✱ EXISTING EXTRACTION POINT
- SS–M04 ⊠ EXISTING SUB-SLAB MONITORING POINT
- HVAC UNIT
- ROOF MONITOR
- PEDESTRIAN ROUTE
- TRAFFIC BARRIER
- TEMPORARY CONSTRUCTION FENCE
- TRAFFIC DIRECTION ONE WAY TRAFFIC WITH FLAGMEN (HEAVY, TASK SPECIFIC CONSTRUCTION ACTIVITY PLAN)
- TWO WAY TRAFFIC (ALL CONSTRUCTION, LANES REMAIN OPEN)

NOTES:

1. LOCATION NAMES AND APPROXIMATE FOOTPRINTS PROVIDED BY KEYPOINT PARTNERS.
2. FOR CONTRACTOR STAGING AREAS REFER TO DRAWING C-1.
3. EXTRACTION POINT TO BE LOCATED AS CLOSE TO LOCATION SHOWN AS FIELD CONDITIONS ALLOW. GROUND PENETRATING RADAR AND FIELD OBSERVATIONS WILL BE UTILIZED FOR DETERMINATION OF FINAL LOCATION.
4. ALL ENTRANCES, SIDEWALKS AND WALKWAYS TO REMAIN OPEN DURING NORMAL CONSTRUCTION.
5. HEAVY CONSTRUCTION TASKS WILL TYPICALLY TAKE PLACE DURING NORTHWELL FACILITY OFF-HOURS AND INCLUDE:
   - A. EXCAVATION ACTIVITIES (TRANSPORT OF SOIL DRUMS, MOVING MACHINES IN AND OUT)
   - B. INSTALLATION OF THE BUILDING FOUNDATION REINFORCEMENT PLATE.
   - C. LOADING MATERIALS TO THE ROOF.

0 20 40 80

SCALE IN FEET

NO.	DATE	REVISION	BY	APVD
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DSGN	EWT	DR RJR CHK SCP	APVD	SCP

STUART C. PEARSON
STATE OF NEW YORK LICENSED PROFESSIONAL ENGINEER
STUART C. PEARSON 090605
8/17/21

100% DESIGN DRAWINGS
OU1 SSDS EXPANSION SYSTEM DESIGN
LOCKHEED MARTIN CORPORATION
FORMER UNISYS SITE 130045 - GREAT NECK
REMEDIATION SITE
111 MARCUS AVENUE
LAKE SUCCESS, NEW YORK 11042

DRAWING STATUS
100% DESIGN SUBMISSION

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TRAFFIC AND STAGING PLAN

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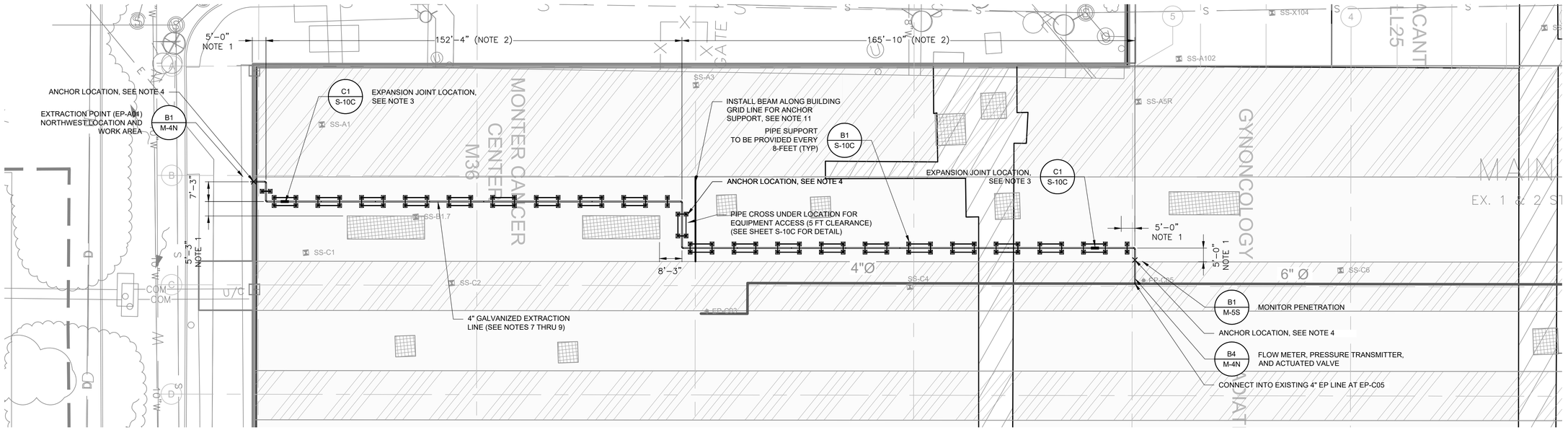
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	AUGUST 17, 2021
PROJ	3617-20-7521
DWG	C-2
SHEET	3 OF 18

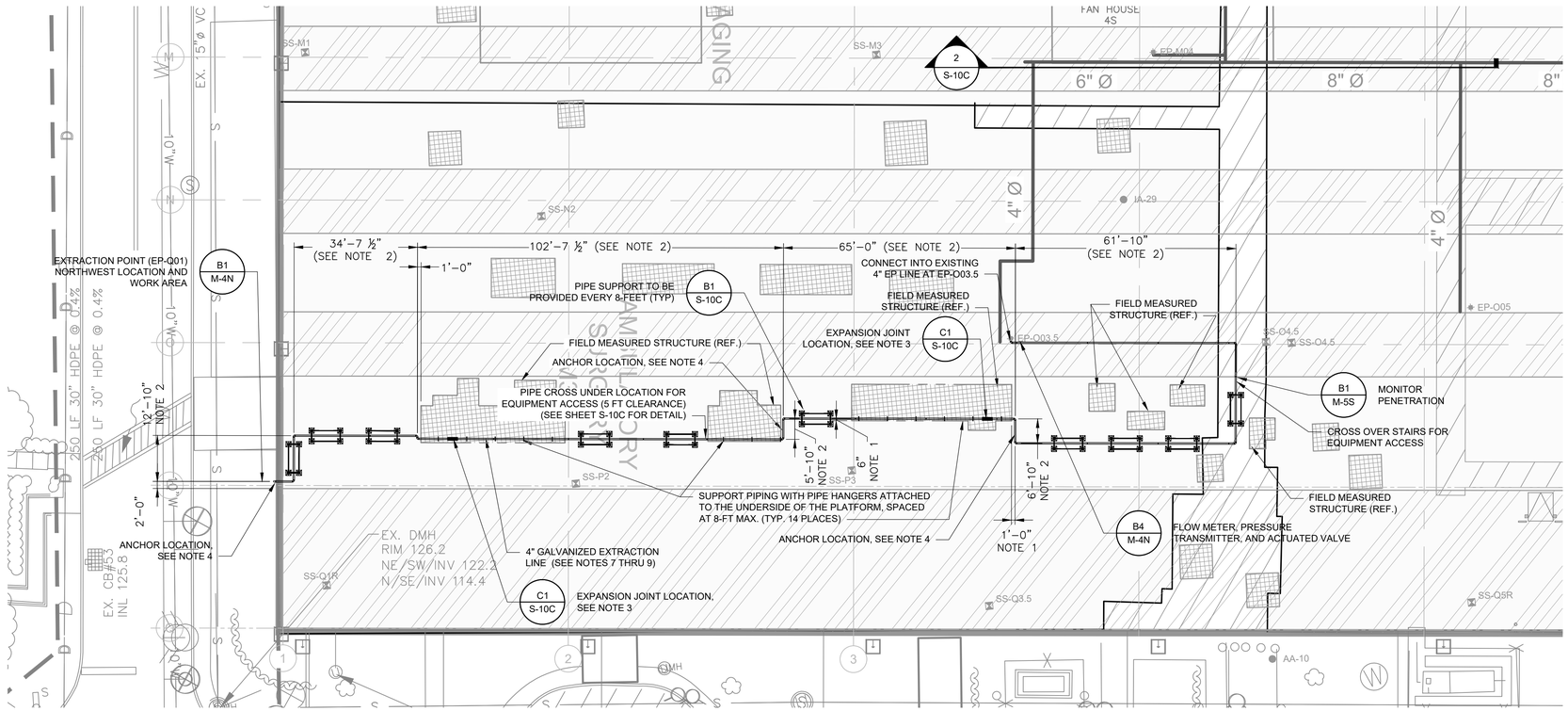
FILE NAME: C:\Users\roger.riquier\Wood PLC\Lockheed Martin Great Neck - SSDS Booster System\8.0 Drawings\Sheets\03 C-2 Traffic, Staging, and Contractor Laydown.dwg PLOT DATE: Tue, 17 Aug 2021 PLOT TIME: 4:12 PM



A NORTHWEST EXTRACTION POINT

1" = 20'

0 10' 20' 40'



B SOUTHWEST EXTRACTION POINT

1" = 20'

0 10' 20' 40'

NOTES:

1. CONTROL DIMENSION, FIXED TO ASSOCIATED LOCATION AS SHOWN.
2. FLOATING DIMENSION, CUT SPOOL LENGTH TO SUIT AS REQUIRED.
3. METRAFLEX MODEL MNLC50 EXPANSION JOINT.
4. FINAL ANCHOR STRUCTURAL TIE IN DESIGN AND DETAILS TO BE DETERMINED BASED ON FIELD CONDITIONS. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS TO THE ENGINEER FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION. SEE SHEET S-10C FOR TYPICAL DETAIL.
5. LOCATION NAMES AND APPROXIMATE FOOTPRINTS PROVIDED BY KEYPOINT PARTNERS.
6. EXTRACTION POINT TO BE LOCATED AS CLOSE TO LOCATION SHOWN AS FIELD CONDITIONS ALLOW. GROUND PENETRATING RADAR AND FIELD OBSERVATIONS WILL BE UTILIZED FOR DETERMINATION OF FINAL LOCATION.
7. LINE TO BE SLOPED A MINIMUM OF 0.5% FROM HIGH POINT BACK TO EXTRACTION POINT AND TO HEADER TIE IN LOCATION.
8. PIPING RUNS SHALL INCLUDE EXPANSION JOINTS, PIPING LOOPS AND STRUCTURAL TIE INS TO BUILDING STEEL AS DETAILED ON SHEET S-10C.
9. ALL ROOF MOUNTED PIPING AND THE FIRST 5 FEET OF INTERIOR PIPING ADJACENT TO ALL GLASS BLOCK PENETRATIONS WILL BE INSULATED AND HEAT TRACED ACCORDING TO THE SPECIFICATIONS. THE REMAINDER OF THE INTERIOR PIPING WILL REMAIN UN-INSULATED. INSULATE AND HEAT TRACE ENTIRE PIPING SYSTEM INCLUDING FITTINGS, JOINTS, FLANGES, FLEXIBLE CONNECTIONS, AND EXPANSION JOINTS. ALL SEAMS WILL BE SECURED WITH PRESSURE-SENSITIVE, RUBBER-BASED ADHESIVE OR PRODUCT APPROVED BY INSULATION MANUFACTURER.
10. SEE SHEET S-10C FOR FIREWALL PENETRATION REQUIREMENTS IF REQUIRED
11. BEAM TO ATTACH TO THE STEEL COLUMNS ON THE SOUTHERN EXTERIOR MONITOR SIDE THROUGH THE USE OF SELF TAPING SCREWS. BEAM TO BE ATTACHED ON THE NORTHERN SIDE TO THE PRECAST CONCRETE SILLS OR TO THE UNDERLYING MASONRY FROM THE EXTERIOR. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS TO THE ENGINEER FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.

LEGEND

- RSM–M04 ▲ EXISTING ROOM STATUS MONITOR POINT
- EP–M04 ✸ EXISTING EXTRACTION POINT
- SS–M04 ⊠ EXISTING SUB-SLAB MONITORING POINT
- HVAC UNITS
- ROOF MONITOR
- PUBLIC HALLWAY

N

0 10 20 40

SCALE IN FEET

STUART C. PEARSON
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STUART C. PEARSON
090906
6/1/18

NO.	DATE	DSGN	DR	CHK	APVD
0	08/17/21	EWT	RJR	SCP	SCP

REVISION / BY

0 100% DESIGN ISSUED FOR CONSTRUCTION RJR SCP

100% DESIGN DRAWINGS
OU1 SSDS EXPANSION SYSTEM DESIGN
LOCKHEED MARTIN CORPORATION
FORMER UNISYS SITE 130045 - GREAT NECK
REMEDIATION SITE
1111 MARCUS AVENUE
LAKE SUCCESS, NEW YORK 11042

DRAWING STATUS
100% DESIGN SUBMISSION

CIVIL

ROOF PIPING ROUTING AND TIE IN LOCATIONS PLAN

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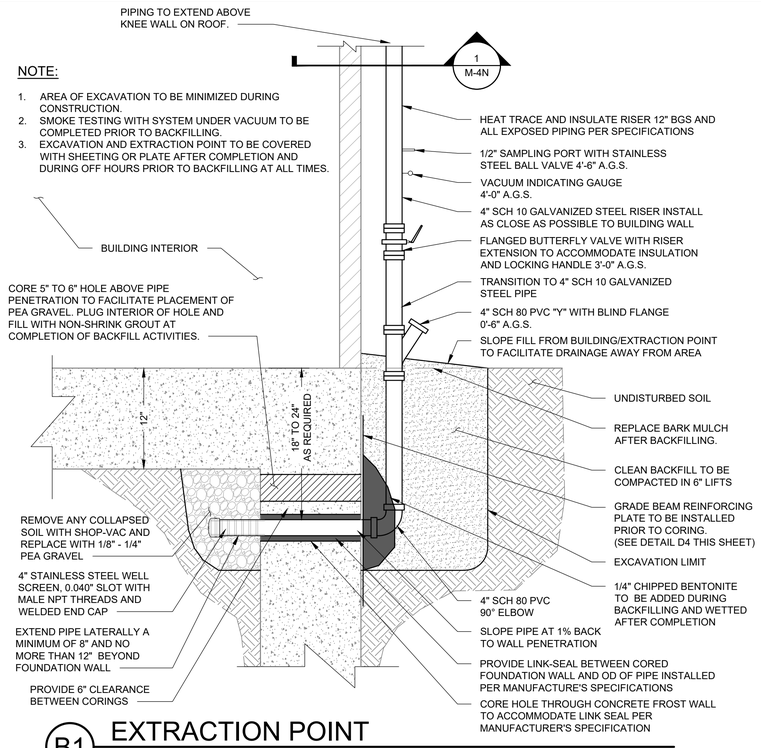
Bayside, NY, 11361

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	AUGUST 17 2021
PROJ	3617-20-7521
DWG	M-1A
SHEET	4 OF 18

FILE NAME: C:\Users\roger.riquier\Wood PLC\Lockheed Martin Great Neck - SSDS Booster System\8.0 Drawings\Sheets\04 M-1A Roof Pipe Rtng Tie in Loc.dwg PLOT DATE: Tue, 17 Aug 2021 PLOT TIME: 4:13 PM

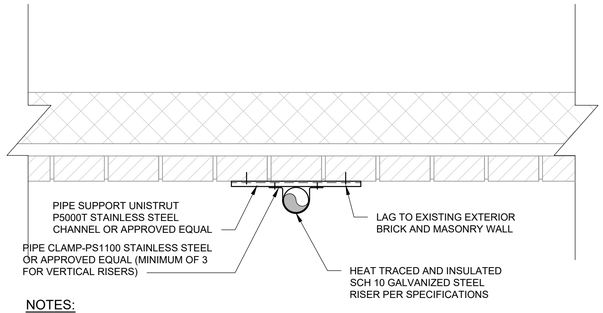


NOTE:

1. AREA OF EXCAVATION TO BE MINIMIZED DURING CONSTRUCTION.
2. SMOKE TESTING WITH SYSTEM UNDER VACUUM TO BE COMPLETED PRIOR TO BACKFILLING.
3. EXCAVATION AND EXTRACTION POINT TO BE COVERED WITH SHEETING OR PLATE AFTER COMPLETION AND DURING OFF HOURS PRIOR TO BACKFILLING AT ALL TIMES.

B1 EXTRACTION POINT

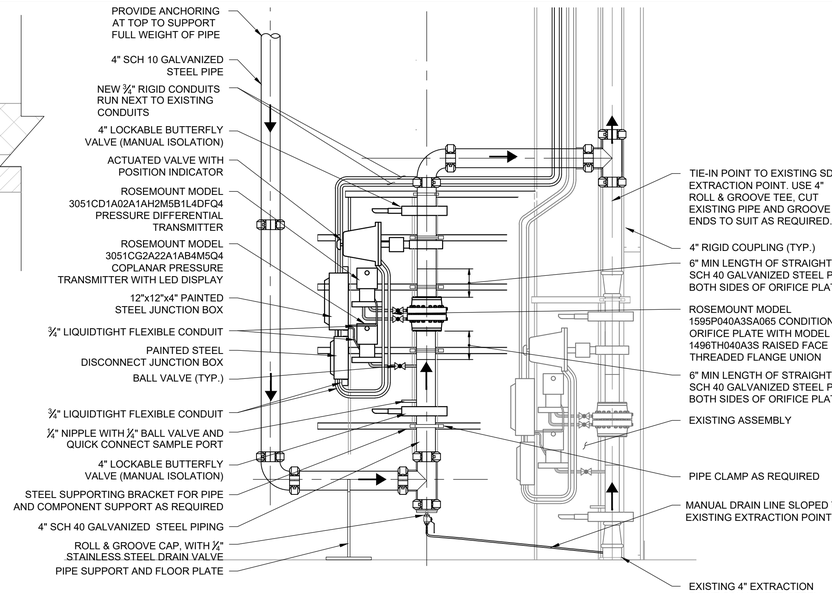
NOT TO SCALE



NOTES:

1. PIPING RISERS TO BE SUPPORTED BY POWER-STRUT® PS 1100 PIPE CLAMPS AND PS 100 EH HOT DIP GALVANIZED CHANNELS, OR APPROVED EQUAL, CONNECTED BY LAGS WITH EPOXY ANCHORS TO BUILDING EXTERIOR. INSTALL STRUT SAFETY END CAPS, PS 6152, OR APPROVED EQUAL.
2. RISER TO BE ROUTED ALONG EXTERIOR OF BUILDING IN-LINE WITH EXISTING COLUMN.

1 EXTERIOR WALL PIPE SUPPORT

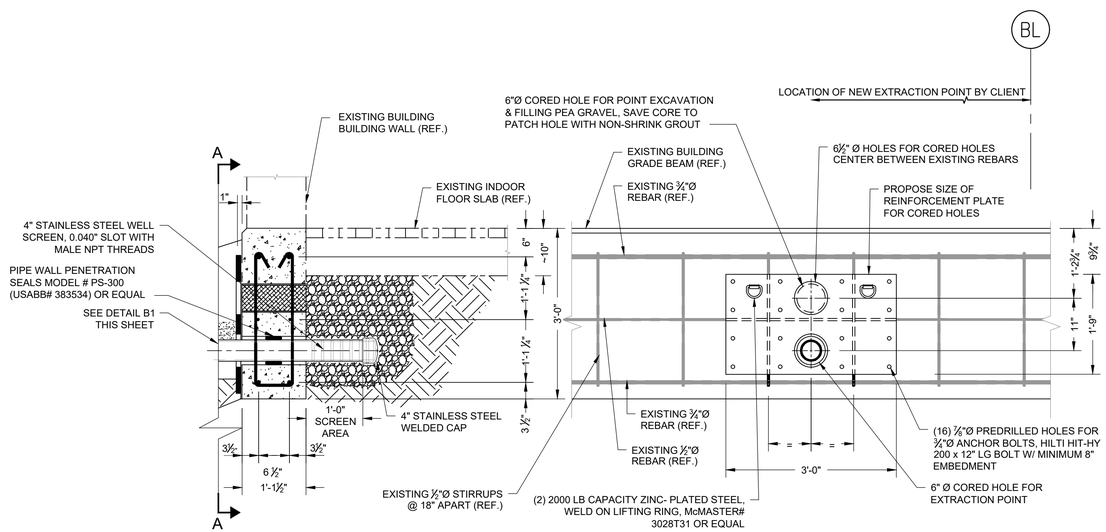


NOTES:

1. CONDUIT CONNECTIONS ARE 1/2-14 NPT.
2. TRANSMITTER CONNECTIONS ARE 1/4-18 NPT.
3. INSTALLED TRANSMITTER MOUNTING BRACKETS PER MANUFACTURER'S RECOMMENDATIONS.
4. INSTALLED MANUAL BUTTERFLY VALVE HANDLE TO SWING UP TO OPEN POSITION.
5. ORIENTED TRANSMITTERS SO LCD DISPLAY IS VISIBLE WHEN ACCESS PANEL IS OPEN.
6. INSTALLED DIFFERENTIAL PRESSURE TRANSMITTER AS SHOWN AT AN ELEVATION ABOVE THE PITOT TUBE WITH CONNECTIONS SLOPING DOWN PER MANUFACTURER'S GUIDELINES.

B4 TYPICAL NEW TIE-IN POINT TO EXISTING EXTRACTION POINT

NOT TO SCALE



EXTRACTION POINT INSTALLATION DETAILS

SECTION A-A

NOTES:

1. 1-INCH THICK REINFORCEMENT PLATE FROM A36 CS PLATE, COATED WITH ZINC RICH PRIMER AND EPOXY TOPCOAT ON ALL SIDES.
2. ALL BURIED HARDWARE TO BE STAINLESS STEEL 316, ANCHOR BOLTS TO BE SS 316 INCLUDING FLAT WASHER AND HEAVY HEX NUT.
3. REBAR IN GRADE BEAM LOCATION SHALL BE CONFIRMED PRIOR TO EXTRACTION POINT INSTALLATION USING A GPR CONCRETE SCANNER.

D4 EXTRACTION POINT INSTALLATION AND SECTION

NOT TO SCALE

NO.	DATE	REVISION	BY	CHK	APVD
0	08/17/21	100% DESIGN ISSUED FOR CONSTRUCTION	RJR	SCP	SCP
DSGN		DR	RJR	SCP	
		EWT			

STUART C. PEARSON

STATE OF NEW YORK * LICENSED PROFESSIONAL ENGINEER * STUART C. PEARSON 090655

100% DESIGN DRAWINGS
OU1 SSDS EXPANSION SYSTEM DESIGN
LOCKHEED MARTIN CORPORATION
FORMER UNISYS SITE 130045 - GREAT NECK
REMEDIATION SITE
1111 MARCUS AVENUE
LAKE SUCCESS, NEW YORK 11042

DRAWING STATUS
100% DESIGN SUBMISSION

CIVIL

EXTRACTION POINT AND PIPING DETAILS

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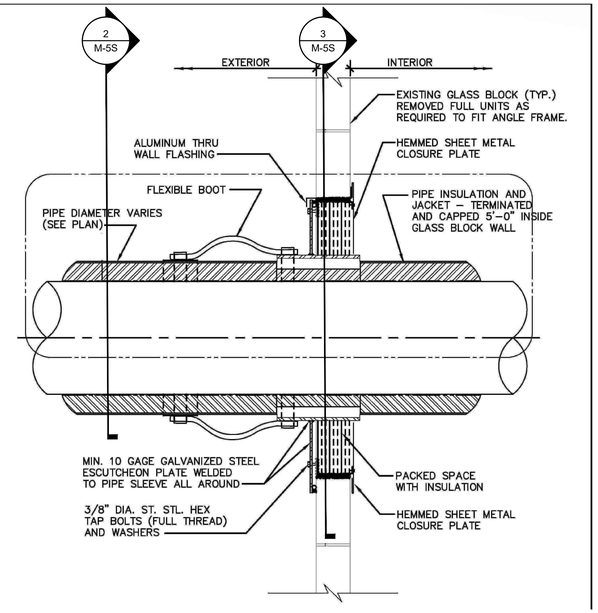
Bayside, NY, 11361

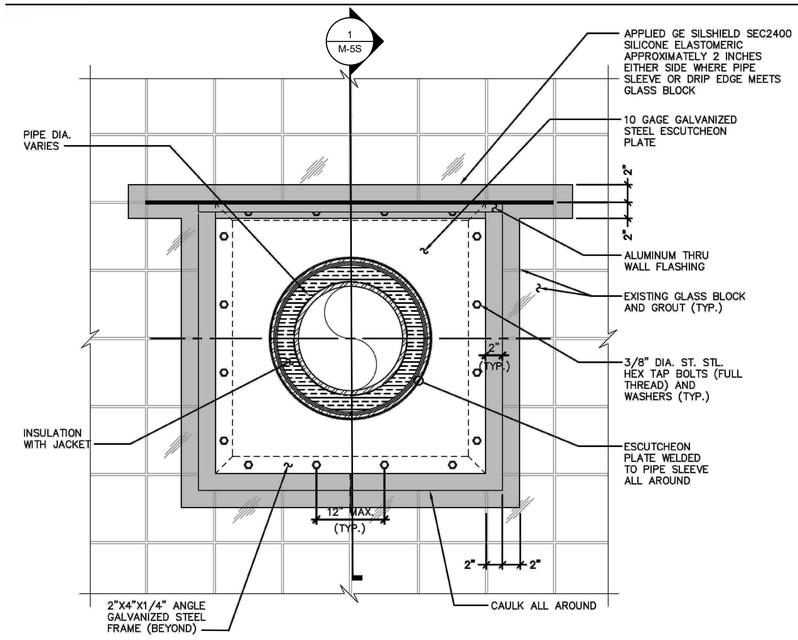
VERIFY SCALE

BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

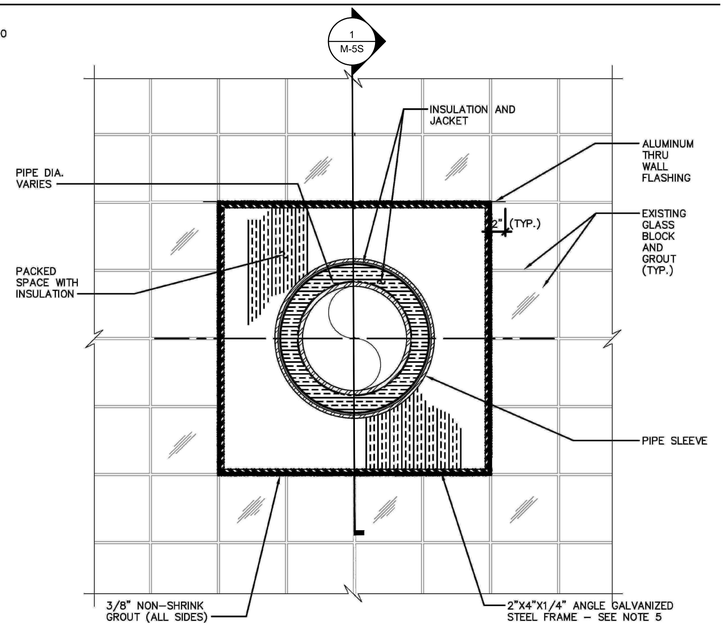
DATE	AUGUST 17, 2021
PROJ	3617-20-7521
DWG	M-4N
SHEET	5 OF 18



1 MONITOR PENETRATION SECTION
NOT TO SCALE



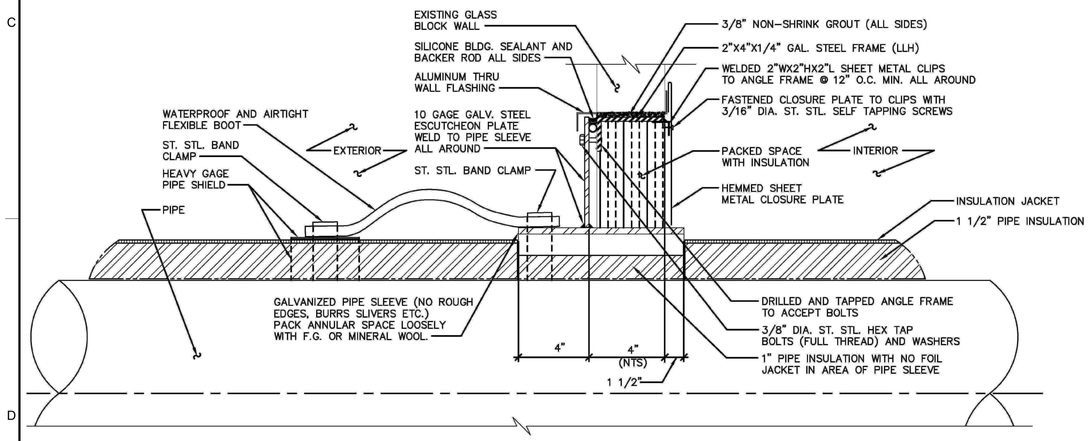
2 MONITOR PENETRATION SECTION (EXTERIOR)
NOT TO SCALE



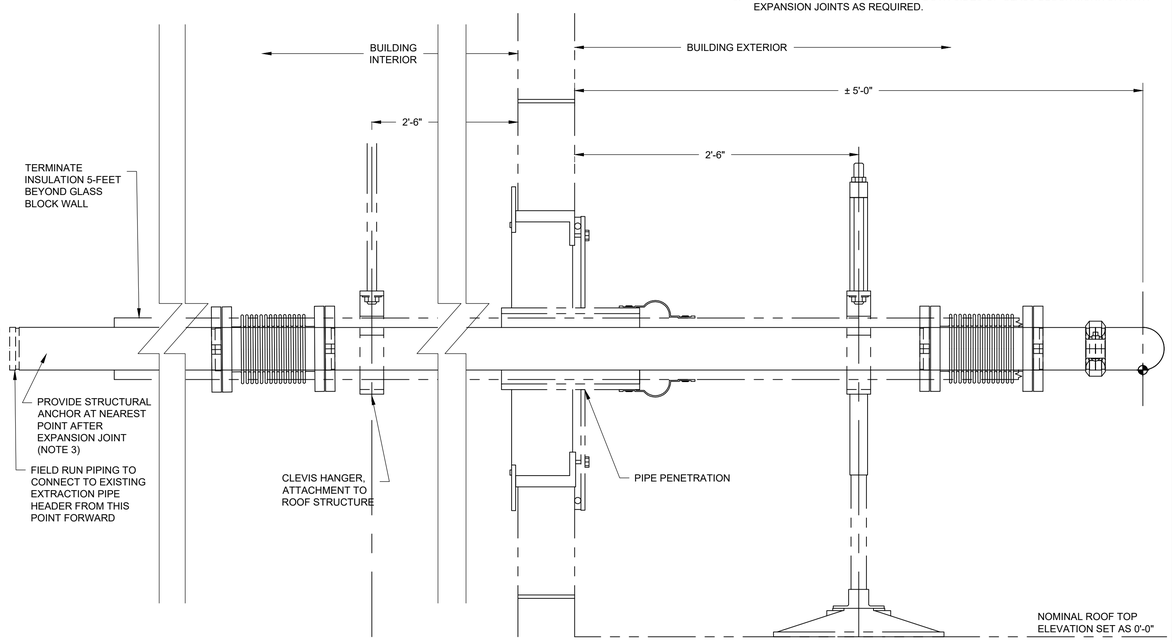
3 MONITOR PENETRATION SECTION (INTERIOR)
NOT TO SCALE

NOTES:

1. THE NUMBER OF EXISTING GLASS BLOCKS REMOVED WILL BE DETERMINED ACCORDING TO SIZE OF PIPE PENETRATION AND LOCATION OF PIPE PENETRATION.
2. TEST GLASS BLOCK PENETRATION FOR LEAKS USING PRESSURIZED WATER TO CONFIRM WEATHER RESISTANCE.
3. PROVIDE STRUCTURAL ANCHORS BOTH SIDES OF GLASS BLOCK MONITOR WITH EXPANSION JOINTS AS REQUIRED.



4 ENLARGED SECTION 1
NOT TO SCALE



D1 BLOCK PENETRATION SUPPORT
NOT TO SCALE

STUART C. PEARSON
STATE OF NEW YORK * STUART C. PEARSON * LICENSED PROFESSIONAL ENGINEER
8/17/21

NO.	DATE	REVISION	BY	CHK	APVD
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			DR	RJR	APVD
DSGN					

100% DESIGN DRAWINGS
OU1 SSDS EXPANSION SYSTEM DESIGN
LOCKHEED MARTIN CORPORATION
FORMER UNISYS SITE I 30045 - GREAT NECK
REMEDIATION SITE
1111 MARCUS AVENUE
LAKE SUCCESS, NEW YORK 11042

DRAWING STATUS
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GLASS BLOCK PENETRATION DETAILS

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Bayside, NY, 11361

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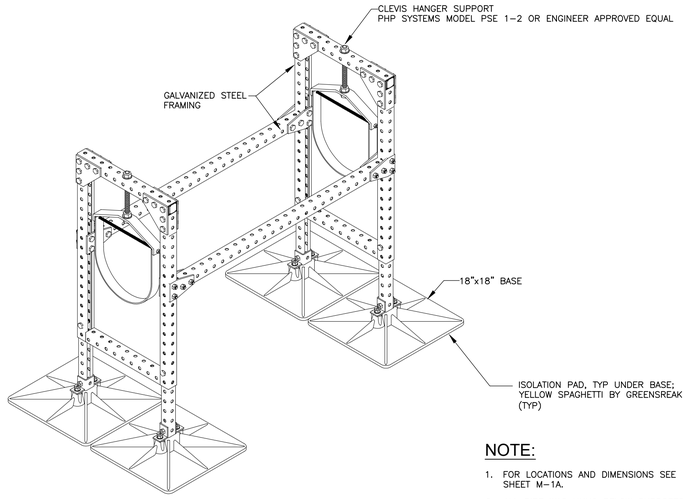
0 1"

DATE	AUGUST 17, 2021
PROJ	3617-20-7521
DWG	M-5S
SHEET	6 OF 18

FILE NAME: C:\Users\roger.riquier\Wood PLC\Lockheed Martin Great Neck - SSDS Booster System\8.0 Drawings\Sheets\06 M-5S Glass Block Penetration Details.dwg PLOT DATE: Tue, 17 Aug 2021 PLOT TIME: 4:14 PM

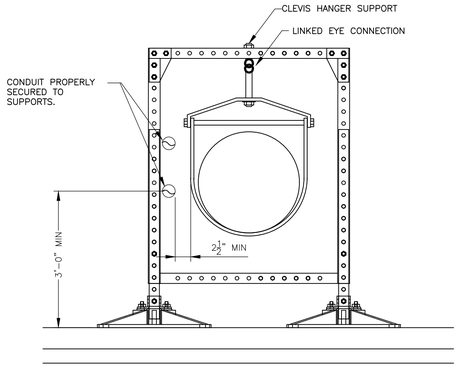


NOTE:

1. FOR LOCATIONS AND DIMENSIONS SEE SHEET M-1A.
2. ALL PIPE WAS HUNG BELOW SUPPORTS WITH CLEVIS HANGERS, SEE DETAIL THIS SHEET.

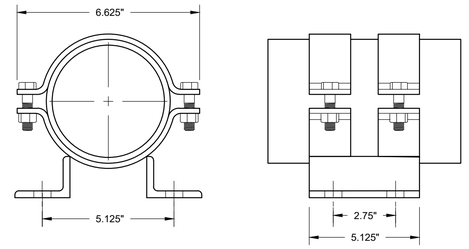
TYPICAL ROOFTOP PIPE SUPPORT

NOT TO SCALE
(PIPE NOT SHOWN)



ROOFTOP PIPE SUPPORT WITH CLEVIS HANGERS

NOT TO SCALE



MASTERFLEX MODEL PA ANCHOR CLAMP

NOTE

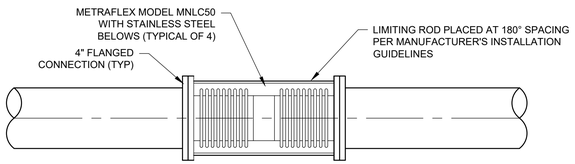
ANCHOR CLAMP TO BE TIED INTO EITHER THE CLOSEST STEEL BEAM, COLUMN, OR STRUCTURAL COMPONENT WITHOUT PUNCTURING THE ROOF. THE PROPOSED ANCHOR TIE-IN METHOD MUST BE REVIEWED WITH THE ENGINEER AND APPROVED PRIOR TO INSTALLATION.

B5 TYPICAL ANCHOR SUPPORT

NOT TO SCALE

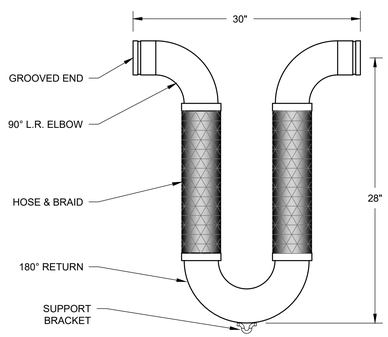
B1 PIPE SUPPORT END AND ISOMETRIC VIEW

NOT TO SCALE



C1 EXPANSION JOINT

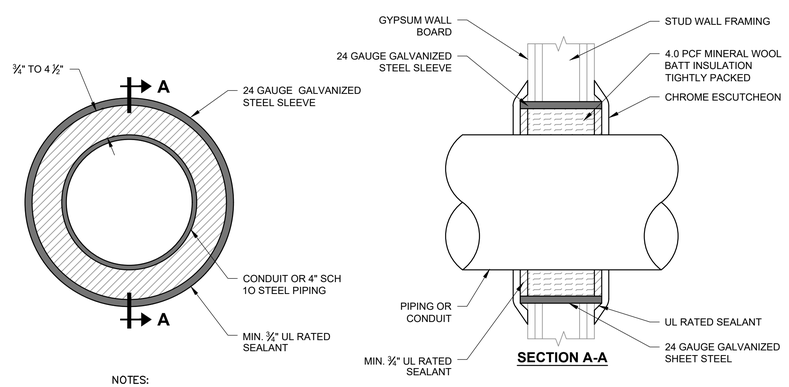
NOT TO SCALE



MASTERFLEX MODEL MLG30400 WITH STAINLESS STEEL BRAID

D1 EXPANSION LOOP

NOT TO SCALE



NOTES:

1. ALL FIRE RATED WALL PENETRATIONS ARE TWO HOUR RATED AS SHOWN ABOVE.
2. SUPPORTED PIPING ON BOTH SIDES OF WALL PENETRATION. DID NOT USE WALL FOR PIPE SUPPORT.
3. USED HILTI, INC. FS-ONE SEALANT INSTALLED TO THE OUTER PERIMETER OF THE STEEL SLEEVE.

D2 GYPSUM BOARD TWO HOUR FIREWALL PENETRATION

NOT TO SCALE

UNLESS UNDER THE DIRECTION OF A NEW YORK LICENSED PROFESSIONAL ENGINEER ALTERATION OR ADDITION TO THIS DOCUMENT IS A VIOLATION OF SECTION 7209 OF THE NEW YORK STATE EDUCATION LAW

STUART C. PEARSON

STATE OF NEW YORK * STUART C. PEARSON * 082 * LICENSED PROFESSIONAL ENGINEER

8/17/21

NO.	DATE	DSGN	DR	CHK	APVD	BY	APVD
0	08/17/21		RJR			EWT	SCP
		REVISION					SCP

100% DESIGN ISSUED FOR CONSTRUCTION

100% DESIGN DRAWINGS
OU1 SSDS EXPANSION SYSTEM DESIGN
LOCKHEED MARTIN CORPORATION
FORMER UNISYS SITE I 30045 - GREAT NECK
REMEDIATION SITE
1111 MARCUS AVENUE
LAKE SUCCESS, NEW YORK 11042

DRAWING STATUS
100% DESIGN SUBMISSION

CIVIL

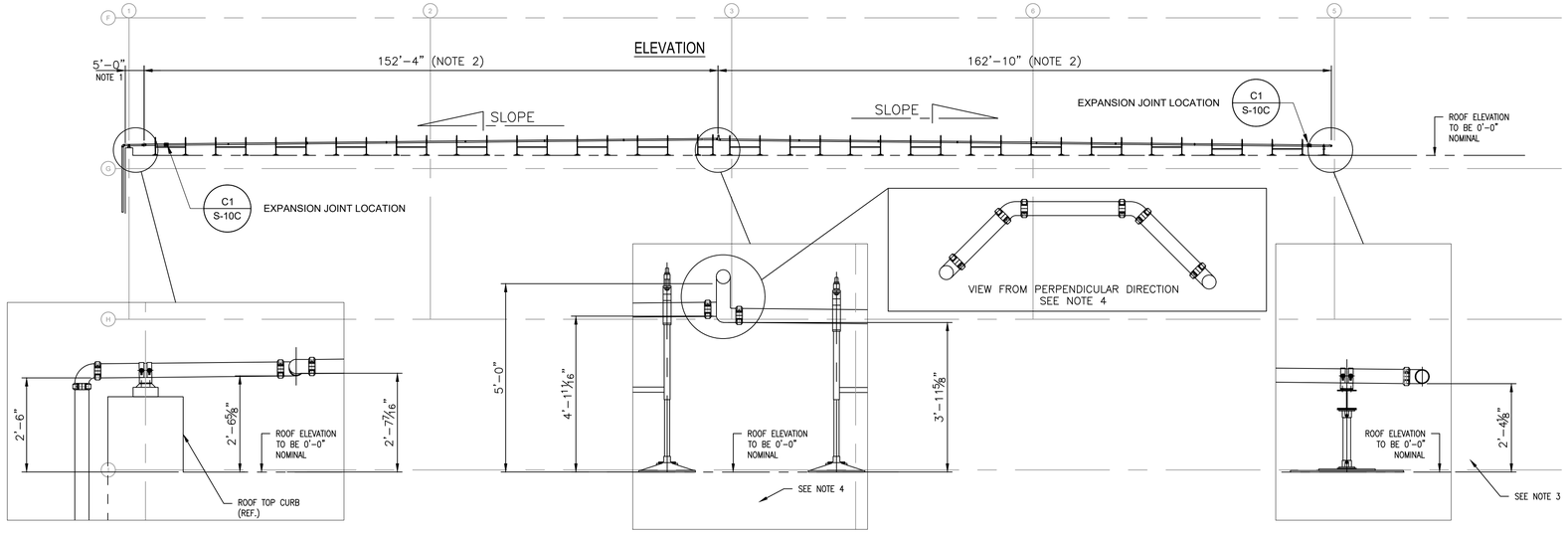
ROOFTOP PIPE SUPPORT DETAILS

amec

AMEC E & E, PC
214-25 42nd Avenue Suite 3R,
Bayside, NY, 11361

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

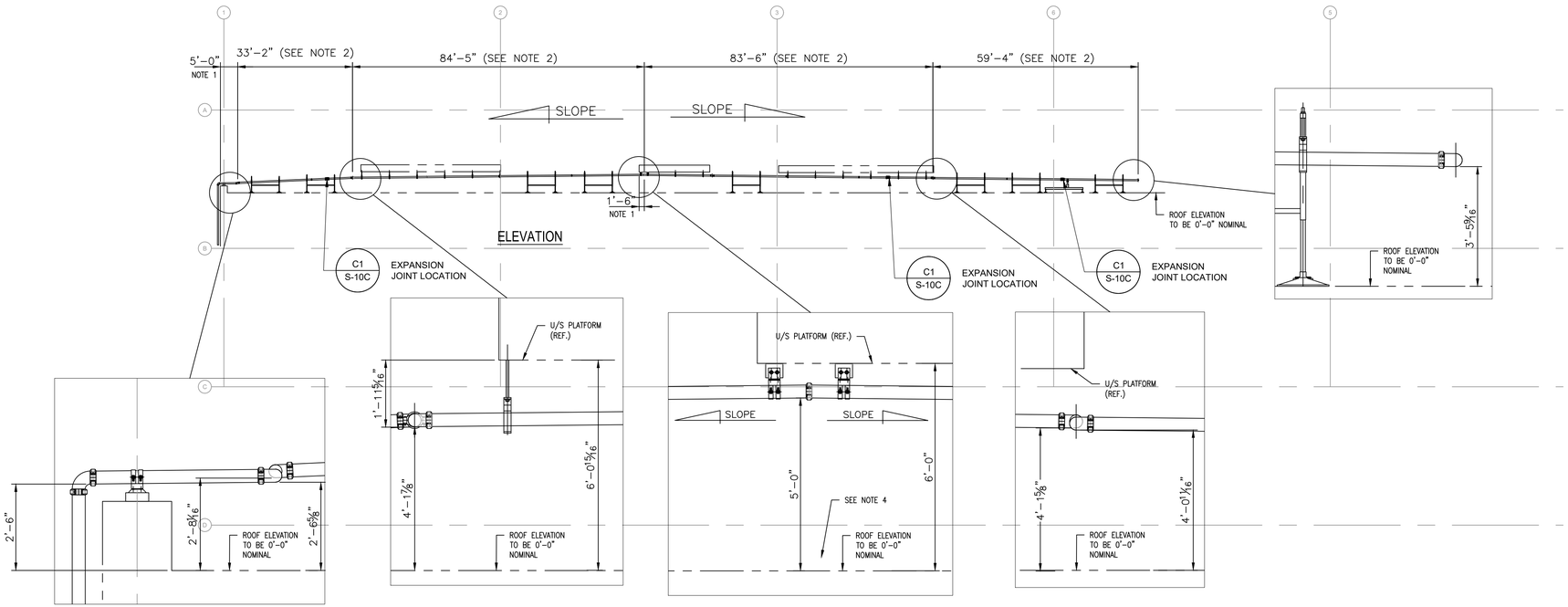
DATE	AUGUST 17, 2021
PROJ	3617-20-7521
DWG	S-10C
SHEET	7 OF 18



A NORTHWEST EXTRACTION POINT

1" = 20'

0 10' 20' 40'



B SOUTHWEST EXTRACTION POINT

1" = 20'

0 10' 20' 40'

NOTES:

1. CONTROL DIMENSION, FIXED TO ASSOCIATED LOCATION AS SHOWN.
2. FLOATING DIMENSION, CUT SPOOL LENGTH TO SUIT AS REQUIRED.
3. SHIP LADDER STAIR CROSS OVER.
4. PIPE CROSS UNDER PROVIDED AT HIGH POINT WITH 5 FT CLEARANCE.

0 10 20 40
SCALE IN FEET

N

STUART C. PEARSON
STATE OF NEW YORK
STUART C. PEARSON
LICENSED PROFESSIONAL ENGINEER
No. 076415

NO.	DATE	DSGN	DR	CHK	APVD	BY
0	08/17/21	EWT	EWT	RJR	SCP	SCP

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OU1 SSDS EXPANSION SYSTEM DESIGN
LOCKHEED MARTIN CORPORATION
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REMEDIATION SITE
1111 MARCUS AVENUE
LAKE SUCCESS, NEW YORK 11042

DRAWING STATUS
100% DESIGN SUBMISSION

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ROOF PIPING ELEVATIONS

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0 1"

DATE	AUGUST 17, 2021
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SHEET	8 OF 18

800AF / 600AT — DRAWOUT CIRCUIT BREAKER.

800AF / 600AT — STATIONARY MOLDED CASE CIRCUIT BREAKER.

30/3 — STATIONARY MOLDED CASE THERMAL MAGNETIC CIRCUIT BREAKER.

VOLTAGE RATINGS

20A MCP — MOTOR CIRCUIT PROTECTOR

T1 — POWER TRANSFORMER.

VFD BYP — VARIABLE SPEED DRIVE.

SPD — SURGE PROTECTIVE DEVICE.

JB–C1 — PROCESS JUNCTION BOX

G — 3/4 " x 10'–0" COPPER CLAD STEEL GROUND ROD WITH INSPECTION WELL.

1B 1A — ELECTRICAL CONNECTION OF DEVICE INDICATED TO THE MCC BUS

$ — TOGGLE SWITCH, SINGLE POLE

$3 — TOGGLE SWITCH, THREE WAY, 20A, 120–277V

$P $ — TOGGLE SWITCH, ILLUMINATED PILOT LIGHT, SINGLE POLE, 20A, 120–277V.

MS — 20A TWO OR THREE POLE MANUAL STARTER

MOTOR STARTER

LC — LIGHTING CONTACTOR

ESS — ELECTRONIC SOLID STATE MOTOR STARTER

FUSED DISCONNECT SWITCH

FUSE, EACH PHASE

OVERLOAD RELAYS

100/3 — IN THIS EXAMPLE, DENOTES 100 AMPERE, 3 POLE DEVICE.

F–100 — IN THIS EXAMPLE, DENOTES DEVICE FUSED AT 100 AMPERES

F–MFR — DENOTES DEVICE FUSED

TS — TIME SWITCH

C1 — LIGHTING CONTACTOR

5 — MOTOR WITH HORSEPOWER INDICATED

UH — ELECTRIC UNIT HEATER

a — RJ45 ETHERNET JACK (a DENOTES NUMBER OF JACKS REQUIRED, SINGLE GANG BOX.

TWO DUPLEX RECEPTACLES IN 2–GANG BOX

RECEPTACLE, DUPLEX

RECEPTACLE DESIGNATION	DENOTES
	NOTE: MULTIPLE RECEPTACLE DESIGNATIONS MAY BE ADJACENT TO DEVICE OR SEPARATED BY COMMAS (EXAMPLE: A, L63, 13).
3	CIRCUIT NUMBER (3 IN THIS EXAMPLE).
A	DENOTES RECEPTACLE FOR WHICH LOCATION AND MOUNTING ARRANGEMENT IS SHOWN ON ARCHITECTURAL DRAWINGS.
L63	SPECIAL PURPOSE RECEPTACLE TYPE (TYPE L63 IN THIS EXAMPLE). SEE SPECIAL PURPOSE RECEPTACLE SCHEDULE.
WP	WEATHERPROOF WITH HINGED COVER.
G	GFCI TYPE, WIRED FOR GFCI TRIP FOR DESIGNATED RCPT ONLY.
GF	GFCI TYPE, WIRED FOR GFCI PROTECTION OF RCPT AND ALL RCPT'S ON SAME CKT, UNO.
H50	DENOTES MH IN INCHES AFF TO CENTER;

CONDUIT DESIGNATIONS
(SEE DRAWING E–2 FOR SCHEDULES AND NOTES)

C–X	CONTROL CONDUIT (120V) ("X" DENOTES CONDUIT NUMBER)
P–X	POWER CONDUIT (480 OR 120/240) ("X" DENOTES CONDUIT NUMBER)
I–X	INSTRUMENTATION/NETWORK CONDUIT ("X" DENOTES CONDUIT NUMBER)

CONNECTION

NO CONNECTION

SEALTITE OR FLEXIBLE CONDUIT (AS DESCRIBED IN SPEC)

SS — SURGE SUPPRESSOR

WYE, 3 PHASE, GROUNDED

GROUND CONNECTION

GROUND ROD

02 — MOTOR STARTER, F.V.N.R. TYPE (NEMA SIZE 2)

FUSE, AMPERE RATING AS SHOWN

J — UNIT, PROCESS OR SPACE HEATER (AS DESC. IN SPEC. (LAYOUT DRAWING)) (SEE HVAC & LTG. SCHED.)

UNIT OR SPACE HEATER (SINGLE LINE DRAWING)

1.0 — INDUCTION MOTOR, SINGLE PHASE, # DENOTES H.P.

CONDUIT RUN (EXPOSED)

CONDUIT RUN (CONCEALED)

G — GROUND BUS OR WIRE, TYPE & SIZE AS SPECIFIED

0.5 — INDUCTION MOTOR, THREE PHASE, # DENOTES H.P.

T H — THERMOSTAT/HUMIDISTAT

LIGHTING FIXTURE (LED)

LIGHTING FIXTURE (LED)

3 — CURRENT TRANSFORMER

WHM — WATTHOUR METER

EMERGENCY LIGHTS

LA. — LIGHTNING ARRESTOR

DISCONNECT (SWITCH) "DSC"

A1A — FLUORESCENT LIGHTING FIXTURE – SURFACE OR CHAIN MOUNTED. ALPHANUMERIC DENOTES FIXTURE DESIGNATION SYMBOL. SEE LIGHTING FIXTURE SCHEDULE FOR DESCRIPTION AND TYPE

C4A — HID CEILING OR PENDANT MOUNTED LIGHTING FIXTURE. ALPHANUMERIC DENOTES FIXTURE DESIGNATION SYMBOL. SEE LIGHTING FIXTURE SCHEDULE FOR DESCRIPTION AND TYPE

AIC — WALL MOUNTED LIGHTING FIXTURE. ALPHANUMERIC DENOTES FIXTURE DESIGNATION SYMBOL. SEE LIGHTING FIXTURE SCHEDULE FOR DESCRIPTION AND TYPE

EM E2A — 2 LAMP SELF CONTAINED DC EMERGENCY LIGHTING UNIT. LETTER DENOTES FIXTURE TYPE. ALPHANUMERIC DENOTES FIXTURE DESIGNATION SYMBOL. SEE LIGHTING FIXTURE SCHEDULE FOR DESCRIPTION AND TYPE

E6B — WALL MOUNTED INDUSTRIAL EXIT SIGN. ALPHANUMERIC DENOTES FIXTURE DESIGNATION (SEE LIGHTING SCHEDULE FOR DESCRIPTION AND TYPE)

Sa — SINGLE POLE SWITCH – LOWER CASE LETTER DENOTES SWITCHING

S3 — THREE–WAY SWITCH

J 10 — CROSS LINES INDICATE NUMBER OF CONDUCTORS. HALF HASH MARKS INDICATES NEUTRAL. NUMBER (10) DENOTES WIRE SIZE WHEN NOT #12 AWG. CONTINUE CONDUIT AND WIRE RUN FROM BOX TO DEVICE IN ROOM OR AREA AS NOTED. #10 AWG WIRING SHALL BE USED FOR RUNS BETWEEN PANEL AND FIRST LIGHTING FIXTURE OR RECEPTACLE EXCEEDING 50 FEET, UNLESS OTHERWISE NOTED ON DRAWING.

INDICATES GROUND CONDUCTOR

PC — PHOTOCELL

INSTRUMENTS:

PS 123 — INSTRUMENT DEVICE: LETTERS IDENTIFY DEVICE FUNCTION, NUMBERS WHERE INDICATED DENOTE LOOP NUMBER

PC — PRESSURE CONTROLLER

PS — PRESSURE SWITCH (PSH DENOTES PRESSURE SWITCH HIGH AND PSL DENOTES PRESSURE LOW)

EPC — EMERGENCY PULL CORD SWITCH

SSL — ZERO SPEED SWITCH

FS — FLOW SWITCH (FSH DENOTES FLOW SWITCH HIGH AND FSL DENOTES FLOW SWITCH LOW)

ZS — LIMIT SWITCH (ZSO DENOTES SWITCH OPEN AND ZSC DENOTES SWITCH CLOSED)

PIT — PRESSURE TRANSMITTER (I DENOTES INDICATING TYPE AND PE DENOTES PRESSURE ELEMENT)

LIT — LEVEL TRANSMITTER (LE DENOTES LEVEL ELEMENT)

FIT — FLOW TRANSMITTER (FE DENOTES FLOW ELEMENT)

AIT — ANALYSIS TRANSMITTER (AE DENOTES ANALYSIS ELEMENT)

TIT — TEMPERATURE TRANSMITTER (TE DENOTES TEMPERATURE ELEMENT)

TS — TEMPERATURE SWITCH (TSH DENOTES TEMPERATURE SWITCH HIGH AND TSL DENOTES TEMPERATURE SWITCH LOW)

LS — LEVEL SWITCH (LSH DENOTES LEVEL SWITCH HIGH AND LSL DENOTES LEVEL SWITCH LOW. LE DENOTES LEVEL ELEMENT)

VS — VIBRATION SWITCH (VE INDICATES VIBRATION ELEMENT)

MOV OR MV — MOTORIZED VALVE

SV OR SV — SOLENOID VALVE

ZC — STROKE POSITIONER

a PTT — INDICATOR LIGHT PUSH–TO–TEST (PTT) (a DENOTES LENS COLOR)

ABBREVIATIONS

A, AMP	AMPERE
AA	AMBIENT AIR
ABV	ABOVE
AC	ALTERNATING CURRENT
AF	AMP FRAME
AFF	ABOVE FINISHED FLOOR
AIC	AMPERE INTERRUPTING CAPACITY
ASYM	ASYMMETRICAL
AT	AMP TRIP
ATS	AUTOMATIC TRANSFER SWITCH
AVG	AVERAGE
AWG	AMERICAN WIRE GAUGE
BAS	BUILDING AUTOMATION SYSTEM
BATT	BATTERY, BATTERIES
BKR	BREAKER
BLDG	BUILDING
BPS	BOLTED PRESSURE SWITCH
C	CONDUIT
CBM	CERTIFIED BALLAST MANUFACTURER
CCTV	CLOSED CIRCUIT TELEVISION CAMERA
CFM	CUBIC FEET PER MINUTE
CKT	CIRCUIT
CLO	CLOSET
COMPT	COMPARTMENT
CONT	CONTINUOUS
CPU	CENTRAL PROCESSING UNIT
CRAC	COMPUTER ROOM AIR CONDITIONING UNIT
CRI	COLOR RENDERING INDEX
CT	CURRENT TRANSFORMER
CU	COEFFICIENT OF UTILIZATION
DEPT	DEPARTMENT
DESIG	DESIGNATION
DIA	DIAMETER
DSC	DISCONNECT
DIST, DISTRIB	DISTRIBUTION
DIV	DIVISION
DWG(S)	DRAWING(S)
DPDT	DOUBLE POLE–DOUBLE THROW
EC	EMPTY CONDUIT
EF	EACH FACE
ELEC	ELECTRIC
EMER	EMERGENCY
EMH	EXISTING MANHOLE
EMT	ELECTRICAL METALLIC TUBING
EPP	EXISTING POWER POLE
EQPT	EQUIPMENT
ETC	ETCETERA
ETL	ELECTRICAL TESTING LABORATORIES
EW	EACH WAY
EXST	EXISTING
F	FAHRENHEIT
FIXT	FIXTURE
FLUOR	FLOURESCENT
FREQ	FREQUENCY
FVNR	FULL–VOLTAGE, NON–REVERSING
GALV	GALVANIZED
GEN	GENERATOR
GFE	DENOTES GOVERNMENT FURNISHED EQUIPMENT, CONTRACTOR INSTALLED
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GFEPD	GROUND FAULT EQUIPMENT PROTECTIVE DEV.
GFP	GROUND FAULT PROTECTION
GND	GROUND
GP	GENERAL PURPOSE
GUI	GRAPHICAL USER INTERFACE
HP	HORSEPOWER
HPS	HIGH PRESSURE SODIUM
HZ	HERTZ
IAW	IN ACCORDANCE WITH
IEC	INTERNATIONAL ELECTRO. COMMISSION
IG	ISOLATED GROUND
IDS	INTRUSION DETECTION SYSTEM
IESNA, IES	ILLUMINATING ENGINEERING SOCIETY OF NORTH AMERICA
IMC	INTERMEDIATE METAL CONDUIT
INC	INCANDESCENT
INST	INSTRUCTIONS
°K	DEGREES KELVIN
KCMIL	ONE THOUSAND CIRCULAR MILS
KV	KILO–VOLT
KVA	KILO–VOLT AMPERES
KVAC	KILO–VOLT AMPERES CONNECTED
KW	KILOWATT

ABBREVIATIONS

L	LUMEN
LA	LIGHTNING ARRESTOR
LAN	LOCAL AREA NETWORK
LB(S)	POUND(S)
LED'S	LIGHT EMITTING DIODES
LPS	LITERS PER SECOND
LT	LIQUID TIGHT
LTS	LIGHTS
MAX	MAXIMUM
MCC	MOTOR CONTROL CENTER
M.C.P.	MOTOR CIRCUIT PROTECTOR
MCP	MAIN CONTROL PANEL
MFR	MANUFACTURER
M/G	MOTOR/GENERATOR
MH	MOUNTING HEIGHT
MHL	METAL HALIDE LAMP
MI	MINERAL INSULATED
MIN	MINIMUM
MLO	MAIN LUGS ONLY
MT	MOUNT
MTD	MOUNTED
N	NEUTRAL
N/A	NOT APPLICABLE
N.C.	NORMALLY CLOSED
NEC	NATIONAL ELECTRICAL CODE
NEMA	NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION
NIC	NOT IN CONTRACT
N.O.	NORMALLY OPEN
NO.	NUMBER
NOS	NUMBERS
NPT	NATIONAL PIPE THREAD
NTE	NOT TO EXCEED
O.C.	ON CENTER
OFE	OWNER FURNISHED EQUIPMENT, CONTRACTOR INSTALLED
P	POLE
PBX	PRIVATE BRANCH EXCHANGE
PCC	POINT OF COMMON COUPLING
PDU	POWER DISTRIBUTION UNIT
PLC ø	PROGRAMMABLE LOGIC CONTROLLER
PMCS	POWER MONITORING AND CONTROL SYSTEM
PNL	PANEL
PT	POTENTIAL TRANSFORMER
PVC	POLYVINYL CHLORIDE
RCP	REMOTE CONTROL PANEL
RCPT(S)	RECEPTACLE(S)
REQMTS	REQUIREMENTS
R	RESISTANCE
RFI	RADIO FREQUENCY INTERFERENCE
RGS	RIGID GALVANIZED STEEL
RM	ROOM
RVAT	REDUCED VOLTAGE AUTOTRANSFORMER
SCHED	SCHEDULE
SECT	SECTION
SKVA	STARTING KILO–VOLT AMPERES
SN	SHARED NEUTRAL
S/MH	SPACING TO MOUNTING HEIGHT RATIO
S/N	SOLID NEUTRAL
SQ	SQUARE
SS	STAINLESS STEEL
SW	SWITCH
SWBD	SWITCHBOARD
SYM	SYMMETRICAL
T & B	TOP AND BOTTOM
TEL	TELEPHONE
TM	THERMAL–MAGNETIC
TVSS	TRANSIENT VOLTAGE SURGE SUPRESSOR
TYP	TYPICAL
UDS	UNITIZED DISTRIBUTION SUBSTATION
UL	UNDERWRITERS' LABORATORIES
UNO	UNLESS NOTED OTHERWISE

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JITENDRA M. PATEL — LICENSED PROFESSIONAL ENGINEER — STATE OF NEW YORK — 081921

NO.	DATE	REVISION	DR	CHK	APVD
0	08/17/21	100% DESIGN ISSUED FOR CONSTRUCTION	TR	RJR	SCP
DSGN			RJR	BY	APVD

100% DESIGN DRAWINGS
OU1 SSDS EXPANSION SYSTEM DESIGN
LOCKHEED MARTIN CORPORATION
FORMER UNISYS SITE 130045 - GREAT NECK
REMEDIATION SITE
1111 MARCUS AVENUE
LAKE SUCCESS, NEW YORK 11042

DRAWING STATUS
100% DESIGN SUBMISSION

ELECTRICAL

LEGEND, ABBREVIATIONS AND GENERAL NOTES

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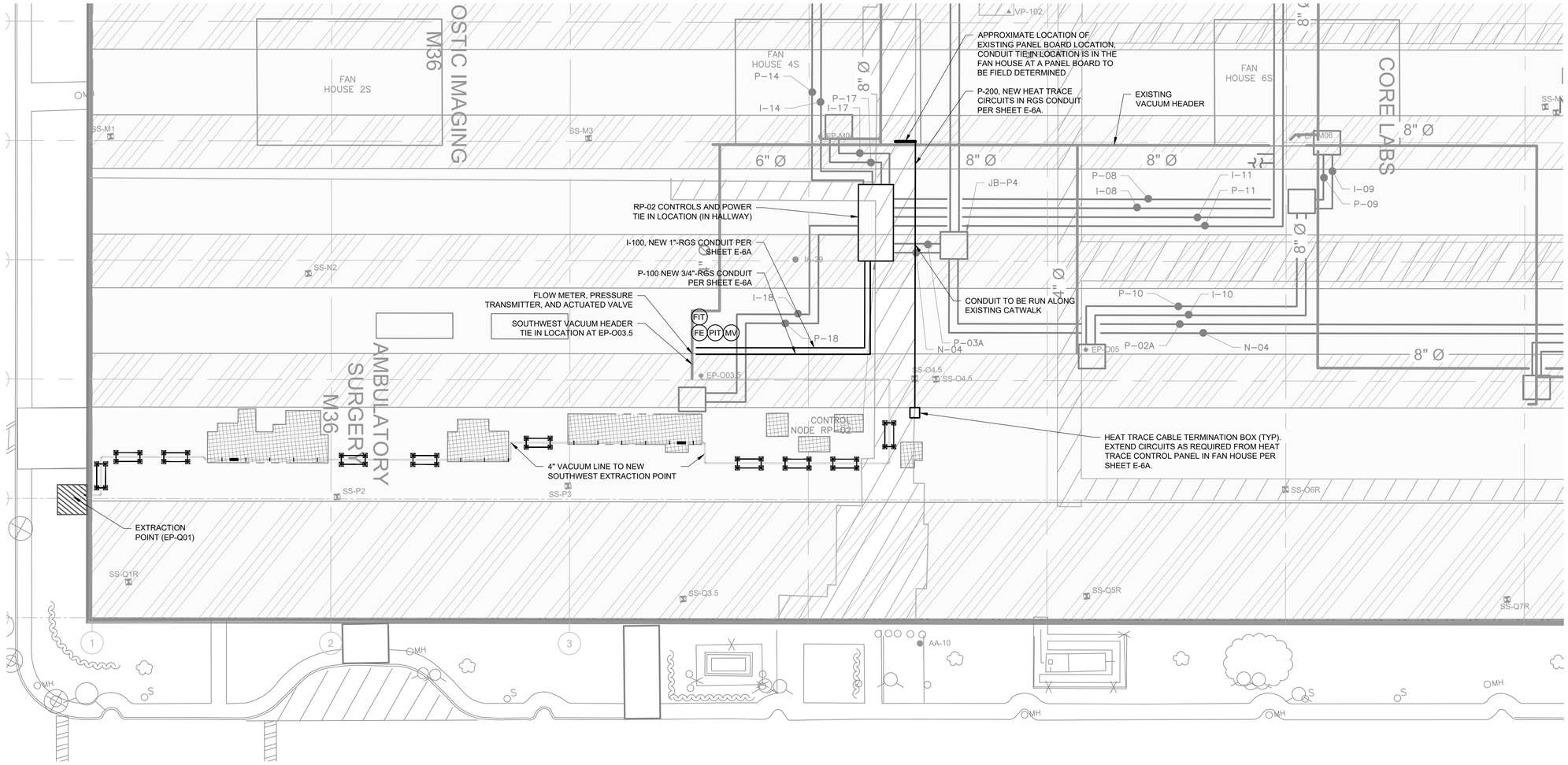
Bayside, NY, 11361

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	AUGUST 17, 2021
PROJ	3617-20-7521
DWG	E-1
SHEET	9 OF 18

FILE NAME: C:\Users\roger.riquier\Wood PLC\Lockheed Martin Great Neck - SSDS Booster System\8.0 Drawings\Sheets\09 E-1 Legend Abbreviations General Notes.dwg PLOT DATE: Tue, 17 Aug 2021 PLOT TIME: 4:14 PM



A SOUTHWEST EXTRACTION POINT ELECTRICAL AND INSTUMENTATION PLAN

1" = 20'

0 10' 20' 40'

LEGEND

RSM–M04 ▲	EXISTING ROOM STATUS MONITOR POINT
EP–M04 ✹	EXISTING EXTRACTION POINT
SS–M04 ⊠	EXISTING SUB-SLAB MONITORING POINT
	HVAC UNITS
	ROOF MONITOR
	PUBLIC HALLWAY

NOTES:

1. LOCATION NAMES AND APPROXIMATE FOOTPRINTS PROVIDED BY KEYPOINT PARTNERS.
2. CONTRACTOR TO PREPARE SUBMITTAL DRAWING SHOWING INSTRUMENTATION WIRING TERMINATION IN RP-2.
3. EXISTING CONDUIT NUMBERS FROM CONTRACT 1 FINAL AS-BUILT DRAWINGS AND NOT REFLECTED IN UNISYS SITE NO. 130045 - SSDS CONSOLIDATED DRAWINGS

N

JITENDRA M. PATEL

NO.	DATE	DSGN	DR	CHK	APVD
0	08/17/21	EWT	RJR	SCP	SCP

REVISION

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LAKE SUCCESS, NEW YORK 11042

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SOUTHWEST ELECTRICAL AND INSTRUMENTATION PLAN

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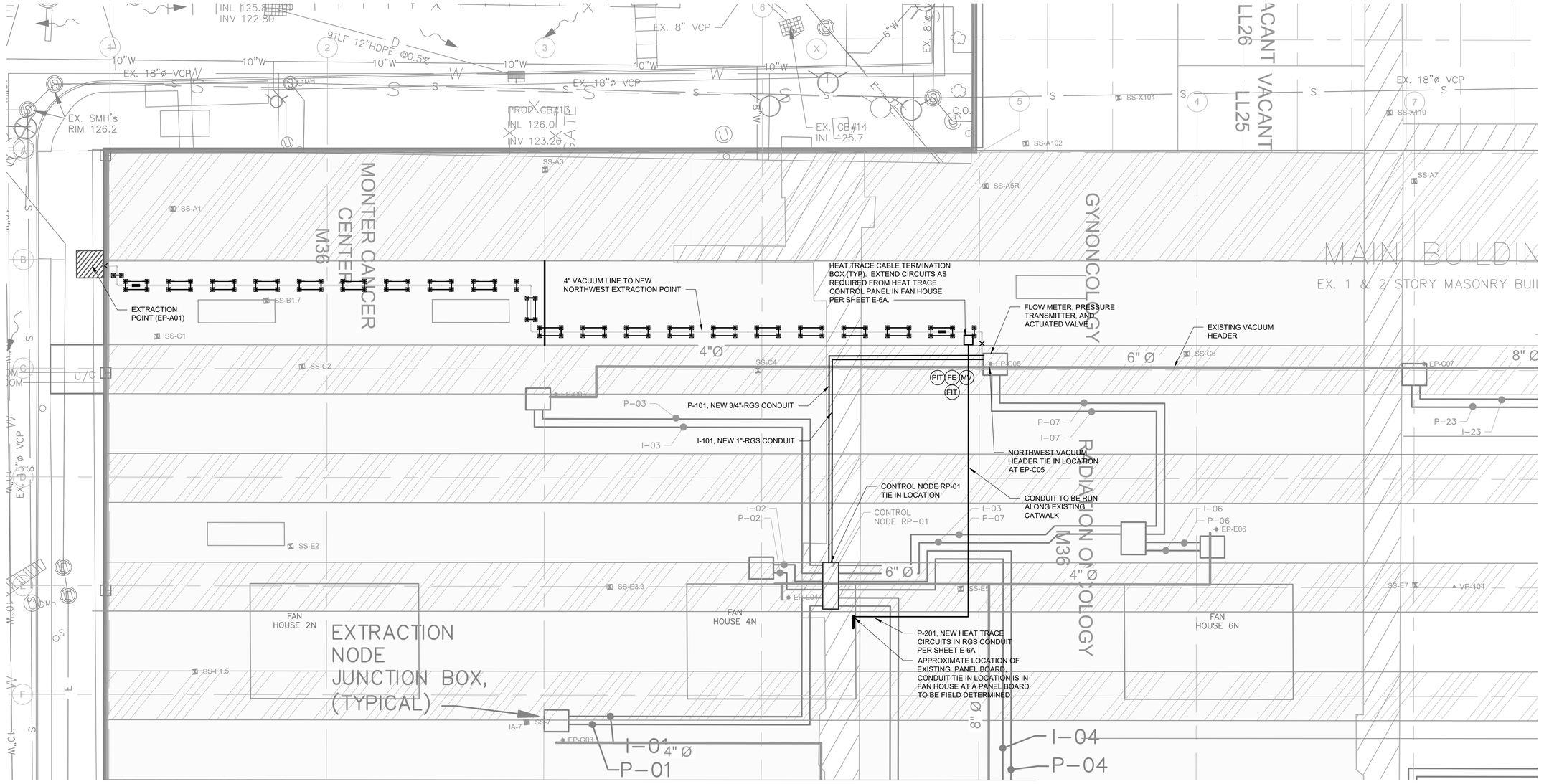
0 1"

DATE	AUGUST 17 2021
PROJ	3617-20-7521
DWG	E-2E
SHEET	10 OF 18

FILE NAME: C:\Users\roger.riquier\Wood PLC\Lockheed Martin Great Neck - SSDS Booster System\8.0 Drawings\Sheets\10 E-2E Southwest Electrcal and Instrumentation.dwg PLOT DATE: Tue, 17 Aug 2021 PLOT TIME: 4:15 PM



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LEGEND

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EP–M04 ✸	EXISTING EXTRACTION POINT
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	HVAC UNITS
	ROOF MONITOR
	PUBLIC HALLWAY

NOTES:

1. LOCATION NAMES AND APPROXIMATE FOOTPRINTS PROVIDED BY KEYPOINT PARTNERS.
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3. EXISTING CONDUIT NUMBERS FROM CONTRACT 1 FINAL AS-BUILT DRAWINGS AND NOT REFLECTED IN UNISYS SITE NO. 130045 - SSDS CONSOLIDATED DRAWINGS

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NORTHWEST ELECTRICAL AND INSTRUMENTTATION PLAN

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Bayside, NY, 11361

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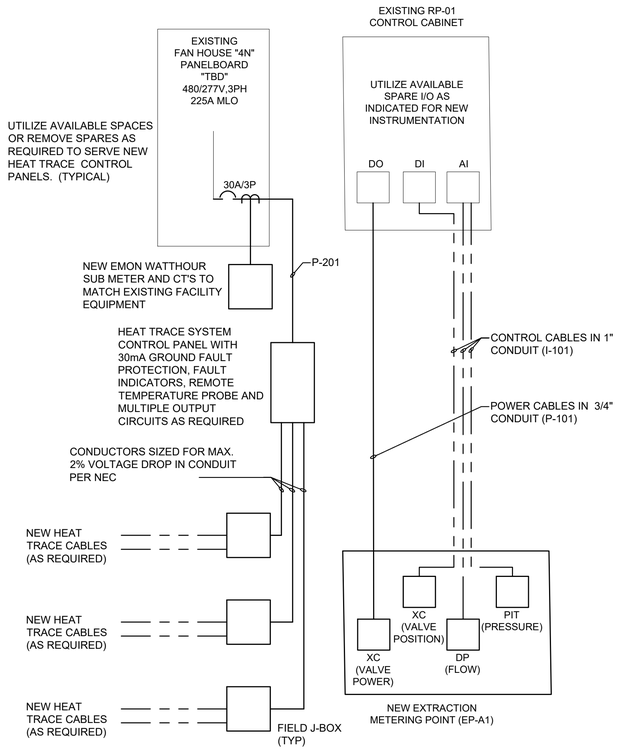
0 1"

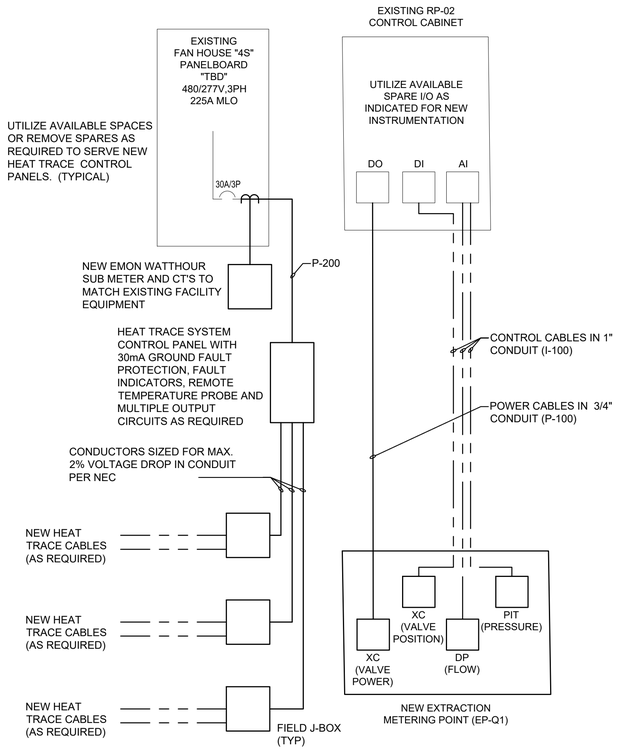
DATE	AUGUST 17, 2021
PROJ	3617-20-7521
DWG	E-2F
SHEET	11 OF 18

OU1 SSDS BOOSTER EXPANSION SYSTEM DESIGN						
CONDUIT	**SIZE**	**CONDUIT TYPE**	**CONDUCTOR SIZE AND TYPE**	**PURPOSE**	**ORIGINATION**	**TERMINATION**
P-100	3/4	RGS	2-1/C#12 AWG, 600V(THHN) & 1-1/C#12 GROUND	POWER FOR EXTRACTION POINT JUNCTION BOX EP-Q1	RP-02	EP-Q1
P-101	3/4	RGS	2-1/C#12 AWG, 600V(THHN) & 1-1/C#12 GROUND	POWER FOR EXTRACTION POINT JUNCTION BOX EP-A1	RP-01	EP-A1
P-200	3/4	EMT	2-1/C#10 AWG 600V(THHN) & 1-1/C #10 GROUND	POWER FOR HEAT TRACE	FAN HOUSE 4S - 480VOLT PANELBOARD "TBD"	HEAT TRACE CONTROL PANEL - SOUTH
P-201	3/4	EMT	2-1/C#10 AWG 600V(THHN) & 1-1/C #10 GROUND	POWER FOR HEAT TRACE	FAN HOUSE 4N - 480VOLT PANELBOARD "TBD"	HEAT TRACE CONTROL PANEL -NORTH
TBD	TBD	RGS	TO BE SUBMITTED WITH HEAT TRACE PACKAGE BY CONTRACTOR	TYPCIAL CIRCUITS TO HEAT TRACE CABLING AS REQUIRED FOR NEW PIPING CONFIGURATION	HEAT TRACE CONTROL PANEL - NORTH AND SOUTH	HEAT TRACE JUNCTION BOX
I-100	1	RGS	2-1 PR#18 AWG, TWISTED SHIELDED PAIR, 300V(BELDEN 9486) AND 4-1/C#14 AWG, 1-1/C#14 G	INSTRUMENTATION FOR EXTRACTION POINT JUNCTION BOX EP-Q1	RP-02	EP-Q1
I-101	1	RGS	2-1 PR#18 AWG, TWISTED SHIELDED PAIR, 300V(BELDEN 9486) AND 4-1/C#14 AWG, 1-1/C#14 G	INSTRUMENTATION FOR EXTRACTION POINT JUNCTION BOX EP-A1	RP-01	EP-A1



D2 NORTHWEST SSDS ONE LINE DIAGRAM

NOT TO SCALE



D4 SOUTHWEST SSDS ONE LINE DIAGRAM

NOT TO SCALE

GENERAL NOTES

1. ALL GENERAL NOTES, SYMBOL LISTS AND DETAILS SHALL BE CONSIDERED AS APPLICABLE TO ALL ELECTRICAL DRAWINGS FOR THIS PROJECT.
2. THESE DRAWINGS ARE PREPARED AND COORDINATED WITH THE PROJECT SPECIFICATIONS. TOGETHER THESE DOCUMENTS FORM THE CONTRACT DOCUMENTS. ANYTHING MENTIONED IN THE SPECIFICATIONS AND NOT SHOWN IN THE DRAWINGS, OR SHOWN IN THE DRAWINGS AND NOT MENTIONED IN THE SPECIFICATIONS, SHALL BE OF LIKE EFFECT AS IF SHOWN AND MENTIONED IN BOTH. IN CASE OF DIFFERENCES BETWEEN THE DRAWINGS AND SPECIFICATIONS THE DRAWINGS GOVERN. OMISSIONS FROM THE DRAWINGS OR SPECIFICATIONS, OR THE INCORRECT DESCRIPTION OF DETAILS OF WORK WHICH ARE EVIDENTLY NECESSARY TO CARRY OUT THE INTENT OF THE DRAWINGS AND SPECIFICATIONS, OR WHICH ARE CUSTOMARILY PERFORMED, SHALL NOT RELIEVE THE CONTRACTOR FROM PERFORMING SUCH OMITTED OR INCORRECTLY DESCRIBED DETAIL OF THE WORK, RATHER, THE WORK SHALL BE PERFORMED AS IF THE DRAWINGS HAVE BEEN VERIFIED, CHECKED AND COORDINATED WITH THE SHOP DRAWINGS AND SAMPLES OF THE WORK AND OF THE SPECIFICATIONS.
3. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH NFPA-70, NATIONAL ELECTRICAL CODE (NEC)(LATEST EDITION).
4. ALL NON-CURRENT CARRYING METAL PARTS OF EQUIPMENT, LIGHTING FIXTURES, ETC. SHALL BE GROUNDED BY MEANS OF A GREEN INSULATED GROUND WIRE RUN IN RACEWAY WITH SUPPLY CONDUCTORS. ALL METALLIC CONDUIT AND CABLE TRAYS SHALL BE ELECTRICALLY CONTINUOUS BONDED, AND GROUNDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE, ARTICLE 250.
5. ALL PENETRATIONS THROUGH FLOORS, RATED WALLS AND PARTITIONS SHALL BE SEALED WITH UL APPROVED FIRE SEALANT MATERIAL TO MAINTAIN THE RATING OF SEPARATION.
6. AN EQUIPMENT GROUNDING CONDUCTOR SHALL BE INSTALLED WITH EVERY FEEDER AND BRANCH CIRCUIT.
7. ALL EXTERIOR ELECTRICAL CONDUIT SHALL BE GALVANIZED RIGID STEEL. EXTERIOR JUNCTION BOXES AND ENCLOSURES SHALL BE NEMA-4X.
8. UNLESS OTHERWISE NOTED WIRING SHALL BE 2#12 AWG CONDUCTORS AND #12 GND. HOME RUNS FED FROM 20A-1P CIRCUITS IN EXCESS OF 100 FEET SHALL BE #10 AWG.
9. ALL WIRING SHALL BE 600V, COPPER WITH THHN/THWN INSULATION.
10. ALL NEW CONDUCTORS SHALL BE INSTALLED CONTINUOUS WITHOUT SPLICES OR JUNCTION POINTS. ALL WIRING TERMINATIONS TO TERMINAL LUGS SHALL BE TORQUED PER MANUFACTURER'S SPECIFICATIONS.
11. NEW EXTRACTION POINTS, POWER CIRCUITS, AND INSTRUMENTATION CIRCUITS ARE INDICATED DIAGRAMMATICALLY WITH GENERIC TAGS (XX). ACTUAL TAG NUMBERING SHALL BE COORDINATED WITH EXISTING SYSTEM'S NEXT AVAILABLE NUMBERING SEQUENCE AND DOCUMENTED ON RECORD DRAWINGS

JITENDRA M. PATEL
STATE OF NEW YORK · JITENDRA M. PATEL · 075301 · LICENSED PROFESSIONAL ENGINEER

NO.	DATE	REVISION	DR	CHK	APVD
0	08/17/21	100% DESIGN ISSUED FOR CONSTRUCTION	EWT	RJR	SCP
DSGN			EWT	BY	APVD

SK SCP

100% DESIGN DRAWINGS
OU1 SSDS EXPANSION SYSTEM DESIGN
LOCKHEED MARTIN CORPORATION
FORMER UNISYS SITE 130045 - GREAT NECK
REMEDIATION SITE
1111 MARCUS AVENUE
LAKE SUCCESS, NEW YORK 11042

DRAWING STATUS
100% DESIGN SUBMISSION

ELECTRICAL

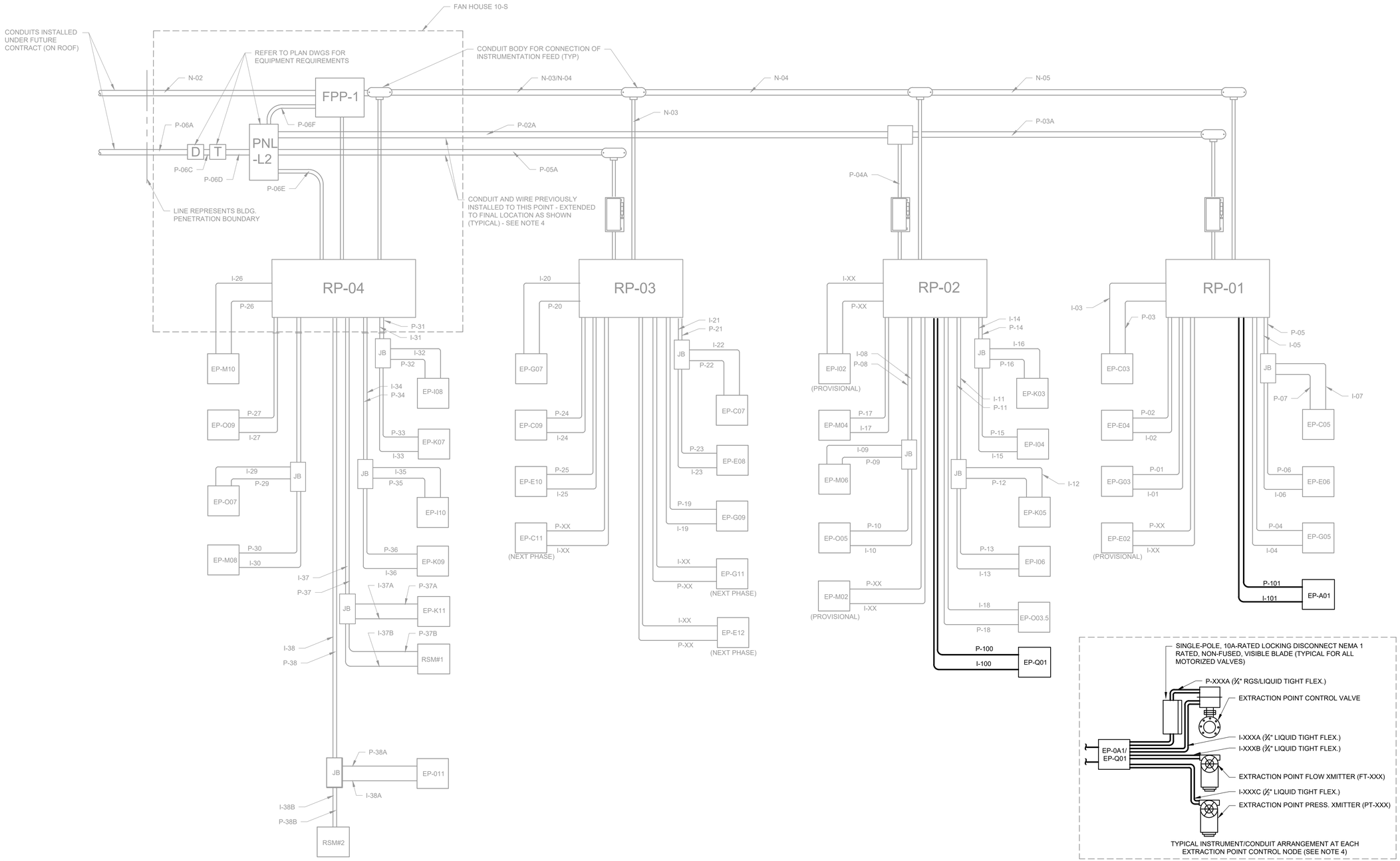
ONE LINE ELECTRICAL DIAGRAM

amec
AMEC E & E, PC
214-25 42nd Avenue Suite 3R,
Bayside, NY, 11361

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	AUGUST 17, 2021
PROJ	3617-20-7521
DWG	E-6A
SHEET	12 OF 18

FILE NAME: C:\Users\roger.riquier\Wood PLC\Lockheed Martin Great Neck - SSDS Booster System\8.0 Drawings\Sheets\12 E-6A_Elec One Line.dwg PLOT DATE: Tue, 17 Aug 2021 PLOT TIME: 4:16 PM



TYPICAL INSTRUMENT/CONDUIT ARRANGEMENT AT EACH EXTRACTION POINT CONTROL NODE (SEE NOTE 4)

DRAWING NOTES:

1. ITEMS DEPICTED IN GREY LINEWEIGHT ARE INSTALLED PREVIOUSLY OR WILL BE INSTALLED UNDER ANOTHER CONTRACT. BOLD ITEMS INSTALLED AS SHOWN.
2. SEE DRAWING E-2A AND E-2B FOR LAYOUT OF BUILDING FLOOR PLAN AND LOCATION OF EACH EXTRACTION POINT LATERAL.
3. CONTROL NETWORK CONSIST OF ALLEN-BRADLEY POINT I/O NETWORKED WITH CENTRAL CONTROL PROCESSOR VIA CONTROLNET NETWORK, UTILIZING HARD-WIRED CONTROLNET NETWORK INFRASTRUCTURE.
4. SUFFICIENT SLACK WIRE EXISTING FOR EXTENTION OF CIRCUITS TO FINAL LOCATIONS SHOWN AT EQUIPMENT IN FAN HOUSE 10-SOUTH. SEE ENLARGED PLAN SHEET E-3AR. PROVIDE ADDITIONAL CONDUITS AS REQUIRED.
5. SEE SHEET E-6A FOR CONDUIT AND CONDUCTOR SCHEDULE

JITENDRA M. PATEL

NO.	DATE	DSGN	DR	CHK	APVD
0	08/17/21	EWT	RJR	SCP	SCP

100% DESIGN ISSUED FOR CONSTRUCTION

REVISION BY APVD

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DRAWING STATUS
100% DESIGN SUBMISSION

ELECTRICAL

CONTROLS, INSTRUMENTATION, AND INTERCONNECT

AMEC E & E, PC
214-25 42nd Avenue Suite 3R,
Bayside, NY, 11361

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

APPROVED BY:

DATE	REVISION	APRD.
05/10/21	REVISION 1	EWT

PROJECT: **iPARK BUILDING SUB-SLAB DEPRESSURIZATION SYSTEM**
LOCATION: **Lockheed Martin Corporation**
Former Unisys Facility - Lake Success, New York
TITLE: **CONTROLS/INSTRUMENTATION INTERCONNECT DRAWING**
ELECTRICAL

APPROVED	PR
DRAFTED	CP
PROJECT#	117-0507648
DATE	3-21-17

FIGURE **E-20**

DATE AUGUST 17, 2021
PROJ 3617-20-7521
DWG E-20
SHEET 13 OF 18

PIPE LINE LEGEND

- PROCESS PIPING
- SECONDARY PROCESS PIPING
- PNEUMATIC PIPING
- FLEXIBLE HOSE
- BACKWASH
- TIE–IN/FUTURE/ BY OTHERS
- INSTRUMENTATION
- INSULATION
- HEAT TRACED W/ INSULATION
- INSULATION (FREEZE PROTECTION) — CLASS H
- INSULATION (UV PROTECTION) — CLASS B
- FLOW DIRECTION
- PIPE BREAK LINE
- PIPE CROSS OVER
- INSTRUMENTATION CROSS OVER
- EQUIPMENT WITHIN BOUNDARIES TO BE PACKAGED SUPPLY

MISC. FITTINGS LEGEND

- FLEXIBLE CONNECTION
- PIPE CAP
- FLANGE CONNECTION
- REDUCER
- PIPING CONNECTION
- PIPE UNION
- CAM LOCK COUPLER
- CAM LOCK CAP

VALVE ACTUATOR SYMBOLS

(NO SYMBOL) = MANUAL FOR ON–OFF SERVICE

- HANDWHEEL (MANUAL OVERRIDE)
- RATE ADJUSTMENT (MANUAL)
- PRESSURE–SAFETY
- ELECTRIC MOTOR w/POSITIONER BOARD
- HANDWHEEL (MANUAL OVERRIDE)
- ELECTRIC
- ELECTRIC MOTOR
- PENUMATIC
- GEAR OPERATOR
- ELECTRO–HYDRAULIC
- SOLENOID (WITHOUT) (WITH)= MANUAL OVERRIDE

DIAPHRAGM – AIR TO AIR: (WITHOUT) (WITH) = POSITIONER

DIAPHRAGM & SPRING: SPRING TO OPEN (WITHOUT) SPRING TO CLOSE (WITH) = POSITIONER

DOUBLE–ACTING CYLINDER: (WITHOUT) (WITH) = POSITIONER

CYLINDER & SPRING: SPRING TO OPEN SPRING TO CLOSE

HEAT EXCHANGER SYMBOLS

HEAT EXCHANGER AND WATER CHILLER

INSTRUMENT LINE SYMBOLS

- ELECTRIC SIGNAL
- SOFTWARE OR DATA
- CAPILLARY TUBE

SYMBOLS FOR VALVE ACTION IN EVENT OF ACTUATOR POWER FAILURE

FO — SYMBOL LOCATED BY VALVE – USED ONLY WHERE NECESSARY TO INCREASE UNDERSTANDING OF THE SYSTEM.

FO = FAIL OPEN
FL = FAIL LOCKED
FC = FAIL CLOSED
FI = FAIL INDETERMINATE
F↘ = USED WITH 3–WAY & 4–WAY VALVE– ARROWS SHOW PATHS OPEN TO FLOW ON POWER FAILURE.

FLOW METER SYMBOLS

- VENTURI OR FLOW TUBE TYPE
- MAGNETIC TYPE FLOW METER
- TURBINE OR PROPELLER TYPE PRIMARY ELEMENT
- PITOT TYPE FLOW SENSOR

VALVE SYMBOLS

- KNIFE GATE
- GATE
- BALL
- GLOBE
- ORBIT
- PLUG
- 3–WAY PLUG
- BUTTERFLY
- CHECK
- STOP CHECK
- DIAPHRAGM
- PINCH
- NEEDLE
- 3–WAY
- 4–WAY
- ANGLE
- SLIDE GATE
- ROTARY
- WEIGHTED RELIEF
- ROOT VALVE (UNDEFINED TYPE)
- SOLENOID
- AIR/VAC RELEASE
- SIGHT GLASS

MOTOR DRIVEN EQUIPMENT

- CENTRIFUGAL PUMP
- DIAPHRAGM PUMP (PNEUMATIC OPERATION)
- ROTARY LOBE BLOWER, COMPRESSOR OR GEAR PUMP
- DIAPHRAGM PUMP–TWIN STAGE (PNEUMATIC OPERATION)
- FAN/BLOWER
- PROGRESSIVE CAVITY PUMP
- VERTICAL CENTRIFUGAL PUMP
- PERISTALTIC (HOSE) PUMP
- VERTICAL TURBINE
- AGITATOR, MIXER
- DIAPHRAGM CHEMICAL FEED PUMP– WITH INTERNAL RELIEF VALVE
- SUBMERSIBLE PUMP
- METERING PUMP
- REGENERATIVE BLOWER

FAN / BLOWER — PROGRESSIVE CAVITY PUMP — TRANSFER PUMP

PIPING ACCESSORIES AND DETAILS

- AIR FILTER WITH SILENCER
- QUICK DISCONNECT ASSEMBLY
- CONCENTRIC REDUCER
- FLEXIBLE COUPLING
- THERMOWELL
- ORIFICE PLATE

MISCELLANEOUS SYMBOLS

- PURGE OR FLUSHING DEVICE
- RESET FOR LATCH – TYPE ACTUATOR
- INTERLOCKING FUNCTIONS — GENERALIZED (I) SPECIFIC (AND, OR)

ABBREVIATIONS

KOT	KNOCK OUT TANK
VF–1	VENTILATION FAN
MDP	MAIN DISTRIBUTION PANEL
MCP	MAIN CONTROL PANEL
VPGAC	VAPOR PHASE GRANULAR ACTIVATED CARBON
UH	UNIT HEATER
VFD	VARIABLE FREQUENCY DRIVE

PIPE LINE DESIGNATION

6"–S04P–101A

- 6" — SIZE
- S04 — MATERIAL
- P — LINE TYPE
- 101 — LINE NUMBER
- A — BRANCH

MATERIAL

BRZ	BRASS/BRONZE
CIR	CAST IRON
CST	CARBON STEEL
CPR	COPPER
CVC	CHLORINATED POLYVINYL CHLORIDE
DIR	DUCTILE IRON
FRP	FIBERGLASS
GCS	GALVANIZED CARBON STEEL
LCS	LINED CARBON STEEL
PET	POLYETHYLENE
POP	POLYPROPYLENE
PVC	POLYVINYL CHLORIDE
RUB	RUBBER
S04	304 STAINLESS STEEL
S4L	304L STAINLESS STEEL
S16	316 STAINLESS STEEL
S6L	316L STAINLESS STEEL
TEF	TEFLON
VIT	VITON

TYPE

- D = DUCT
- H = HOSE
- P = PIPE
- T = TUBE
- C = DOUBLE WALL CONTAINMENT PIPE

INSTRUMENT SYMBOLS

	CONTROL ROOM OR MAIN CONTROL PANEL		AUXILLARY LOCATION		
	PRIMARY CONTROL PANEL NORMALLY ACCESSIBLE TO OPERATOR	BEHIND PANEL OR NORMALLY INACCESSIBLE FUNCTION	AUXILIARY PANEL OR RACK NORMALLY ACCESSIBLE TO OPERATOR	AUXILIARY PANEL OR RACK NORMALLY INACCESSIBLE TO OPERATOR	FIELD MOUNTED
DISCRETE INSTRUMENTS	○	○	○	○	○
SHARED DISPLAY, SHARED CONTROL	⬭	⬭	⬭	⬭	⬭
COMPUTER FUNCTION (INCLUDING DISTRIB. CONTROL SYS.)	⬡	⬡	⬡	⬡	⬡
PROGRAMMABLE LOGIC CONTROLLER FUNCTION	◇	◇	◇	◇	◇

INSTRUMENT IDENTIFICATION LETTERS

FIRST LETTER		SUCCEEDING LETTERS		
MEASURE OR INITIATING VARIABLE	MODIFIER (1)	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A = ANALYSIS (2)		ALARM		
B = BURNER, COMBUSTION		USER'S CHOICE (3)	USER'S CHOICE (3)	USER'S CHOICE (3)
C = CONDUCTIVITY (ELECTRICAL)			CONTROL	
D = DENSITY OR SP. GR.	DIFFERENTIAL			
E = VOLTAGE (EMF)		SENSOR (PRIMARY ELEMENT)		
F = FLOW RATE	RATIO (FRACTION)			
G = USER'S CHOICE (3)		GLASS OR VIEWING DEVICE		
H = HAND (MANUAL)				HIGH
I = CURRENT (ELECTRICAL)		INDICATE		
J = POWER	SCAN (5)			
K = TIME OR TIME SCHEDULE	TIME RATE OF CHANGE		CONTROL STATION	
L = LEVEL		LIGHT		LOW
M = USER'S CHOICE (3)	MOMENTARY			MIDDLE OR INTERMEDIATE
N = USER'S CHOICE (3)		USER'S CHOICE (3)	USER'S CHOICE (3)	USER'S CHOICE (3)
O = USER'S CHOICE (3)		ORIFICE (RESTRICTION)		
P = PRESSURE OR VACUUM		TEST OR SAMPLE POINT		
Q = QUANTITY	INTEGRATE OR TOTALIZE			
R = RADIATION		RECORD OR PRINT		
S = SPEED OR FREQUENCY	SAFETY		SWITCH	
T = TEMPERATURE			TRANSMIT	
U = MULTIVARIABLE		MULTIFUNCTION	MULTIFUNCTION	MULTIFUNCTION
V = VACUUM			VALVE, DAMPER OR LOUVER	
W = WEIGHT OR FORCE		WELL		
X = UNCLASSIFIED (4)	X AXIS	UNCLASSIFIED (4)	UNCLASSIFIED (4)	UNCLASSIFIED (4)
Y = EVENT, STATE OR PRESENCE	Y AXIS		RELAY, COMPUTE, CONVERT	
Z = POSITION OR DIMENSION	Z AXIS		DRIVE , ACTUATOR, ETC.	

(1) ANY FIRST LETTER COMBINED WITH MODIFIER REPRESENTS A NEW AND SEPARATE MEASURED VARIABLE.
EXAMPLES: PD= DIFFERENTIAL PRESSURE, FQ= INTEGRATED R TOTALIZED FLOW. EXCEPTION IS THE MODIFIER "J" FOR MULTIPOINT SCANNING.

(2) FOR ANALYSIS NOT IDENTIFIED BY A SPECIFIC LETTER IN THE TABLE, USE FIRST LETTER "A". NEAR THE INSTRUMENT SYMBOL, SPECIFY THE NATURE OF THE ANALYSIS. EXAMPLE: SILICA.

(3) MEANING OF A "USER CHOICE" LETTER SHALL BE CONSISTENT THROUGHOUT A PROJECT AND SHALL BE SPECIFIED IN THE DRAWING LEGEND.

(4) UNCLASSIFIED LETTER MAY HAVE A FEW DIFFERENT MEANINGS ON A PROJECT. THE MEANING SHALL BE SPECIFIED NEAR EACH INSTRUMENT SYMBOL USING THE UNCLASSIFIED LETTER.

(5) THE MODIFIER "SCAN" APPLIES TO MULTIPOINT PRINTING INSTRUMENTS, SUCH AS CJRS (MULTIPOINT CONDUCTIVITY RECORDER WITH ALARM SWITCHES).

STUART C. PEARSON — STATE OF NEW YORK — LICENSED PROFESSIONAL ENGINEER — 6/15/21

NO.	DATE	REVISION	BY	APVD
0	08/17/21	100% DESIGN ISSUED FOR CONSTRUCTION	EWT	SCP

DSGN: EWT — DR: RJR — CHK: SCP — APVD: SCP

100% DESIGN DRAWINGS
OU1 SSDS EXPANSION SYSTEM DESIGN
LOCKHEED MARTIN CORPORATION
FORMER UNISYS SITE 130045 - GREAT NECK
REMEDIATION SITE
111 MARCUS AVENUE
LAKE SUCCESS, NEW YORK 11042

DRAWING STATUS
100% DESIGN SUBMISSION

PROCESS

LEGEND, ABBREVIATIONS, AND GENERAL NOTES

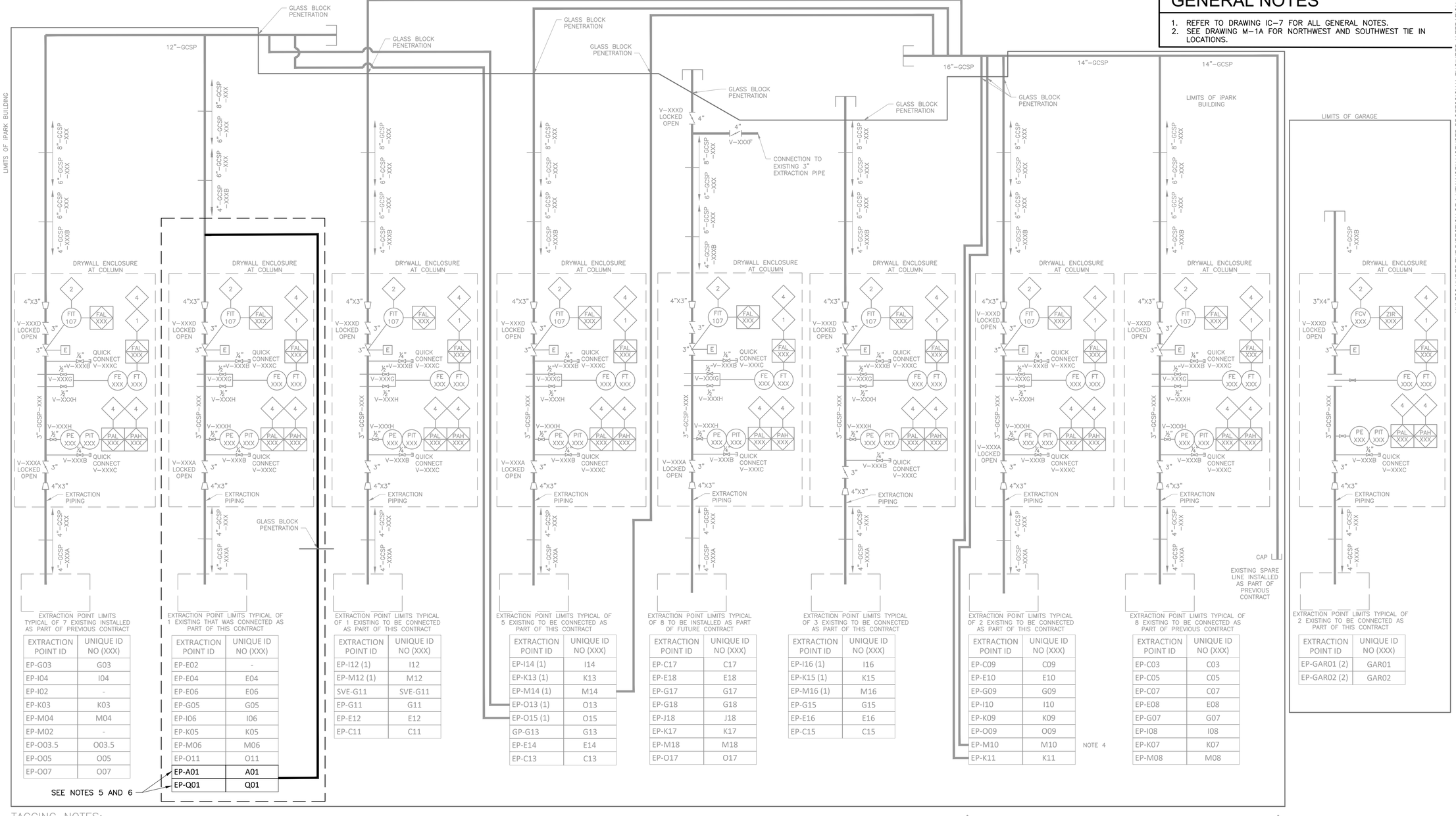
amec
AMEC E & E, PC
214-25 42nd Avenue Suite 3R,
Bayside, NY, 11361

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 — 1"

DATE	AUGUST 17, 2021
PROJ	3617-20-7521
DWG	IC-1
SHEET	14 OF 18

GENERAL NOTES

1. REFER TO DRAWING IC-7 FOR ALL GENERAL NOTES.
2. SEE DRAWING M-1A FOR NORTHWEST AND SOUTHWEST TIE IN LOCATIONS.



EXTRACTION POINT LIMITS TYPICAL OF 7 EXISTING INSTALLED AS PART OF PREVIOUS CONTRACT

EXTRACTION POINT ID	UNIQUE ID NO (XXX)
EP-G03	G03
EP-I04	I04
EP-I02	-
EP-K03	K03
EP-M04	M04
EP-M02	-
EP-O03.5	O03.5
EP-O05	O05
EP-O07	O07

EXTRACTION POINT LIMITS TYPICAL OF 1 EXISTING THAT WAS CONNECTED AS PART OF THIS CONTRACT

EXTRACTION POINT ID	UNIQUE ID NO (XXX)
EP-E02	-
EP-E04	E04
EP-E06	E06
EP-G05	G05
EP-I06	I06
EP-K05	K05
EP-M06	M06
EP-O11	O11
EP-A01	A01
EP-Q01	Q01

EXTRACTION POINT LIMITS TYPICAL OF 1 EXISTING TO BE CONNECTED AS PART OF THIS CONTRACT

EXTRACTION POINT ID	UNIQUE ID NO (XXX)
EP-I12 (1)	I12
EP-M12 (1)	M12
SVE-G11	SVE-G11
EP-G11	G11
EP-E12	E12
EP-C11	C11

EXTRACTION POINT LIMITS TYPICAL OF 5 EXISTING TO BE CONNECTED AS PART OF THIS CONTRACT

EXTRACTION POINT ID	UNIQUE ID NO (XXX)
EP-I14 (1)	I14
EP-K13 (1)	K13
EP-M14 (1)	M14
EP-O13 (1)	O13
EP-O15 (1)	O15
GP-G13	G13
EP-E14	E14
EP-C13	C13

EXTRACTION POINT LIMITS TYPICAL OF 8 TO BE INSTALLED AS PART OF FUTURE CONTRACT

EXTRACTION POINT ID	UNIQUE ID NO (XXX)
EP-C17	C17
EP-E18	E18
EP-G17	G17
EP-G18	G18
EP-J18	J18
EP-K17	K17
EP-M18	M18
EP-O17	O17

EXTRACTION POINT LIMITS TYPICAL OF 3 EXISTING TO BE CONNECTED AS PART OF THIS CONTRACT

EXTRACTION POINT ID	UNIQUE ID NO (XXX)
EP-I16 (1)	I16
EP-K15 (1)	K15
EP-M16 (1)	M16
EP-G15	G15
EP-E16	E16
EP-C15	C15

EXTRACTION POINT LIMITS TYPICAL OF 2 EXISTING TO BE CONNECTED AS PART OF THIS CONTRACT

EXTRACTION POINT ID	UNIQUE ID NO (XXX)
EP-C09	C09
EP-E10	E10
EP-G09	G09
EP-I10	I10
EP-K09	K09
EP-O09	O09
EP-M10	M10
EP-K11	K11

NOTE 4

EXTRACTION POINT LIMITS TYPICAL OF 8 EXISTING TO BE CONNECTED AS PART OF PREVIOUS CONTRACT

EXTRACTION POINT ID	UNIQUE ID NO (XXX)
EP-C03	C03
EP-C05	C05
EP-C07	C07
EP-E08	E08
EP-G07	G07
EP-I08	I08
EP-K07	K07
EP-M08	M08

EXTRACTION POINT LIMITS TYPICAL OF 2 EXISTING TO BE CONNECTED AS PART OF THIS CONTRACT

EXTRACTION POINT ID	UNIQUE ID NO (XXX)
EP-GAR01 (2)	GAR01
EP-GAR02 (2)	GAR02

TAGGING NOTES:

1. TAG NUMBERS OF SENSORS AND FIELD INSTRUMENTS ARE AS SHOWN AN AS SPECIFIED. FOR ITEMS NOT SHOWN OR SPECIFICALLY TAGGED, THE ITEM TAG NUMBER WAS ESTABLISHED BY THE SYSTEM SUPPLIER. ALL INSTRUMENTS WHETHER FIELD OR PANEL MOUNTED, HAVE AN IDENTIFICATION TAG.
2. INFORMATION PERMANENTLY ENGRAVED ONTO THE TAG INCLUDES THE IDENTIFICATION TAG NUMBER, MANUFACTURER, MODEL NUMBER, SERVICE, AND RANGE.
3. TAGS WERE FASTENED TO THE DEVICE WITH SELF TAPPING STAINLESS STEEL SCREW. WHERE FASTENING WITH SCREWS COULD NOT BE ACCOMPLISHED HE TAGS WERE PERMANENTLY ATTACHED TO THE DEVICE BY A CIRCLET OF STRANDED STAINLESS STEEL WIRE ROPE AND CLAMP.
4. ALL SENSORS AND FIELD INSTRUMENTS MOUNTED ON OR WITHIN CONTROL PANELS AND ENCLOSURES HAD THE IDENTIFICATION TAG INSTALLED SO THAT THE ENGRAVINGS ARE EASILY VISIBLE TO SERVICE PERSONNEL. PANEL MOUNTED DEVICES HAVE THE TAG ATTACHED TO THE REAR OF THE DEVICE.
5. TAGS WERE ENGRAVED WITH 3/16" LETTERS AND CONSTRUCTED AS FOLLOWS:
   A. 1/32" THICK LAMINATED PHENOLIC FOR ENGRAVING COMPOSED OF CORE, LAMINATED ON BOTH SIDES WITH A MATTE (NON-GLARE) FINISH COVER SHEET.
   B. CORE TO BE BLACK; COVER SHEET TO BE WHITE.
   C. MOUNTING HOLES WERE CENTERED ON WIDTH AND 1/4" FROM EACH END.

NOTES:

1. EXISTING EXTRACTION POINT THAT WAS CONNECTED UNDER THIS CONTRACT.
2. CAPPED PIPING TO BE EXTENDED UNDER FUTURE CONTRACT.
3. INSTALLED ALL INSTRUMENT TAGS UNDER THIS CONTRACT – SEE TAGGING NOTES.
4. M10 INSTRUMENTATION WAS ONLY INSTALLED UNDER THIS CONTRACT.
5. THIS SHEET SHOWS PIPING AND CONTROL CONFIGURATION FOR EXISTING EXTRACTION POINTS (EP). SEE SHEET IC-7A FOR PIPING AND CONTROL CONFIGURATION DETAILS OF NEW EP-A01 AND EP-Q01.
6. ALL PIPING AND INSTRUMENTATION FOR EP-A01 AND EP-Q01 WILL BE 4" (NO REDUCTION TO 3").

1. EXTRACTION FLOW MONITOR (FE/FT-XXX)
   OUTPUTS EXTRACTION POINT FLOW DATA TO THE PLC.
2. FLOW CONTROL VALVE (FCV-XXX)
   VALVE POSITION IS MODULATED TO MAINTAIN FLOW AT SETPOINT BASED ON INPUT FROM FE/FT-XXX. PLC WILL MONITOR FEEDBACK.
3. NOT USED
4. MAINTENANCE ALARM
   ALARM FOR MAINTENANCE REQUIREMENT.

STUART C. PEARSON
STATE OF NEW YORK * LICENSED PROFESSIONAL ENGINEER * STUART C. PEARSON
8/17/21

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PROCESS
PIPING AND INSTRUMENTATION DIAGRAM

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VERIFY SCALE
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0 1"

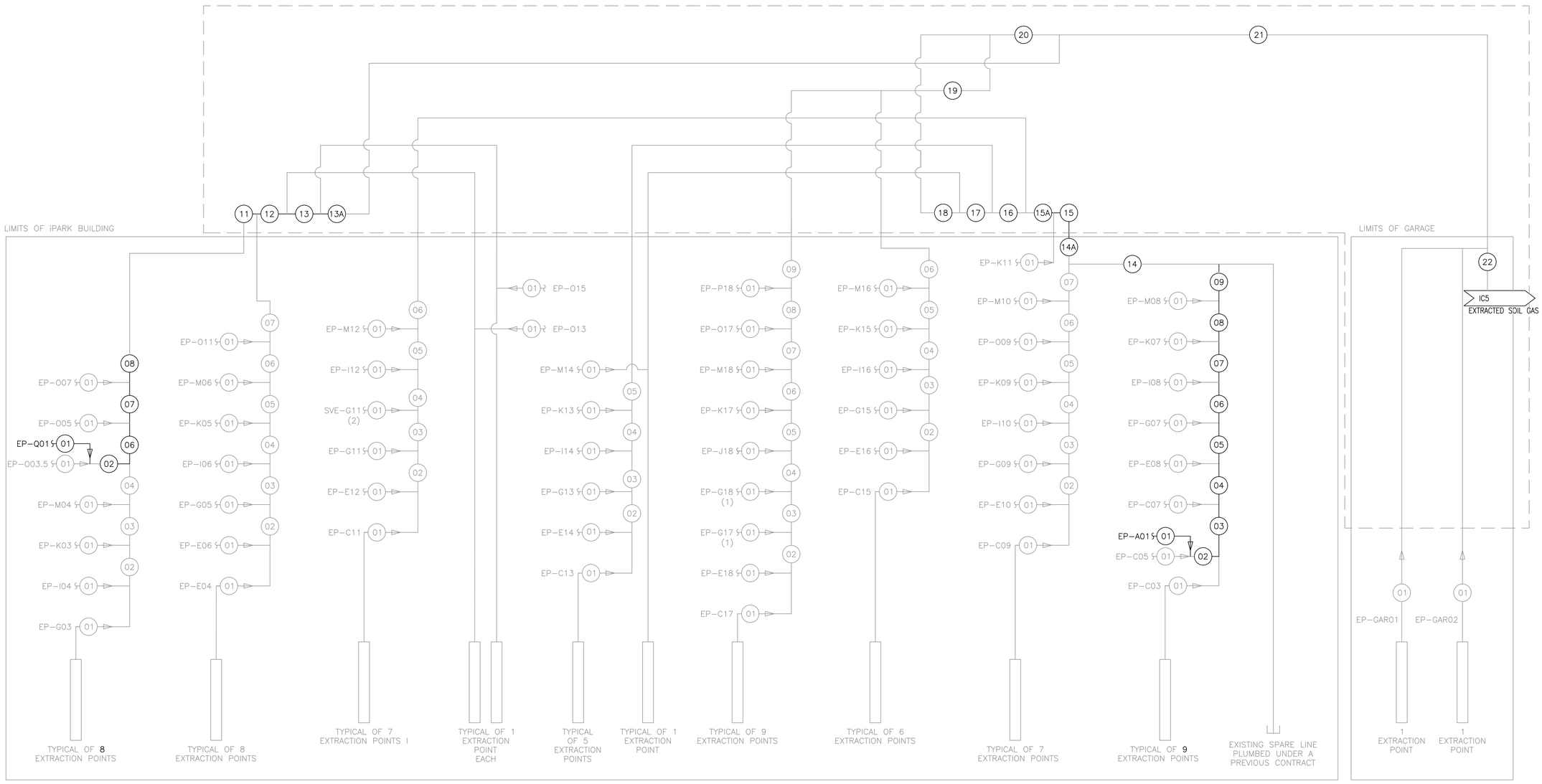
APPROVED BY:	DATE	REVISION	APRD.
	05/10/21	REVISION 1	EWT

PROJECT: iPARK BUILDING SUB-SLAB DEPRESSURIZATION SYSTEM
LOCATION: Lockheed Martin Corporation
Former Unisys Facility - Lake Success, New York
TITLE: PIPING AND INSTRUMENTATION DIAGRAM
INSTRUMENTATION AND CONTROL

APPROVED	PR
DRAFTED	CP
PROJECT#	117-0507648
DATE	3-21-17

FIGURE IC-2

DATE AUGUST 17, 2021
PROJ 3617-20-7521
DWG IC-2
SHEET 15 OF 18



PROCESS FLOW DETAILS

FLOW POINT	01	02	03	04	05	06	07	08	09	10	11	12	13	14	14A	14B	15	16	17	18	19	20	21	22	13A	15A
FLOW (SCFM)	100	200	300	400	500	600	700	800	900	1600	800	1500	1600	900	1700	1500	1700	2400	2900	3000	1500	4400	6100	6300	1700	1700
TEMPERATURE (DEGREES F)	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
PIPE DIAMETER (INCHES)	4	6	8	8	8	8	8	8	8	12	12	12	12	14	14	14	14	16	16	16	12	24	24	24	12	14

NOTE: PIPING IS SIZED FOR MAXIMUM FLOW OF 100 SCFM PER EXTRACTION POINT.

NOTES

(1) SIXTY ONE EXTRACTION POINTS INSTALLED (INCLUDED AS PART OF A PREVIOUS CONTRACT).

(2) ONE EXISTING SVE WELL (INCLUDED AS PART OF A PREVIOUS CONTRACT).

(3) THREE PROVISIONAL EXTRACTION POINTS (NOT INSTALLED).

(4) PIPING WAS CAPPED FOR CONTINUATION UNDER FUTURE CONTRACT.

(5) PIPE DIAMETERS BASED ON TETRATECH DRAWINGS.

SCFM = STANDARD CUBIC FEET PER MINUTE
F = FAHRENHEIT
MAX. = MAXIMUM
A. = AVERAGE

GENERAL NOTES

1. REFER TO DRAWING IC-7 FOR ALL GENERAL NOTES.
2. SEE DRAWING M-1A FOR NORTHWEST AND SOUTHWEST TIE IN LOCATIONS.

APPROVED BY:

DATE	REVISION	APRD.
05/10/21	REVISION 1	EWT

PROJECT: **iPARK BUILDING SUB-SLAB DEPRESSURIZATION SYSTEM**
LOCATION: **Lockheed Martin Corporation**
Former Unisys Facility - Lake Success, New York
TITLE: **PROCESS FLOW DIAGRAM SHEET 1**
INSTRUMENTATION AND CONTROL

APPROVED	PR
DRAFTED	CP
PROJECT#	117-0507648
DATE	3-21-17

FIGURE **IC-3**

STUART C. PEARSON
STATE OF NEW YORK * LICENSED PROFESSIONAL ENGINEER
8/18/21

NO.	DATE	DSGN	DR	CHK	APVD
0	08/17/21	EWT	RJR	SCP	SCP

100% DESIGN ISSUED FOR CONSTRUCTION

BY	APVD
EWT	SCP

100% DESIGN DRAWINGS
OU1 SSDS EXPANSION SYSTEM DESIGN
LOCKHEED MARTIN CORPORATION
FORMER UNISYS SITE 130045 - GREAT NECK
REMEDIATION SITE
1111 MARCUS AVENUE
LAKE SUCCESS, NEW YORK 11042

DRAWING STATUS
100% DESIGN SUBMISSION

PROCESS
PROCESS FLOW DIAGRAM

amec
AMEC E & E, PC
214-25 42nd Avenue Suite 3R,
Bayside, NY, 11361

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	AUGUST 17, 2021
PROJ	3617-20-7521
DWG	IC-3
SHEET	16 OF 18

GENERAL NOTES:

A. LOW PRESSURE ALARMS INDICATE VACUUM CONDITION IN EXCESS OF DESIGN POINT, HIGH PRESSURE ALARMS INDICATE VACUUM CONDITION BELOW DESIGN POINT.

B. SEE SPECIFICATION SECTION 13491 FOR AUTO-DIALER ALARM POINTS.

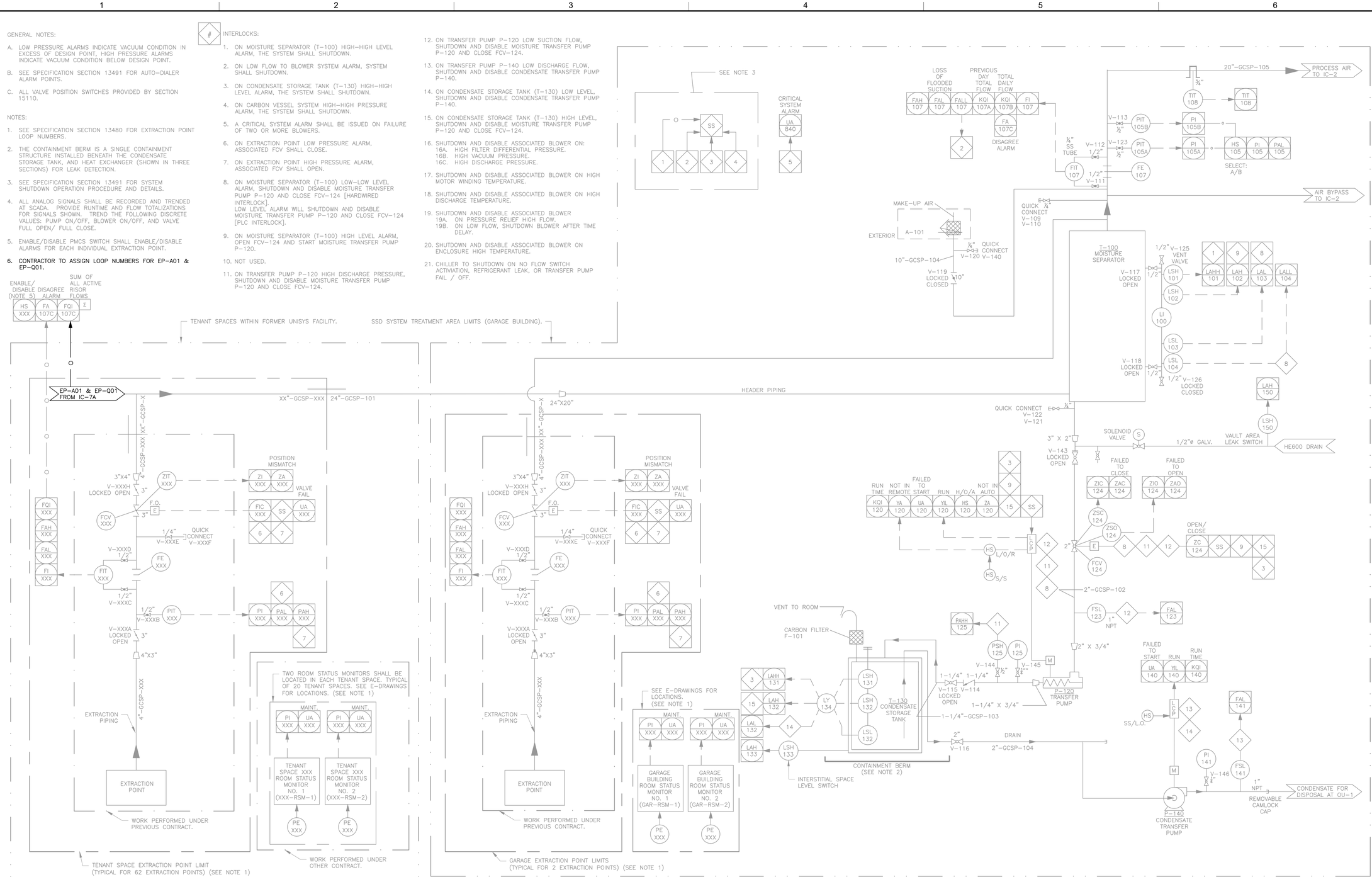
C. ALL VALVE POSITION SWITCHES PROVIDED BY SECTION 15110.

NOTES:

1. SEE SPECIFICATION SECTION 13480 FOR EXTRACTION POINT LOOP NUMBERS.
2. THE CONTAINMENT BERM IS A SINGLE CONTAINMENT STRUCTURE INSTALLED BENEATH THE CONDENSATE STORAGE TANK, AND HEAT EXCHANGER (SHOWN IN THREE SECTIONS) FOR LEAK DETECTION.
3. SEE SPECIFICATION SECTION 13491 FOR SYSTEM SHUTDOWN OPERATION PROCEDURE AND DETAILS.
4. ALL ANALOG SIGNALS SHALL BE RECORDED AND TRENDED AT SCADA. PROVIDE RUNTIME AND FLOW TOTALIZATIONS FOR SIGNALS SHOWN. TREND THE FOLLOWING DISCRETE VALUES: PUMP ON/OFF, BLOWER ON/OFF, AND VALVE FULL OPEN/ FULL CLOSE.
5. ENABLE/DISABLE PMCS SWITCH SHALL ENABLE/DISABLE ALARMS FOR EACH INDIVIDUAL EXTRACTION POINT.
6. CONTRACTOR TO ASSIGN LOOP NUMBERS FOR EP-A01 & EP-Q01.

(#) INTERLOCKS:

1. ON MOISTURE SEPARATOR (T-100) HIGH-HIGH LEVEL ALARM, THE SYSTEM SHALL SHUTDOWN.
2. ON LOW FLOW TO BLOWER SYSTEM ALARM, SYSTEM SHALL SHUTDOWN.
3. ON CONDENSATE STORAGE TANK (T-130) HIGH-HIGH LEVEL ALARM, THE SYSTEM SHALL SHUTDOWN.
4. ON CARBON VESSEL SYSTEM HIGH-HIGH PRESSURE ALARM, THE SYSTEM SHALL SHUTDOWN.
5. A CRITICAL SYSTEM ALARM SHALL BE ISSUED ON FAILURE OF TWO OR MORE BLOWERS.
6. ON EXTRACTION POINT LOW PRESSURE ALARM, ASSOCIATED FCV SHALL CLOSE.
7. ON EXTRACTION POINT HIGH PRESSURE ALARM, ASSOCIATED FCV SHALL OPEN.
8. ON MOISTURE SEPARATOR (T-100) LOW-LOW LEVEL ALARM, SHUTDOWN AND DISABLE MOISTURE TRANSFER PUMP P-120 AND CLOSE FCV-124 [HARDWIRED INTERLOCK].
   LOW LEVEL ALARM WILL SHUTDOWN AND DISABLE MOISTURE TRANSFER PUMP P-120 AND CLOSE FCV-124 [PLC INTERLOCK].
9. ON MOISTURE SEPARATOR (T-100) HIGH LEVEL ALARM, OPEN FCV-124 AND START MOISTURE TRANSFER PUMP P-120.
10. NOT USED.
11. ON TRANSFER PUMP P-120 HIGH DISCHARGE PRESSURE, SHUTDOWN AND DISABLE MOISTURE TRANSFER PUMP P-120 AND CLOSE FCV-124.
12. ON TRANSFER PUMP P-120 LOW SUCTION FLOW, SHUTDOWN AND DISABLE MOISTURE TRANSFER PUMP P-120 AND CLOSE FCV-124.
13. ON TRANSFER PUMP P-140 LOW DISCHARGE FLOW, SHUTDOWN AND DISABLE CONDENSATE TRANSFER PUMP P-140.
14. ON CONDENSATE STORAGE TANK (T-130) LOW LEVEL, SHUTDOWN AND DISABLE CONDENSATE TRANSFER PUMP P-140.
15. ON CONDENSATE STORAGE TANK (T-130) HIGH LEVEL, SHUTDOWN AND DISABLE MOISTURE TRANSFER PUMP P-120 AND CLOSE FCV-124.
16. SHUTDOWN AND DISABLE ASSOCIATED BLOWER ON:
    16A. HIGH FILTER DIFFERENTIAL PRESSURE.
    16B. HIGH VACUUM PRESSURE.
    16C. HIGH DISCHARGE PRESSURE.
17. SHUTDOWN AND DISABLE ASSOCIATED BLOWER ON HIGH MOTOR WINDING TEMPERATURE.
18. SHUTDOWN AND DISABLE ASSOCIATED BLOWER ON HIGH DISCHARGE TEMPERATURE.
19. SHUTDOWN AND DISABLE ASSOCIATED BLOWER
    19A. ON PRESSURE RELIEF HIGH FLOW.
    19B. ON LOW FLOW, SHUTDOWN BLOWER AFTER TIME DELAY.
20. SHUTDOWN AND DISABLE ASSOCIATED BLOWER ON ENCLOSURE HIGH TEMPERATURE.
21. CHILLER TO SHUTDOWN ON NO FLOW SWITCH ACTIVATION, REFRIGERANT LEAK, OR TRANSFER PUMP FAIL / OFF.



GENERAL NOTES

1. REFER TO DRAWING IC-7 FOR ALL GENERAL NOTES.
2. SEE DRAWING M-1A FOR NORTHWEST AND SOUTHWEST TIE IN LOCATIONS.

APPROVED BY:

NO.	DATE	REVISION	BY	APVD
0	08/17/21	PRELIMINARY DESIGN DRAWINGS	EWT	SCP
		REVISION	CHK	APVD
DSGN	EWT	DR	JVM	SCP

DATE	REVISION	APRD.
05/10/21	REVISION 1	EWT

PROJECT: **iPARK BUILDING SUB-SLAB DEPRESSURIZATION SYSTEM**

LOCATION: **Lockheed Martin Corporation**
Former Unisys Facility - Lake Success, New York

TITLE: **PIPING AND INSTRUMENTATION DIAGRAM LEGEND SHEET 1**
INSTRUMENTATION AND CONTROL

APPROVED	PR
DRAFTED	CP
PROJECT#	117-0507648
DATE	3-2-17

FIGURE **IC-7**

STUART C. PEARSON
STATE OF NEW YORK LICENSED PROFESSIONAL ENGINEER
05/10/21

100% DESIGN DRAWINGS
OU1 SSDS EXPANSION SYSTEM DESIGN
LOCKHEED MARTIN CORPORATION
FORMER UNISYS SITE 130045 - GREAT NECK
REMEDIATION SITE
1111 MARCUS AVENUE
LAKE SUCCESS, NEW YORK 11042

DRAWING STATUS
100% DESIGN SUBMISSION

PROCESS
PIPING AND
INSTRUMENTATION DIAGRAM

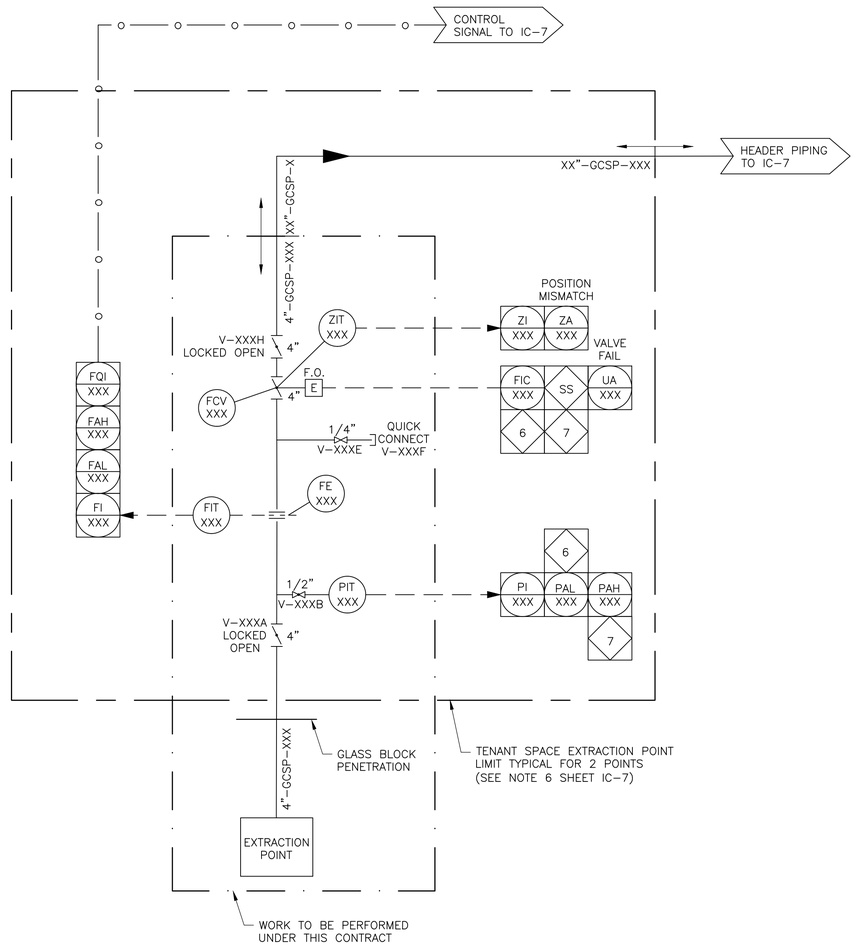
amec
AMEC E & E, PC
214-25 42nd Avenue Suite 3R,
Bayside, NY, 11361

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE AUGUST 17, 2021
PROJ 3617-20-7521
DWG IC-7
SHEET 17 OF 18

GENERAL NOTES

1. REFER TO DRAWING IC–7 FOR ALL GENERAL NOTES.
2. SEE DRAWING M–1A FOR NORTHWEST AND SOUTHWEST TIE IN LOCATIONS.
3. CONTRACTOR TO ASSIGN INSTRUMENTATION NUMBERS AS PART OF PROGRAMMING CHANGES.



STUART C. PEARSON

STATE OF NEW YORK * LICENSED PROFESSIONAL ENGINEER * STUART C. PEARSON

NO.	DATE	REVISION	BY	APVD
0	08/17/21	100% DESIGN ISSUED FOR CONSTRUCTION	EWT	SCP
DSGN	EWT	DR RJR CHK SCP	APVD	SCP

100% DESIGN DRAWINGS
OU1 SSDS EXPANSION SYSTEM DESIGN
LOCKHEED MARTIN CORPORATION
FORMER UNISYS SITE 130045 - GREAT NECK
REMEDIATION SITE
1111 MARCUS AVENUE
LAKE SUCCESS, NEW YORK 11042

DRAWING STATUS
100% DESIGN SUBMISSION

PROCESS
PIPING AND
INSTRUMENTATION DIAGRAM

AMEC E & E, PC
214-25 42nd Avenue Suite 3R,
Bayside, NY, 11361

VERIFY SCALE
BAR IS ONE INCH ON ORGINAL DRAWING.
0 1"

DATE	AUGUST 17, 2021
PROJ	3617-20-7521
DWG	IC-7A
SHEET	18 OF 18

FILE NAME: C:\Users\roger.riquier\Wood PLC\Lockheed Martin Great Neck - SSDS Booster System\8.0 Drawings\Sheets\18 IC-7A Piping and Instrumentation Diagram.dwg PLOT DATE: Tue, 17 Aug 2021 PLOT TIME: 4:17 PM

APPENDIX B – TECHNICAL SPECIFICATIONS LIST

SPECIFICATIONS
ISSUED FOR CONSTRUCTION
100% Design

Operable Unit 1 Sub-Slab Depressurization System Expansion
Former Unisys Site, Lake Success, New York

Prepared for:

Lockheed Martin Corporation

SPECIFICATIONS

100% DESIGN

OPERABLE UNIT 1 SUB-SLAB DEPRESSURIZATION SYSTEM EXPANSION
FORMER UNISYS SITE, LAKE SUCCESS, NEW YORK

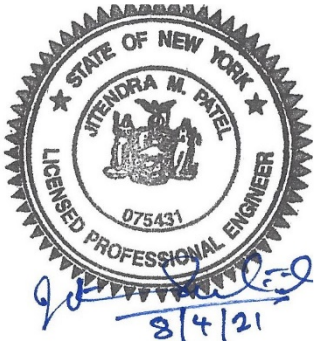
Prepared for:

LOCKHEED MARTIN CORPORATION

Prepared by:

AMEC E & E P.C.
Bayside, NY

August 2021



Stuart Pearson, P.E.
Process Engineer of Record

Jitendra M. Patel, P.E.
Electrical Engineer of Record

PROJECT TABLE OF CONTENTS

-- End of Project Table of Contents --

DOCUMENT 00 01 15

LIST OF DRAWINGS

PART 1 GENERAL

1.1 SUMMARY

This section lists the drawings for the project pursuant to contract.

1.2 CONTRACT DRAWINGS

Contract drawings are as follows:

DRAWING NO.	REVISION NO.	TITLE
G-1		COVER SHEET
C-1		SITE PLAN
C-1		TRAFFIC, STAGIG, AND LAYDOWN PLAN
M-1A		ROOF PIPING ROUTING AND TIE IN LOCATIONS PLAN
M-4N		EXTRACTION POINT AND PIPING DETAILS
M-5S		GLASS BLOCK PENETRATIOAN DETAILS
S-10C		ROOFTOP PIPING AND SUPPORT DETAILS
S-10D		ROOFTOP PIPING SECTIONS
E-1		LEGEND, ABBREVIATIONS, AND GENERAL NOTES
E-2E		SOUTHWEST ELECTRICAL AND INSTRUMENTATION PLAN
E-2F		NORTHWEST ELECTRICAL AND INSTRUMENTATION PLAN
E-6A		ONE LINE DIAGRAM
E-20		CONTROLS/INSTRUMENTATION INTERCONNECT
IC-1		LEGEND, ABBREVIATIONS, AND GENERAL NOTES
IC-2		PIPING AND INSTRUMENTATION PLAN
IC-3		PROCESS FLOW DIAGRAM
IC-7A		PIPING AND INSTRUMENTATION PLAN

1.3 SUPPLEMENTARY DRAWINGS

1.3.1 Reference Drawings

The following reference drawings are intended only to show the original construction. Full-size drawings are available at the bidder's or Contractor's expense.

Unisys Site No. 130045 - SSDS Consolidated Drawings - 03.21.17

-- End of Document --

SECTION 01 11 00

SUMMARY OF WORK

PART 1 GENERAL

1.1 SUBMITTALS

Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Utility Outage Requests

Utility Connection Requests

1.2 WORK COVERED BY CONTRACT DOCUMENTS

1.2.1 Project Description

The work includes the addition of two new extraction points to the existing sub-slab depressurization system (Main SSDS) and incidental related work. Anticipated work include, but is not limited to:

- Excavation and installation of one 4-inch extraction point on the northwest corner of the building exterior.
- Excavation and installation of one 4-inch extraction point on the southwest corner of the building exterior
- Tie-in of the extraction points to the existing Main SSDS as indicated on the Drawings.
- Installation of valving, pressure sensors, flow meters, and actuated valving for each new extraction point as indicated on the Drawings.
- Control and electrical tie-in of new equipment to the existing Main SSDS control system.
- Programming and integration of the extraction points into the Main SSDS PLC control system.
- Site restoration of areas impacted by construction activities.

1.2.2 Location

The work is located at 1111 Marcus Ave., Lake Success, NY.

1.3 CONTRACT DRAWINGS

Contract drawings for this project are listed in Section 00 01 15 LIST OF DRAWINGS of these specifications.

Immediately check furnished drawings and notify the Engineer of any discrepancies.

1.4 WORK SCHEDULING

Normal duty hours for work are listed in Section 01 14 00 WORK RESTRICTIONS of these specifications. Requests for additional work requires written approval from the Engineer and Property Owner 7 days in advance of the proposed work period.

1.5 OCCUPANCY OF PREMISES

Building(s) may be occupied during performance of work under this Contract, however, the majority of the work in or near occupied areas is to be scheduled during off-hours to minimize the disturbance to Northwell operations at the facility.

Before work is started, arrange with the Engineer and Property Owner a sequence of procedure, means of access, space for storage of materials and equipment, and use of approaches, corridors, and stairways.

1.6 EXISTING WORK

Protection of Existing Vegetation, Structures, Equipment, Utilities, and Improvements:

a. Remove or alter existing work in such a manner as to prevent injury or damage to any portions of the existing work which remain.

b. Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as approved by the Engineer. At the completion of operations, existing work must be in a condition equal to or better than that which existed before new work started.

1.7 ON-SITE PERMITS

1.7.1 Utility Outage Requests and Utility Connection Requests

Schedule work to minimize outages. For utility outages and connections required during the execution of work that affects existing systems, (electrical, control, and existing Main SSDS operations),schedule outside the regular working hours or on weekends, as approved by the Engineer and/or Property Owner as applicable. Schedule utility outages and connections to minimize disruptions to the Northwell property and existing Main SSDS system. No additional payment will be provided for utility outages and connections required to be performed outside the regular work hours.

Submit requests for utility outages and connections in writing to the Engineer and Property Owner (as applicable) for approval at least 7 calendar days in advance of the time required. In each request, state the system involved, area involved, approximate duration of outage, and the nature of work involved.

1.8 LOCATION OF UNDERGROUND UTILITIES

Obtain digging permits prior to start of excavation, and comply with Installation requirements for locating and marking underground utilities. Contact local utility locating service a minimum of 48 hours prior to excavating, to mark utilities, and within sufficient time required if work occurs on a Monday or after a Holiday. Verify existing utility locations

indicated on contract drawings, within area of work.

Identify and mark all other utilities not managed and located by the local utility companies. Scan the construction site with Ground Penetrating Radar (GPR), electromagnetic, or sonic equipment, and mark the surface of the ground or paved surface where existing underground utilities are discovered. Verify the elevations of existing piping, utilities, and any type of underground or encased obstruction not indicated, or specified to be removed, that is indicated or discovered during scanning, in locations to be traversed by piping, ducts, and other work to be conducted or installed. Verify elevations before installing new work closer than nearest manhole or other structure at which an adjustment in grade can be made.

1.8.1 Notification Prior to Excavation

Notify the Engineer and Property Owner at least 48 hours prior to starting excavation work.

1.9 MATERIAL AND EQUIPMENT

1.9.1 Delivery Schedule

Notify the Engineer in writing at least 7 calendar days in advance of the date on which the materials and equipment are required.

1.9.2 Delivery Location

Delivery of materials and equipment will be directly to one of the two designated contractor staging areas indicated on the Drawings. Materials and equipment are to be stored at the location(s) indicated on the Drawings according to Section 01 50 00 TEMPORARY CONSTRUCTION FACILITIES AND CONTROLS. High-value equipment and materials may be stored in the existing Main SSDS garage pending approval by the Engineer and Operating personnel.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

-- End of Section --

SECTION 01 14 00

WORK RESTRICTIONS

PART 1 GENERAL

1.1 SUBMITTALS

Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Traffic Control Plan

Security Plan

Site Specific Health and Safety Plan

Transportation of Personnel, Materials, and Equipment

List of Contact Personnel

Employee List

1.2 SPECIAL SCHEDULING REQUIREMENTS

a. The Northwell facility and existing sub-slab depressurization system (Main SSDS) will remain in operation during the entire construction period. The Contractor must conduct his operations so as to cause the least possible interference with normal operations of these activities.

b. Permission to interrupt any activities, roads, or utility service must be requested in writing a minimum of 7 calendar days prior to the desired date of interruption. Written approval of the request from the Engineer and/or Property Owner (as applicable) will be required prior to any interruptions.

c. The work under this contract requires special attention to the scheduling and conduct of the work in connection with existing Northwell facility and existing Main SSDS operations. Identify on the construction schedule each factor which constitutes a potential interruption to operations.

The following conditions apply:

(1) Construction hours will be between 5:00 a.m. and 7:00 p.m. Monday through Friday for work outside of the facility and in unoccupied areas excluding construction activities as defined on the Drawings. Work required in occupied areas (hallways, offices, etc.) and heavy construction activities must be scheduled outside of business hours and require Engineer and Property Owner approval prior to commencement of work. Work within occupied areas will be allowed after normal business hours and between 7:00 a.m. and 7:00 p.m. Saturday and Sunday. Delivery of equipment and materials will alsoonly be allowed during these times.

(2) Construction materials and equipment required for the day's work will be staged at the work location(s) prior to 6:00 a.m or after

6:00 p.m. each day during the Northwell facilities off hours. Movement of materials outside these hours will require written authorization from the Engineer and Property Owner.

1.3 CONTRACTOR ACCESS AND USE OF PREMISES

1.3.1 Activity Regulations

Ensure that Contractor personnel employed on the Activity become familiar with and obey Activity regulations including safety, fire, traffic and security regulations. Keep within the limits of the work and avenues of ingress and egress. To minimize traffic congestion, delivery of materials must be outside of peak traffic hours (6:30 to 8:00 a.m. and 3:30 to 5:00 p.m.) unless otherwise approved by the Engineer and Property Owner. Wear appropriate personal protective equipment (PPE) in designated areas. Do not enter any restricted areas unless required to do so and until cleared for such entry. Mark Contractor equipment for identification.

1.3.1.1 Subcontractors and Personnel Contacts

Provide a list of contact personnel of the Contractor and subcontractors including addresses and telephone numbers for use in the event of an emergency. As changes occur and additional information becomes available, correct and change the information contained in previous lists.

1.3.1.2 Additional Personnel Requirements

All personnel must be trained and competent to perform theh work assigned. The following conditions also apply:

a. All equipment operators (manlifts, etc.) must be certified and follow all OSHA requirements related to operation.

b. All workers must be Hazardous Waste Operations and Emergency Response (HAZWOPER) 40-hour trained according to 40 CFR 1910.120 (e). Additionally, the site supervisor must abe HAZWOPER 8-hour Site Supervisor trained.

1.3.1.2.1 General Construction and Finish Work

General construction and finish work must be performed by U.S. firms. General construction includes construction activities such as building sitework, utilities, foundations, structure, and enclosure or shell, including doors, windows, and faēade work. Finish Work includes construction activities such as insulation, floor, partition, and ceiling systems; cabinet work; conveyor systems; specialties; building furnishings, fixtures, and equipment; and mechanical and electrical services and equipment, including those specialized for fire protection, security, communication, control, energy conservation, safety, comfort, convenience, and similar purposes.

1.3.1.3 Employee List

The Contractor must provide to the Engineer, in writing, the names of employees and subcontractor's employees prior to commencement of work under this contract.

1.3.1.4 No Smoking Policy

Smoking is prohibited within and outside of all buildings on installation. This applies to existing buildings, buildings under construction and buildings under renovation. Discarding tobacco materials other than into designated tobacco receptacles is considered littering and is subject to fines.

1.3.2 Working Hours

Construction hours will be between 5 a.m and 7 p.m. Monday through Friday for work outside of the facility (extraction points and roof) and in unoccupied areas. Work required in occupied areas (hallways, offices, etc.) must be scheduled outside of business hours and between 7 a.m. and 7 p.m. Saturday and Sunday. Delivery of equipment and materials will also only be allowed during these times.

1.3.3 Work Outside Regular Hours

Work outside regular working hours requires Engineer and/or Property Owner approval. Work performed outside regular working hours will include extraction point excavation, staging of materials on the roof or inside the building required for construction and any work performed in occupied areas. Make application 7 calendar days prior to such work to allow arrangements to be made by the Engineer for inspecting the work in progress, giving the specific dates, hours, location, and type of work to be performed. Based on the justification provided, the Engineer may approve work outside regular hours. During periods of darkness, the different parts of the work must be lighted in a manner approved by the Engineer.

1.3.4 Exclusionary Period

No work may be performed during normal business hour of occupied spaces, inclusive, without prior written approval of the Engineer and/or Property Owner as applicable.

1.3.5 Occupied and Existing Building

The Contractor shall be working in an existing building which is occupied. Do not enter any occupied areas of the building without prior approval of the Engineer and Property Owner.

The Contractor shall not be allowed to use the existing catwalk structure o the roof for construction purposes.

1.3.6 Utility Cutovers and Interruptions

a. Make utility cutovers and interruptions after normal working hours or on Saturdays and Sundays. Conform to procedures required in paragraph WORK OUTSIDE REGULAR HOURS.

b. Ensure that new utility lines are complete, except for the connection, before interrupting existing service.

c. Interruption to water, sanitary sewer, storm sewer, telephone service, electric service, air conditioning, heating, fire alarm, and existing Main SSDS operations are considered utility cutovers pursuant to the paragraph WORK OUTSIDE REGULAR HOURS. This time limit includes time

for deactivation and reactivation.

1.4 SITE SPECIFIC HEALTH AND SAFETY PLAN

The Contractor shall provide a Site Specific Health and Safety Plan for the project that conforms to the requirements of 40 CFR 1910.120. The plan must also include procedures, contacts and information related to emergency response specific to the site.

1.5 COVID PRECAUTIONS

All workers will following the current New York Department of Health guidelines for COVID precautions at the time of the performance of the work. This includes any restrictions related to travel to the site, masking, and use of sanitizers.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

SECTION 01 32 01.00 10

PROJECT SCHEDULE

PART 1 GENERAL

1.1 SUBMITTALS

Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Initial Project Schedule

Periodic Schedule Update

1.2 PROJECT SCHEDULER QUALIFICATIONS

Designate an authorized representative to be responsible for the preparation of the schedule and all required updating and production of reports. The authorized representative must have a minimum of 2-years experience scheduling construction projects similar in size and nature to this project.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

Prepare for approval a Project Schedule, as specified herein. Show in the schedule the proposed sequence to perform the work and dates contemplated for starting and completing all schedule activities. The scheduling of the entire project is required.The scheduling of construction is the responsibility of the Contractor.Contractor management personnel must actively participate in its development. Subcontractors and suppliers working on the project must also contribute in developing and maintaining an accurate Project Schedule. Provide a schedule that is a forward planning as well as a project monitoring tool.

3.2 PROJECT SCHEDULE DETAILED REQUIREMENTS

3.2.1 Level of Detail Required

Develop the Project Schedule to the appropriate level of detail to address major milestones and to allow for satisfactory project planning and execution. Failure to develop the Project Schedule to an appropriate level of detail will result in its disapproval. The Engineer will consider, but is not limited to, the following characteristics and requirements to determine appropriate level of detail:

3.2.2 Activity Durations

Reasonable activity durations are those that allow the progress

of ongoing activities to be accurately determined between update periods.

3.2.3 Procurement Activities

Include activities associated with the critical submittals and their approvals, procurement, fabrication, and delivery of long-lead materials, equipment, fabricated assemblies, and supplies. Long lead procurement activities are those with an anticipated procurement sequence of over 90 calendar days.

3.2.4 Mandatory Tasks

Include the following activities/tasks in the initial project schedule and all updates.

a. Submission, review and acceptance of SD-01 Preconstruction Submittals (individual activity for each).

b. Submission, review and acceptance of design packages.

c. Submission of mechanical/electrical/information systems layout drawings.

d. Long procurement activities

e. Submission and approval of O & M manuals.

f. Submission and approval of record drawings.

g. Controls testing.

h. Performance Verification testing.

i. Contractor's pre-final inspection.

j. Correction of punch list from Contractor's pre-final inspection.

k. Engineer's pre-final inspection.

l. Correction of punch list from Engineer's pre-final inspection.

m. Final inspection.

3.3 PROJECT SCHEDULE SUBMISSIONS

Provide the submissions as described below. The data CD/DVD, reports, and network diagrams required for each submission are contained in paragraph SUBMISSION REQUIREMENTS. If the Contractor fails or refuses to furnish the information and schedule updates as set forth herein, then the Contractor will be deemed not to have provided an estimate upon which a progress payment can be made.

3.3.1 Initial Project Schedule Submission

Submit the Initial Project Schedule for approval by the Engineer prior to commencement of work. The schedule must demonstrate a reasonable and realistic sequence of activities which represent all work through the entire contract performance period. Include in the schedule he entire construction effort from construction start and completion milestones, and

detailed construction activities through construction completion.

3.3.2 Periodic Schedule Updates

Update the Project Schedule on a regular basis, monthly at a minimum. Provide a draft Periodic Schedule Update for review at the schedule update meetings as prescribed in the paragraph PERIODIC SCHEDULE UPDATE MEETINGS. These updates will enable the Engineer to assess Contractor's progress.

3.4 PERIODIC SCHEDULE UPDATE

3.4.1 Periodic Schedule Update Meetings

Conduct periodic schedule update meetings for the purpose of reviewing the proposed Periodic Schedule Update, Narrative Report, Schedule Reports, and progress payment. Conduct meetings at least monthly within five days of the proposed schedule data date. The meeting is a working interactive exchange which allows the Engineer and Contractor the opportunity to review the updated schedule on a real time and interactive basis. The Contractor's Project Manager and scheduler must attend the meeting with the authorized representative of the Engineer.
Superintendents, foremen and major subcontractors must attend the meeting as required to discuss the project schedule and work.

3.4.2 Update Submission Following Progress Meeting

Submit the complete Periodic Schedule Update of the Project Schedule containing all approved progress, revisions, and adjustments, pursuant to paragraph SUBMISSION REQUIREMENTS not later than 4 work days after the periodic schedule update meeting.

3.5 WEEKLY PROGRESS MEETINGS

Conduct a weekly meeting with the Engineer (or as otherwise mutually agreed to) between the meetings described in paragraph entitled PERIODIC SCHEDULE UPDATE MEETINGS for the purpose of jointly reviewing the actual progress of the project as compared to the as planned progress and to review planned activities for the upcoming two weeks. Use the current approved schedule update for the purposes of this meeting and for the production and review of reports. At the weekly progress meeting, address the status of RFIs, RFPs and Submittals.

3.6 REQUESTS FOR TIME EXTENSIONS

Provide a justification of delay to the Engineer in accordance with the contract provisions and clauses for approval within 10 days of a delay occurring.

3.6.1 Justification of Delay

Provide a description of the event(s) that caused the delay and/or impact to the work. As part of the description, identify all schedule activities impacted.

-- End of Section --

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

1.1.1 Submittal Information

The Engineer may request submittals in addition to those specified when deemed necessary to adequately describe the work covered in the respective sections. Each submittal is to be complete and in sufficient detail to allow ready determination of compliance with contract requirements.

Units of weights and measures used on all submittals are to be the same as those used in the contract drawings.

1.1.2 Project Type

The Contractor's Quality Control (CQC) System Manager are to check and approve all items before submittal and stamp, sign, and date indicating action taken. Proposed deviations from the contract requirements are to be clearly identified. Include within submittals items such as: Contractor's, manufacturer's, or fabricator's drawings; descriptive literature including (but not limited to) catalog cuts, diagrams, operating charts or curves; test reports; test cylinders; samples; O&M manuals (including parts list); certifications; warranties; and other such required submittals.

1.1.3 Submission of Submittals

Schedule and provide submittals requiring Engineer approval before acquiring the material or equipment covered thereby. Pick up and dispose of samples not incorporated into the work in accordance with manufacturer's Safety Data Sheets (SDS) and in compliance with existing laws and regulations.

1.2 DEFINITIONS

1.2.1 Submittal Descriptions (SD)

Submittal requirements are specified in the technical sections. Examples and descriptions of submittals identified by the Submittal Description (SD) numbers and titles follow:

SD-01 Preconstruction Submittals

Submittals that are required prior to or commencing with the start of work on site. Submittals that are required prior to or at the start of construction (work) or the next major phase of the construction on a multiphase contract.

Preconstruction Submittals include schedules and a tabular list of locations, features, and other pertinent information regarding products, materials, equipment, or components to be used in the work.

List Of Proposed Products

Submittal Register

SD-02 Shop Drawings

Drawings, diagrams and schedules specifically prepared to illustrate some portion of the work.

Diagrams and instructions from a manufacturer or fabricator for use in producing the product and as aids to the Contractor for integrating the product or system into the project.

Drawings prepared by or for the Contractor to show how multiple systems and interdisciplinary work will be coordinated.

SD-03 Product Data

Catalog cuts, illustrations, schedules, diagrams, performance charts, instructions and brochures illustrating size, physical appearance and other characteristics of materials, systems or equipment for some portion of the work.

Samples of warranty language when the contract requires extended product warranties.

SD-06 Test Reports

Report that includes finding of a test made at the job site on portion of work during or after installation.

Final acceptance test and operational test procedure

SD-07 Certificates

Statements printed on the manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that the product, system, or material meets specification requirements. Must be dated after award of project contract and clearly name the project.

SD-08 Manufacturer's Instructions

Preprinted material describing installation of a product, system or material, including special notices and (SDS)concerning impedances, hazards and safety precautions.

SD-10 Operation and Maintenance Data

Data provided by the manufacturer, or the system provider, including manufacturer's help and product line documentation, Operation and Maintenance Manuals, drawings and spare parts lists necessary to maintain and install equipment and for operating and maintenance use byfacility personnel.

Data required by operating and maintenance personnel for the safe and efficient operation, maintenance and repair of the item.

Data incorporated in an operations and maintenance manual or control system.

SD-11 Closeout Submittals

Special requirements necessary to properly close out a construction contract. For example, Record Drawings and as-built drawings. Also, submittal requirements necessary to properly close out a major phase of construction on a multi-phase contract.

1.2.2 Work

As used in this section, on-site and off-site construction required by contract documents, including labor necessary to produce submittals, construction, materials, products, equipment, and systems incorporated or to be incorporated in such construction.

1.3 SUBMITTALS

Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Submittal Register

1.4 SUBMITTAL CLASSIFICATION

1.4.1 Engineer Approved

Engineer approval is required for extensions of design, critical materials, variations, equipment whose compatibility with the entire system must be checked, and other items as designated by the Engineer.

Engineer approval is required for any variations from the Solicitation or the Accepted Proposal and for other items as designated by the Engineer.

1.4.2 Submittal Classifications

1.4.2.1 Substitutions

Unless prohibited or otherwise provided for elsewhere in the contract, where the Accepted Proposal named products, systems, materials or equipment by manufacturer, brand name, model number, or other specific identification, and the Contractor desires to substitute a manufacturer or model after award, submit a requested substitution for Engineer concurrence. Include substantiation, through identifying information, that the substitute meets the contract requirements and that it is equal in function, performance, quality, and salient features to that in the accepted contract proposal. If the contract otherwise prohibits substitutions of equal named products, systems, materials or equipment by manufacturer, brand name, model number or other specific identification, the request is considered a "variation" to the contract.

1.5 FORWARDING SUBMITTALS REQUIRING ENGINEER APPROVAL

As soon as practicable after award of contract, and before procurement or fabrication, forward to the Engineer, submittals required in the technical sections of this specification, including shop drawings, product data and samples.

1.5.1 O&M Data

Submit Operation and Maintenance data (SD-10) specified for a given item to the Engineer for approval prior to procurement.

1.6 PREPARATION

1.6.1 Transmittal Form

Transmit each submittal to the office of the Engineer using the transmittal form prescribed by the Engineer. Include all information prescribed by the transmittal form and required in paragraph IDENTIFYING SUBMITTALS.

1.6.2 Identifying Submittals

The Contractor's approving authority must prepare, review and stamp submittals, including those provided by a subcontractor, before submittal to the Engineer.

Mark each copy of each submittal identically, with the following:

a. Project title and location

b. Construction contract number

c. Dates of the drawings and revisions

d. Name, address, and telephone number of Subcontractor, supplier, manufacturer, and any other Subcontractor associated with the submittal.

e. Section number of the specification by which submittal is required

f. Submittal description (SD) number of each component of submittal

g. For a resubmission, add alphabetic suffix on submittal description, for example, submittal 18 would become 18A, to indicate resubmission

h. Product identification and location in project.

1.6.3 Submittal Format

1.6.3.1 Format of SD-01 Preconstruction Submittals

When the submittal includes a document that is to be used in the project, or is to become part of the project record, other than as a submittal, do not apply the Contractor's approval stamp to the document itself, but to a separate sheet accompanying the document.

Provide data in the unit of measure used in the contract documents.

1.6.3.2 Format for SD-02 Shop Drawings

Prepare drawings to accurate size, with scale indicated, unless another form is required. Ensure drawings are suitable for reproduction and of a quality to produce clear, distinct lines and letters, with dark lines on a white background.

a. Include the nameplate data, size, and capacity on drawings. Also include applicable federal, military, industry, and technical society publication references.

b. Dimension drawings, except diagrams and schematic drawings. Prepare drawings demonstrating interface with other trades to scale. Use the same unit of measure for shop drawings as indicated on the contract drawings. Identify materials and products for work shown.

Submit an electronic copy of drawings in PDF format.

1.6.3.3 Format of SD-03 Product Data

Indicate, by prominent notation, each product that is being submitted; indicate the specification section number and paragraph number to which it pertains (if applicable). Submit an electronic copy in PDF format.

1.6.3.3.1 Product Information

Supplement product data with material prepared for the project to satisfy the submittal requirements where product data does not exist. Submit an electronic copy in PFDF format.

1.6.3.3.2 Standards

Where equipment or materials are specified to conform to industry or technical-society reference standards of such organizations as the American National Standards Institute (ANSI), ASTM International (ASTM), National Electrical Manufacturer's Association (NEMA), Underwriters Laboratories (UL), or Association of Edison Illuminating Companies (AEIC), submit proof of such compliance.

1.6.3.3.3 Data Submission

Collect required data submittals for each specific material, product, unit of work, or system into a single submittal that is marked for choices, options, and portions applicable to the submittal. Mark each copy of the product data identically. Submt an electronic copy in PDF format.

Submit the manufacturer's instructions before installation.

1.6.4 Electronic File Format

Provide submittals in electronic format. Compile the submittal file as a single, complete document, to include the Transmittal Form described within. Name the electronic submittal file specifically according to its contents, and coordinate the file naming convention with the Engineer. Electronic files must be of sufficient quality that all information is legible. Use PDF as the electronic format, unless otherwise specified or directed by the Engineer. If documents are scanned, optical character resolution (OCR) routines are required.

E-mail electronic submittal documents smaller than 10MB to an e-mail address as directed by the Engineer. Provide electronic documents over 10 MB on an optical disc or through an electronic file-sharing system.

1.7 PROJECT SUBMITTAL REGISTER AND DATABASE

The Engineer will provide the initial submittal register in electronic format.

1.7.1 Submittal Management

Prepare and maintain a submittal register, as the work progresses.

The Contractor is to track all submittals by maintaining a complete list, including dates on which submittals are received by and returned by the Engineer.

1.8 SCHEDULING

Schedule and submit concurrently product data and shop drawings covering component items forming a system or items that are interrelated.

Coordinate scheduling, sequencing, preparing, and processing of submittals with performance of work so that work will not be delayed by submittal processing. The Contractor is responsible for additional time required for Engineer reviews resulting from required resubmittals. The review period for each resubmittal is the same as for the initial submittal.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

SECTION 01 50 00

TEMPORARY CONSTRUCTION FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(2020; ERTA 20-1 2020; ERTA 20-2 2020; TIA 20-1; TIA 20-2; TIA 20-3; TIA 20-4) National Electrical Code
NFPA 241	(2019) Standard for Safeguarding Construction, Alteration, and Demolition Operations

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2014) Safety and Health Requirements Manual

U.S. FEDERAL HIGHWAY ADMINISTRATION (FHWA)

MUTCD	(2009; Rev 2012) Manual on Uniform Traffic Control Devices

1.2 SUBMITTALS

Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Construction Site Plan Updates

Traffic Control Plan Updates

1.3 CONSTRUCTION SITE PLAN

Prior to the start of work, submit for Engineer and Property Owner approval any proposed changes to the Construction Site Plan presented in the Drawings (including layouts and details, equipment and material storage area (onsite and offsite), and access and haul routes, avenues of ingress/egress to the fenced area and details of the fence installation. Indicate if the use of a supplemental or other staging area is desired.

PART 2 PRODUCTS

2.1 TEMPORARY SIGNAGE

2.1.1 Warning Signs

Post temporary signs, tags, and labels to give workers and the public adequate warning and caution of construction hazards according to the EM 385-1-1 Section 04. Attach signs to the perimeter fencing every 150 feet warning the public of the presence of construction hazards. Signs must require unauthorized persons to keep out of the construction site. Correct the data required by safety signs daily. Post signs at all points of entry designating the construction site as a hard hat area.

2.2 TEMPORARY TRAFFIC CONTROL

2.2.1 Barricades

Erect and maintain temporary barricades to limit public access to hazardous areas. Barricades are required whenever safe public access to paved areas such as roads, parking areas or sidewalks is prevented by construction activities or as otherwise necessary to ensure the safety of both pedestrian and vehicular traffic. Securely place barricades clearly visible with adequate illumination to provide sufficient visual warning of the hazard during both day and night.

2.3 FENCING

Provide fencing along the construction site and at all open excavations to control access by unauthorized personnel. Safety fencing must be highly visible to be seen by pedestrians and vehicular traffic. All fencing must meet the requirements of EM 385-1-1. Remove the fence upon completion and acceptance of the work.

To block public view of the construction, enclose the project work area and Contractor lay-down area with a 8 ft high chain link fence and gates with brown, UV light resistant, plastic fabric mesh netting (similar to tennis court or other screening).

2.3.1 Polyethylene Mesh Safety Fencing

Temporary safety fencing must be a high visibility orange colored, high-density polyethylene grid, a minimum of 48 inches high and maximum mesh size of 2 inches. Fencing must extend from the grade to a minimum of 48 inches above the grade and be tightly secured to T-posts spaced as necessary to maintain a rigid and taut fence. Fencing must remain rigid and taut with a minimum of 200 pounds of force exerted on it from any direction with less than 4 inches of deflection.

2.3.2 Chain Link Panel Fencing

Temporary panel fencing must be galvanized steel chain link panels 6 feet high. Multiple fencing panels may be linked together at the bases to form long spans as needed. Each panel base must be weighted down using sand bags or other suitable materials in order for the fencing to withstand anticipated winds while remaining upright. Fencing must remain rigid and taut with a minimum of 200 pounds of force exerted on it from any direction with less than 4 inches of deflection.

2.4 TEMPORARY WIRING

Provide temporary wiring in accordance with EM 385-1-1 Section 11, NFPA 241 and NFPA 70. Include monthly inspection and testing of all equipment and apparatus.

PART 3 EXECUTION

3.1 EMPLOYEE PARKING

Construction Contract employees must park privately owned vehicles around the Main SSDS facility as directed by the Engineer and Property Owner. Employee parking must not interfere with existing and established parking requirements of the facility.

3.2 AVAILABILITY AND USE OF UTILITY SERVICES

3.2.1 Temporary Utilities

Provide temporary utilities required for construction if required where access to existing facility utilities is not possible. Materials may be new or used, must be adequate for the required usage, not create unsafe conditions, and not violate applicable codes and standards.

3.2.2 Sanitation

Workers will be allowed to use the sanitation facilities at the Main SSDS facility. If required, the contractor can provide field-type sanitary facilities in accordance with EM 385-1-1 Section 02 pending approval of the Engineer and Property Owner. Locate the facilities behind the construction fence or out of the public view. Clean units and empty wastes at least once a week.

3.2.3 Fire Protection

Provide temporary fire protection equipment for the protection of personnel and property during construction including all activities conducted on the roof of the facility. Remove debris and flammable materials daily to minimize potential hazards.

3.3 TRAFFIC PROVISIONS

3.3.1 Maintenance of Traffic

a. Conduct operations in a manner that will not close a thoroughfare or interfere with traffic on railways or highways except with written permission of the Engineer and Property Owner at least 15 calendar days prior to the proposed modification date, and provide a Traffic Control Plan for approval detailing the proposed controls to traffic movement for approval. The plan must be in accordance with State and local regulations and the MUTCD, Part VI. Contractor may move oversized and slow-moving vehicles to the worksite provided requirements of the highway authority have been met.

b. Conduct work so as to minimize obstruction of traffic, and maintain traffic on at least half of the roadway width at all times. Obtain approval from the Engineer and Property Owner prior to starting any activity that will obstruct traffic.

c. Provide, erect, and maintain, at Contractor's expense, lights,

barriers, signals, passageways, detours, and other items, that may be required.

d. Provide cones, signs, barricades, lights, or other traffic control devices and personnel required to control traffic.

3.3.2 Protection of Traffic

Maintain and protect traffic on all affected roads during the construction period except as otherwise specifically directed by the Engineer and Property Owner.Measures for the protection and diversion of traffic, including the provision of watchmen and flagmen, erection of barricades, placing of lights around and in front of equipment the work, and the erection and maintenance of adequate warning, danger, and direction signs, will be as required by the State and local authorities having jurisdiction. Brightly-colored vests are required for all personnel working in roadways. Protect the traveling public from damage to person and property. Minimize the interference with public traffic on roads selected for hauling material to and from the site. Investigate the adequacy of existing roads and their allowable load limit. Contractor is responsible for the repair of damage to roads caused by construction operations.

3.3.3 Rush Hour Restrictions

Do not interfere with the peak traffic flows preceding and during normal operations without notification to and approval by the Engineer and Property Owner.

3.4 CONTRACTOR'S TEMPORARY FACILITIES

3.4.1 Storage Area

Construct a temporary 6 foot high chain link panel fencing around trailers and materials. Include plastic strip inserts, colored green or brown, so that visibility through the fence is obstructed. Do not place or store trailers, materials, or equipment outside the fenced area unless such trailers, materials, or equipment are assigned a separate and distinct storage area by the Engineer away from the vicinity of the construction site but within the installation boundaries. Trailers (if required), equipment, or materials must not be open to public view with the exception of those items which are in support of ongoing work on the current day. Do not stockpile materials outside the fence in preparation for the next day's work. Park mobile equipment, such as tractors, wheeled lifting equipment, cranes, trucks, and like equipment within the fenced area, in one of the designated Contractor staging areas (see Drawings) or at the Main SSDS Facility at the end of each work day.

Keep fencing in a state of good repair and proper alignment. Mow and maintain grass located within the boundaries of the construction site for the duration of the project. Grass and vegetation along fences, buildings, under trailers, and in areas not accessible to mowers must be edged or trimmed neatly.

3.4.2 Supplemental Storage Area

Upon request, and pending availability, the Engineer will designate another or supplemental area for the use and storage of trailers,

equipment, and materials. This area may not be in close proximity of the construction site but will be within the installation boundaries. Maintain the area in a clean and orderly fashion and secured if needed to protect supplies and equipment.

3.4.3 Safety Systems

Protect the integrity of all installed safety systems or personnel safety devices. Obtain prior approval from the Engineer and Property Owner if entrance into systems serving safety devices is required. If it is temporarily necessary to remove or disable personnel safety devices in order to accomplish Contract requirements, provide alternative means of protection prior to removing or disabling any permanently installed safety devices or equipment and obtain approval from the Engineer.

3.4.4 Special Storage Requirements - High-Value Items

The Contractor will be allowed to store certain high-value equipment and materials in the Main SSDS Garage after approval by the Engineer. Storage of materials must not interfere with the operation of the Main SSDS system.

3.4.5 Weather Protection of Temporary Facilities and Stored Materials

Take necessary precautions to ensure that roof openings and other critical openings in the building are monitored carefully. Take immediate actions required to seal off such openings when rain or other detrimental weather is imminent, and at the end of each workday. Ensure that the openings are completely sealed off to protect materials and equipment in the building from damage.

3.4.5.1 Building, Site and Worker Storm Protection

When a warning of gale force winds is issued, take precautions to minimize danger to persons, and protect the work and nearby property. Precautions must include, but are not limited to, closing openings; removing loose materials, tools and equipment from exposed locations; and removing or securing scaffolding and other temporary work. Close openings in the work when storms of lesser intensity pose a threat to the work or any nearby property. Rally point for all workers shall be at the Main SSDS facility in the event of severe weather.

3.5 TEMPORARY PROJECT SAFETY FENCING

As soon as practicable, but not later than 15 days after the date established for commencement of work, furnish and erect temporary project safety fencing around area(s) to be excavated as part of the project. Maintain the safety fencing during the life of the Contract and, upon completion and acceptance of the work, remove from the work site.

3.6 CLEANUP

Remove construction debris, waste materials, packaging material and the like from the work site daily. Any dirt or mud which is tracked onto paved or surfaced roadways must be cleaned away. Store all salvageable materials resulting from demolition activities within the fenced area described above or at the supplemental storage area. Neatly stack stored materials not in trailers, whether new or salvaged.

3.7 RESTORATION OF STORAGE AREA

Upon completion of the project remove the signs, barricades, haul roads, and all other temporary products from the site. After removal of trailers, materials, and equipment from within the fenced area, remove the fence. Restore areas used during the performance of the Contract to the original or better condition. Remove gravel used to traverse grassed areas and restore the area to its original condition, including top soil (seeding as necessary), curbing and irrigation systems.

-- End of Section --

SECTION 02 61 13

EXCAVATION AND HANDLING OF CONTAMINATED MATERIAL

PART 1 GENERAL

The soil to be excavated is not known or expected to be contaminated but excavated material will be handled as potentially contaminated and analyzed prior to disposal.

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1926	Safety and Health Regulations for Construction

1.2 DESCRIPTION OF WORK

The work consists of excavation and temporary storage of approximately 3 cubic yards of potentially contaminated material at each extraction point location (2). Approximate locations of material are shown on the drawings. Submit a Work Plan as specified below. Notify the Engineer within 24 hours, and before excavation, if contaminated material is discovered that has not been previously identified or if other discrepancies between data provided and actual field conditions are discovered. Backfill material is not available onsite. Ground water is not anticipated to be encountered during excavations. Required sampling and chemical analysis shall be conducted by the Engineer.

1.2.1 Scheduling

Notify the Engineer 7 calendar days prior to the start of excavation of contaminated material. The Contractor shall be responsible for contacting regulatory agencies in accordance with the applicable reporting requirements.

1.2.2 Work Plan

Submit a Work Plan within 30 calendar days after notice to proceed. No work at the site, with the exception of site inspections and surveys, shall be performed until the Work Plan is approved. No adjustment for time or money will be made if resubmittals of the Work Plan are required due to deficiencies in the plan. At a minimum, the Work Plan shall include:

a. Schedule of activities.

b. Method of excavation and equipment to be used.

c. Shoring or side-wall slopes proposed (if required).

d. Storage methods and locations for liquid and solid contaminated

material.

e. Borrow sources and haul routes.

f. Decontamination procedures.

g. Spill contingency plan.

h. Waste Management Plan

1.2.3 Other Submittal Requirements

Submit separate cross-sections of each area before and after excavation and after backfilling, test results, and an electronic copy of the Closure Report within 14 calendar days of work completion at the site.

1.3 SUBMITTALS

Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Work Plan

SD-06 Test Reports

Construction Completion Report

1.4 REGULATORY REQUIREMENTS

1.4.1 Radiation Monitoring

Radiation monitoring will be conducted by the Engineer during all excavation activities. The Contractor must notify the Engineer 7 days in advance of any excavation work.

1.4.2 Air Emissions

Air emissions shall be monitored by the Engineer and controlled by the Contractor if required.

PART 2 PRODUCTS

2.1 BACKFILL

Backfill material shall be obtained from offsite sources approved by the Engineer and New York State Department of Environmental Conservation (NYSDEC). Backfill shall be free from roots and other organic matter, trash, debris, snow, ice or frozen materials. A minimum of one set of classification tests shall be performed per borrow source. Testing shall include:

a. PFAS Compounds.

b. Metals: Almuinum, Antimonry, Arsenic, Barium, Beryilium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Vanadium, Zinc, Mercury.

c. VOCs - volatile organic compounds.

d. Dioxane.

e. Percent Moisture.

f. Percent Solids.

Do not use material for backfill until borrow source chemical and physical test results have been approved by the Engineer.

PART 3 EXECUTION

3.1 EXISTING STRUCTURES AND UTILITIES

No excavation shall be performed until site utilities have been field located. Take the necessary precautions to ensure no damage occurs to existing structures and utilities. Damage to existing structures and utilities resulting from the Contractor's operations shall be repaired at no additional cost to the Engineer. Utilities encountered that were not previously shown or otherwise located shall not be disturbed without approval from the Engineer.

3.2 CLEARING

Clearing shall be performed to the limits required for the performance of the work and be kept at a minimum.

3.3 POTENTIALLY CONTAMINATED MATERIAL REMOVAL

3.3.1 Excavation

Areas of potential contamination shall be excavated to the depth and extent shown on the drawings and not more than one ft beyond the depth and extent shown on the drawings unless directed by the Engineer. Excavation shall be performed in a manner that will limit spills and the potential for contaminated material to be mixed with uncontaminated material. An excavation log describing visible signs of contamination encountered shall be maintained for each area of excavation.

All excavated material will require characterization prior to off-site disposal by the Contractor. Off-site disposal facilities will require Lockheed Martin and NYSDEC approval prior to material shipment.

3.3.2 Shoring

If workers must enter the excavation, it shall be evaluated, shored, sloped or braced as required by 29 CFR 1926 section 650 for performance of the work.

3.3.3 Dewatering

Surface water shall be diverted to prevent entry into the excavation.

3.4 CONFIRMATION SAMPLING AND ANALYSIS

The Engineer shall be present to inspect the removal of contaminated material from each site. After all material has been removed, the excavation shall be examined for evidence of contamination. After all material is removed, confirmation samples shall be collected and analyzed

by the Engineer. Samples will be analyzed for the following to determine disposal requirements:

a. Solid 8270D TCL BNAs
b. Solid 8082A PCBs
c. Solid 8260C TCLP VOCs
d. Solid 1311 TCLP Volatile Extraction
e. olid 8270D TCLP Semivolatile Organic Compounds
f. Solid 6010D TCLP Metals
g. Solid 1311 TCLP Extraction
h. Solid 7470A TCLP Mercury
I. Solid 901.1 NORM Target List + TICs
j. Solid A-01-R isotopic Thorium and Uranium

3.5 MATERIAL STORAGE

Material shall be placed in temporary storage immediately after excavation at an on-site location to be identified by the Engineer. Storage can be either of the methods described below after approval by the Engineer.

3.5.1 Stockpiles

Stockpiles shall be constructed to isolate stored material from the environment. Stockpiles shall be constructed to include:

a. A chemically resistant geomembrane liner free of holes and other damage. Liner shall be 20 mil (minimum) HDPE.

b. The cover material shall be 6 mil (minimum) HDPE and extended over the berms and anchored orballasted to prevent it from being removed or damaged by wind.

3.5.2 Roll-Off Units

Roll-off units used to temporarily store contaminated material shall be water tight. A cover shall be placed over the units to prevent precipitation from contacting the stored material.

3.5.3 Drums

Drums used to temporarily store contaminated material shall be water-tight. A cover shall be placed over the units to prevent precipitation from contacting the stored material.

3.5.4 Liquid Storage

Liquid collected from excavations and stockpiles shall be temporarily stored in 55 gallon barrels. Liquid storage containers shall be water-tight.

3.6 DISPOSAL

A waste disposal plan will be submitted to NYSDEC for approval based on characterization results. Excavated material removed from the Site will be transported and disposed off-site in a permitted facility in accordance with all local, state, and federal regulations. Tickets and copies of the bill of landing will be provided to the Engineer within 24 hours of shipment. All waste streams from the site will be shipped under a bill of landing regardless of material or type. The Engineer will maintain all waste transportation and disposal records to be included in the construction completion report.

3.6.1 Shipment

No vehicle will be allowed to leave the site unless it is clean and free of loose dirt and soil material on tailgates, sideboards, wheel axles, and tires to prevent foreign object debris from being released onto local or state highways. No container or waste vehicle will be allowed to leave the site unless covered to prevent blowing and or material drops off the load.

3.7 CONSTRUCTION COMPLETION REPORT

Submit a Construction Completion Report within 14 calendar days of completing work at the site. The report shall be prepared in accordance with NYSDED's Technical Guidance for Site Investigation and Remediation (DER-10).

-- End of Section --

SECTION 02 62 16.13 10

OPERATION, MAINTENANCE, AND PROCESS MONITORING FOR SOIL SUB-SLAB DEPRESSURIZATION SYSTEM (MAIN SSDS) START-UP

PART 1 GENERAL

1.1 ADMINISTRATIVE REQUIREMENTS

1.1.1 Assistance in Preparing O & M Manuals

Provide assistance to the team tasked to prepare the Draft and Final O & M Manuals. Include the following assistance: provide equipment manufacture's literature, as requested and demonstrate operation, maintenance, and monitoring protocols.

1.1.2 Sequencing and Scheduling

Do not initiate the first period of operation of the new extraction points until after all test and inspection reports have been submitted and approved. Notify the Engineer not less than 7 calendar days prior to initiating the first period of operation.

1.2 SUBMITTALS

Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Start-Up and Testing Plan

SD-06 Test Reports

Completion Testing Report

SD-10 Operation and Maintenance Data

Construction Completion Report

Manufacturer's Operation and Maintenance Manuals

1.3 QUALITY ASSURANCE

Contractor will coordinate testing with the Engineer and current Main SSDS System Operators. Testing will be considered complete after satisfactory operation as determined by the Engineer and current SDS Operators.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 APPLICATION

3.1.1 Main SSDS System Operation

Submit a Start-Up and Testing Plan for Engineer approval. Allow a period of not less than 14 calendar days in the schedule for Engineer review. In the plan, include an outline of the parameters to be monitored to assure proper operation including operation and testing of all valves and sensors. The period of operation begins after approval of the Start-Up and Testing Plan and receipt of written approval from the Engineer.

3.1.1.1 Period of Operation

The two new extraction points will be operated and monitored according to the Start-Up and Testing Work Plan for a period of 30 calendar days by Main SSDS operating personnel. Do not include time required to complete commissioning and demonstration in the period of operation.

The Contractor will be on-call and make personnel available to correct any deficiencies and/or operational issues identified during this period by the Main SSDS operating personnel.

3.1.1.2 Hours of Operation and Reliability

Unless otherwise directed by the Engineer, keep the Main SSDS system in operation 24 hours per day during the test period. Reliability is the percent of time that the system is on, and minimum airflow rates are being maintained. Keep the Operations Log at the facility, and available for inspection.

3.1.1.3 Operational Airflow Rates

For the extraction points to be considered in operation, ensure air is flowing from the wells designated in Table 1 at the flow rates shown in Table 1.

TABLE 1 - AIRFLOW RATES

WELL IDENTIFICATION	TARGET AIRFLOW RATE	TARGET VACUUM (I.W.C.)
EP-A1	100 CFM	50
EP-Q1	100 CFM	50

3.1.1.4 Adjustments to Mode of Operation

Obtain written approval from the Engineer before implementing any changes to the mode of operation.

3.2 QUALITY CONTROL

3.2.1 Completion Testing

a. Submit a Completion Testing Report not more than 30 calendar days after finishing Completion Testing. Allow a period of not less than 14

calendar days in the schedule for Engineer review. Organize results of testing according to category, and shown chronologically within each category. Ensure the report is signed and dated by the Contractor's Quality Control representative.

3.3 CLOSEOUT ACTIVITIES

3.3.1 Training

Provide a minimum of 4 hours of training to the Main SSDS Operators prior to completion of the contract. Scheduling of training will be subject to approval by the Engineer. In the Training sessions, include: demonstrating the use of each new piece of equipment; demonstrating the use all interlocks and system controls; demonstrating maintenance procedures; demonstrating process monitoring requirements and sampling procedures during a scheduled monitoring event; providing written inventory and showing the locations of materials and spare parts that will be left on-site.

3.3.2 Construction Completion Report

Incorporate OM&M start-up data into Construction Completion Report and submit within 30 calendar days after completing work at the site. The report shall be prepared in accordance with NYSDEC's Technical Guidance for Site Investigation and Remediation (DER-10). Allow a period of not less than 14 calendar days in the schedule for Engineer review. This report is in addition to Operation and Maintenance manuals and as-built drawing requirements specified elsewhere.

-- End of Section --

SECTION 23 05 15

COMMON PIPING MATERIALS

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

AISC 325	(2017) Steel Construction Manual

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

ASME B16.1	(2020) Gray Iron Pipe Flanges and Flanged Fittings Classes 25, 125, and 250
ASME B16.5	(2017) Pipe Flanges and Flanged Fittings NPS 1/2 Through NPS 24 Metric/Inch Standard
ASME B31.3	(2016) Process Piping
ASME B40.100	(2013) Pressure Gauges and Gauge Attachments

ASTM INTERNATIONAL (ASTM)

ASTM A53/A53M	(2020) Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
ASTM A126	(2004; R 2019) Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings
ASTM A307	(2014; E 2017) Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength
ASTM A563	(2015) Standard Specification for Carbon and Alloy Steel Nuts
ASTM B370	(2012; R 2019) Standard Specification for Copper Sheet and Strip for Building Construction
ASTM C920	(2018) Standard Specification for Elastomeric Joint Sealants
ASTM D2308	(2007; R 2013) Standard Specification for Thermoplastic Polyethylene Jacket for Electrical Wire and Cable
ASTM D2564	(2012) Standard Specification for Solvent

	Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems
ASTM D2822/D2822M	(2005; R 2011; E 2011) Standard Specification for Asphalt Roof Cement, Asbestos-Containing
ASTM D2855	(2015) Standard Practice for Making Solvent-Cemented Joints with Poly(Vinyl Chloride) (PVC) Pipe and Fittings
ASTM F104	(2011; R 2020) Standard Classification System for Nonmetallic Gasket Materials

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE 515	(2017) Standard for the Testing, Design, Installation, and Maintenance of Electrical Resistance Heat Tracing for Industrial Applications
IEEE C2	(2017; Errata 1-2 2017; INT 1 2017) National Electrical Safety Code

MANUFACTURERS STANDARDIZATION SOCIETY OF THE VALVE AND FITTINGS INDUSTRY (MSS)

MSS SP-58	(2018) Pipe Hangers and Supports - Materials, Design and Manufacture, Selection, Application, and Installation
MSS SP-67	(2017; Errata 1 2017) Butterfly Valves

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(2020; ERTA 20-1 2020; ERTA 20-2 2020; TIA 20-1; TIA 20-2; TIA 20-3; TIA 20-4) National Electrical Code

SOCIETY OF AUTOMOTIVE ENGINEERS INTERNATIONAL (SAE)

SAE J1508	(2009) Hose Clamp Specifications

U.S. GENERAL SERVICES ADMINISTRATION (GSA)

CID A-A-1922	(Rev A; Notice 3) Shield, Expansion (Caulking Anchors, Single Lead)
CID A-A-1923	(Rev A; Notice 3) Shield, Expansion (Lag, Machine and Externally Threaded Wedge Bolt Anchors)
CID A-A-1924	(Rev A; Notice 3) Shield, Expansion (Self Drilling Tubular Expansion Shell Bolt Anchors
CID A-A-1925	(Rev A; Notice 3) Shield Expansion (Nail Anchors)

CID A-A-55614	(Basic; Notice 2) Shield, Expansion (Non-Drilling Expansion Anchors)
CID A-A-55615	(Basic; Notice 3) Shield, Expansion (Wood Screw and Lag Bolt Self-Threading Anchors

1.2 GENERAL REQUIREMENTS

Submit Records of Existing Conditions consisting of the results of Contractor's survey of work area conditions and features of existing structures and facilities within and adjacent to the jobsite. Commencement of work constitutes acceptance of the existing conditions.

Include with Equipment Foundation Data for piping systems all plan dimensions of foundations and relative elevations, equipment weight and operating loads, horizontal and vertical loads, horizontal and vertical clearances for installation, and size and location of anchor bolts.

Submit Fabrication Drawings for pipes, valves and specialties consisting of fabrication and assembly details to be performed in the factory.

Submit Material, Equipment, and Fixture Lists for pipes, valves and specialties including manufacturer's style or catalog numbers, specification and drawing reference numbers, warranty information, and fabrication site information. Provide a complete list of construction equipment to be used.

Submit Record Drawings for pipes, valves and accessories providing current factual information including deviations and amendments to the drawings, and concealed and visible changes in the work.

Submit Connection Diagrams for pipes, valves and specialties indicating the relations and connections of devices and apparatus by showing the general physical layout of all controls, the interconnection of one system (or portion of system) with another, and internal tubing, wiring, and other devices.

Submit Coordination Drawings for pipes, valves and specialties showing coordination of work between different trades and with the structural and architectural elements of work. Detail all drawings sufficiently to show overall dimensions of related items, clearances, and relative locations of work in allotted spaces. Indicate on drawings where conflicts or clearance problems exist between various trades.

1.3 SUBMITTALS

Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Material, Equipment, and Fixture Lists

SD-02 Shop Drawings

Record Drawings

Connection Diagrams

Coordination Drawings

Fabrication Drawings

Installation Drawings

SD-03 Product Data

Pipe and Fittings

Piping Specialties

Valves

Miscellaneous Materials

Supporting Elements

Equipment Foundation Data

SD-06 Test Reports

Valve-Operating Tests

System Operation Tests

SD-07 Certificates

Temperature Ratings

SD-10 Operation and Maintenance Data

Operation and Maintenance Manuals

1.4 QUALITY ASSURANCE

1.4.1 Material and Equipment Qualifications

Provide materials and equipment that are standard products of manufacturers regularly engaged in the manufacture of such products, which are of a similar material, design and workmanship. Provide standard products in satisfactory commercial or industrial use for 2 years prior to bid opening. The 2-year use includes applications of equipment and materials under similar circumstances and of similar size. Ensure the product has been for sale on the commercial market through advertisements, manufacturers' catalogs, or brochures during the 2 year period.

1.4.2 Manufacturer's Nameplate

Provide a nameplate on each item of equipment bearing the manufacturer's name, address, model number, and serial number securely affixed in a conspicuous place; the nameplate of the distributing agent is not acceptable.

1.5 DELIVERY, STORAGE, AND HANDLING

Handle, store, and protect equipment and materials to prevent damage before and during installation in accordance with the manufacturer's recommendations, and as approved by the Engineer. Replace damaged or defective items.

1.6 ELECTRICAL INSTALLATION REQUIREMENTS

Ensure electrical installations conform to IEEE C2, NFPA 70, and requirements specified herein.

1.6.1 New Work

Provide electrical components of mechanical equipment, such as motors, motor starters, control or push-button stations, float or pressure switches, solenoid valves, integral disconnects, and other devices functioning to control mechanical equipment, as well as control wiring and conduit for circuits rated 100 volts or less, to conform with the requirements of the section covering the mechanical equipment.

1.7 ACCESSIBILITY

Install all work so that parts requiring periodic inspection, operation, maintenance, and repair are readily accessible. Install concealed valves, expansion joints, controls, dampers, and equipment requiring access, in locations freely accessible through access doors.

PART 2 PRODUCTS

2.1 ELECTRICAL HEAT TRACING

Provide heat trace systems for pipes, valves, and fittings that are in accordance with IEEE 515 and be UL listed. System includes all necessary components, including heaters and controls to prevent freezing.

Provide self-regulating heaters consisting of two minimum 16 AWG tinned-copper bus wires embedded in parallel in a self-regulating polymer core that varies its power output to respond to temperature along its length. Ensure heater is able to be crossed over itself without overheating. Obtain approval before used directly on plastic pipe. Cover heater with a radiation cross-linked modified polyolefin dielectric jacket in accordance with ASTM D2308.

For installation on plastic piping, apply the heater using aluminum tape. Provide heater with an outer braid of tinned-copper and an outer jacket of modified polyolefin in accordance with ASTM D2308, to provide a good ground path and to enhance the heater's ruggedness.

Provide heater with self-regulating factor of at least 90 percent, in order to provide energy conservation and to prevent overheating.

Operate heater on line voltages of 277 volts without the use of transformers.

Preliminary heater sizing according to the following table (to be verified by Vendor before installation):

Pipe Size

(Inch, Diameter)	Minus 10 degrees F	Minus 20 degrees F
3 inches or less	5 watts per foot (wpf)	5 wpf
4 inch	5 wpf	8 wpf
6 inch	8 wpf	8 wpf
8 inch	2 strips/5 wpf	2 strips/8 wpf
12 inch	2 strips/8 wpf	2 strips/8 wpf

The Vendor shall submit a detailed design including all calculations and drawings supporting the selection of type and wattage rating for each heat trace section.

Control systems by an ambient sensing thermostat set at 40 degrees F through an appropriate contactor.

2.2 PIPE AND FITTINGS

Submit equipment and performance data for pipe and fittings consisting of corrosion resistance, life expectancy, gage tolerances, and grade line analysis. Also include in data pipe size, shape, and dimensions, as well as temperature ratings, vibration and thrust limitations minimum burst pressures, shut-off and non-shock pressures and weld characteristics.

2.2.1 Type GCS, Galvanized Carbon Steel

Ensure pipe 1/2 through 10 inches, and where indicated is Schedule 10 seamless or electric-resistance welded galvanized steel conforming to ASTM A53/A53M, Type E, Grade B (electric-resistance welded) or Type S (seamless) or Engineer approved schedule 10 equal.

2.2.2 PVC Piping

All PVC piping shall be Schedule 80.

PVC and CPVC pipe shall have joints made with solvent cement elastomeric, threading, (threading of Schedule 80 Pipe is allowed only where required for disconnection and inspection), or mated flanged.

2.3 PIPING SPECIALTIES

Submit equipment and performance data for piping specialties consisting of corrosion resistance, life expectancy, gage tolerances, and grade line analysis. Also include in data pipe size, shape, and dimensions, as well as temperature ratings, vibration and thrust limitations minimum burst pressures, shut-off and non-shock pressures and weld characteristics.

2.3.1 Expansion Vibration Isolation Joints

Construct single or multiple arch-flanged expansion vibration isolation joints of steel-ring reinforced chloroprene-impregnated cloth materials. Design joint to absorb the movement of the pipe sections in which installed with no detrimental effect on the pipe or connected equipment. Back flanges with ferrous-metal backing rings. Provide control rod

assemblies to restrict joint movement. Coat all nonmetallic exterior surfaces of the joint with chlorosulphinated polyethylene. Provide grommets in limit bolt hole to absorb noise transmitted through the bolts.

Ensure joints are suitable for continuous-duty working temperature of at least 250 degrees F.

Fill arches with soft chloroprene.

2.3.2 Metallic Expansion Joints

Provide Type I expansion joints; Class 2 (double bellows, expansion joint).

Design and construct joints to absorb all of the movements of the pipe sections in which installed, with no detrimental effect on pipe or supporting structure.

Ensure joints have a designed bursting strength in excess of four times their rated pressure.

Ensure joints are capable of withstanding a hydrostatic test of 1.5 times their rated pressure while held at their uncompressed length without leakage or distortion that may adversely affect their life cycle.

Ensure life expectancy is not less than 10,000 cycles.

Provide bellows and internal sleeve material of AISI Type 304, 304L, or 321 corrosion-resistant steel.

End connections require no field preparation other than cleaning.

Flanges of flanged-end expansion joints conforms to the same codes and standard requirements as are applicable to companion flanges specified for the given piping system at the indicated joint location.

Provide joints, 3 inches and larger, with removable external covers, internal sleeves, and purging connection. Size sleeves to accommodate lateral clearance required, with minimum reduction of flow area, and with oversized bellows where necessary. When a sleeve requires a gasket as part of a locking arrangement, provide the gasket used by the manufacturer. Joints without purging connection may be provided; however, remove these from the line prior to, or not installed until, cleaning operations are complete.

Ensure each expansion joint has adjustable clamps or yokes provided at quarter points, straddling the bellows. Overall joint length is set by the manufacturer to maintain joints in manufacturer's recommended position during installation.

Permanently and legibly mark each joint with the manufacturer's name or trademark and serial number; the size, series, or catalog number; bellows material; and directional-flow arrow.

2.3.3 Pressure Gages

Ensure pressure gages conform to ASME B40.100 and to requirements specified herein. Pressure-gage size is 3-1/2 inches nominal diameter. Ensure case is corrosion-resistant steel.

2.3.4 Grooved Mechanical Joints

Grooves shall be prepared according to the coupling manufacturer's instructions. Grooved fittings, couplings, and grooving tools shall be products of the same manufacturer. Pipe and groove dimensions shall comply with the tolerances specified by the coupling manufacturer.

Grooved mechanical joints shall be Shurjoint Z07 painted rigid couplings or approved equal.

2.3.5 Stainless Steel Wall Screen

Well screen for the extraction points shall be 4" diameter and constructed out of 316 stainless steel with a 0.040 slot size as manufactured by Alloy Machine Works.

2.4 VALVES

Submit equipment and performance data for valves consisting of corrosion resistance and life expectancy. Also include in data, pipe dimensions, as well as temperature ratings, vibration and thrust limitations, minimum burst pressures, shut-off and non-shock pressures and weld characteristics.

2.4.1 Ball and Butterfly Valves

Ensure butterfly valves conform to MSS SP-67and are the wafer type for mounting between specified flanges. Ensure valves are rated for 150-psig shutoff and nonshock working pressure. Select bodies of cast ferrous metal conforming to ASTM A126, Class B, and to ASME B16.1 for body wall thickness. Seats and seals are fabricated from resilient elastomer designed for field removal and replacement.

Motorized Flow Control (Butterfly) Valves shall be Ultraflo 422 Series and open upon failure. Actuators shall be Valvcon NEMA 4X, 120 VAC and 4-20 mA positioning and include a battery back-up with 2 limit switches.

2.5 MISCELLANEOUS MATERIALS

Submit equipment and performance data for miscellaneous materials consisting of corrosion resistance, life expectancy, gage tolerances, and grade line analysis.

2.5.1 Bolting

Ensure flange and general purpose bolting is hex-head and conforms to ASTM A307, Grade B (bolts, for flanged joints in piping systems where one or both flanges are cast iron). Heavy hex-nuts conform to ASTM A563. Square-head bolts and nuts are not acceptable. Ensure threads are coarse-thread series.

2.5.2 Elastomer Caulk

Use two-component polysulfide- or polyurethane-base elastomer caulking material, conforming to ASTM C920.

2.5.3 Flange Gaskets

Provide compressed non-asbestos sheets, conforming to ASTM F104, coated on both sides with graphite or similar lubricant, with nitrile composition,

binder rated to 750 degrees F.

2.5.4 Pipe Thread Compounds

Use polytetrafluoroethylene tape not less than 2 to 3 mils thick in potable and process water and in chemical systems for pipe sizes to and including 1-inch ips. Use polytetrafluoroethylene dispersions and other suitable compounds for all other applications upon approval by the Engineer; however, do not use lead-containing compounds in potable water systems.

2.5.5 Plastic Solvent Cement for PVC Plastic Pipe

Plastic solvent and cement shall be in accordance with ASTM D2564 and ASTM D2855.

2.5.6 Flanged Fittings

Flanged fittings including, but not limited to, flanges, bolts, nuts and bolt patterns shall be in accordance with ASME B16.5 class 150.

2.5.7 Miscellaneous Materials

Miscellaneous materials shall conform to the following:

a. Copper, Sheet and Strip for Building Construction: ASTM B370.

b. Asphalt Roof Cement: ASTM D2822/D2822M.

c. Hose Clamps: SAE J1508.

2.6 SUPPORTING ELEMENTS

Submit equipment and performance data for the supporting elements consisting of corrosion resistance, life expectancy, gage tolerances, and grade line analysis.

Provide all necessary piping systems and equipment supporting elements, including but not limited to: building structure attachments; supplementary steel; hanger rods, stanchions, and fixtures; vertical pipe attachments; horizontal pipe attachments; anchors; guides; and spring-cushion, variable, or constant supports. Ensure supporting elements are suitable for stresses imposed by systems pressures and temperatures and natural and other external forces normal to this facility without damage to supporting element system or to work being supported.

Ensure attachments welded to pipe are made of materials identical to that of pipe or materials accepted as permissible raw materials by referenced code or standard specification.

Ensure supporting elements exposed to weather are hot-dip galvanized or stainless steel. Select materials of such a nature that their apparent and latent-strength characteristics are not reduced due to galvanizing process. Electroplate supporting elements in contact with copper tubing with copper.

Provide support elements, except for supplementary steel, that are cataloged, load rated, commercially manufactured products.

2.6.1 Building Structure Attachments

2.6.1.1 Anchor Devices, Concrete and Masonry

Ensure anchor devices conform to CID A-A-1922, CID A-A-1923, CID A-A-1924, CID A-A-1925 , CID A-A-55614, and CID A-A-55615

Do not use powder-actuated anchoring devices to support any mechanical systems components.

2.6.1.2 Beam Clamps

Ensure beam clamps are center-loading and conform to MSS SP-58.

2.6.1.3 Inserts, Concrete

Use concrete MSS SP-58 Type 18 inserts When applied to piping in sizes 2 inches ips and larger and where otherwise required by imposed loads, insert and wire a 1-foot length of 1/2-inch reinforcing rod through wing slots. Submit proprietary-type continuous inserts for approval.

2.6.2 Horizontal Pipe Attachments

2.6.2.1 Single Pipes

Use MSS SP-58 Type 1 and Type 6 assemblies on vapor-sealed insulated piping and have an inside diameter larger than pipe being supported to provide adequate clearance during pipe movement.

Where thermal movement of a point in a piping system 4 inches and larger would cause a hanger rod to deflect more than 4 degrees from the vertical or where a horizontal point movement exceeds 1/2 inch, use MSS SP-58 conforming pipe rolls.

Use MSS SP-58 Type 40 shields on all insulated piping. Ensure area of the supporting surface is such that compression deformation of insulated surfaces does not occur. Roll away longitudinal and transverse shield edges from the insulation.

Provide insulated piping without vapor barrier on roll supports with MSS SP-58 Type 39 saddles.

2.6.3 Vertical Pipe Attachments

Ensure vertical pipe attachments are MSS SP-58 Type 8.

Include complete fabrication and attachment details of any spring supports in shop drawings.

2.6.4 Hanger Rods and Fixtures

Use only circular cross-section rod hangers to connect building structure attachments to pipe support devices. Use pipe, straps, or bars of equivalent strength for hangers only where approved by the Engineer.

Provide turnbuckles, swing eyes, and clevises as required by support system to accommodate temperature change, pipe accessibility, and adjustment for load and pitch. Rod couplings are not acceptable.

2.6.5 Supplementary Steel

Where it is necessary to frame structural members between existing members or where structural members are used in lieu of commercially rated supports, design and fabricate such supplementary steel in accordance with AISC 325.

PART 3 EXECUTION

3.1 PIPE INSTALLATION

Fabricate and install piping systems in accordance with ASME B31.3 and MSS SP-58.

Make final connections to equipment with flanges.

Ream all pipe ends before joint connections are made.

Make screwed joints with specified joint compound with not more than three threads showing after joint is made up.

Apply joint compounds to the male thread only and exercise care to prevent compound from reaching the unthreaded interior of the pipe.

Provide bolted flanges wherever required to permit convenient removal of equipment, valves, and piping accessories from the piping system for maintenance.

Securely support piping systems with due allowance for thrust forces, thermal expansion and contraction. Do not subject the system to mechanical, chemical, vibrational or other damage as specified in ASME B31.3.

3.2 VALVES

Provide valves in piping mains and all branches and at equipment where indicated and as specified.

Provide valves to permit isolation of branch piping and each equipment item from the balance of the system.

Provide valves unavoidably located in furred or other normally inaccessible places with access panels adequately sized for the location and located so that concealed items may be serviced, maintained, or replaced.

3.3 SUPPORTING ELEMENTS INSTALLATION

Provide supporting elements in accordance with the referenced codes and standards.

Support piping from building structure. Do not support piping from roof deck or from other pipe.

Run piping parallel with the lines of the building. Space and install piping and components so that a threaded pipe fitting may be removed between adjacent pipes and so that there is no less than 1/2 inch of clear space between the finished surface and other work and between the finished

surface of parallel adjacent piping. Arrange hangars on different adjacent service lines running parallel with each other in line with each other and parallel to the lines of the building.

Install piping support elements at intervals specified hereinafter, at locations not more than 3 feet from the ends of each runout, and not over 1 foot from each change in direction of piping.

Support vertical risers independently of connected horizontal piping, whenever practicable, with fixed or spring supports at the base and at intervals to accommodate system range of thermal conditions. Ensure risers have guides for lateral stability.

3.4 PENETRATIONS

Provide effective sound stopping and adequate operating clearance to prevent structure contact where piping penetrates walls, floors, or ceilings into occupied spaces adjacent to equipment rooms; where similar penetrations occur between occupied spaces; and where penetrations occur from pipe chases into occupied spaces. Occupied spaces include space above ceilings where no special acoustic treatment of ceiling is provided. Finish penetrations to be compatible with surface being penetrated.

3.5 UNDERGROUND PIPING INSTALLATION

Prior to being lowered into a trench, clean all piping, visually inspected for apparent defects, and tapped with a hammer to audibly detect hidden defects.

Begin laying of pipe at the low point of a system. When in final acceptance position, ensure it is true to the grades and alignment indicated, with unbroken continuity of invert. Blocking and wedging is not permitted.

Make changes in direction with long sweep fittings.

Provide necessary socket clamping, piers, bases, anchors, and thrust blocking. Protect rods, clamps, and bolting with a coating of bitumen.

3.6 HEAT TRACE CABLE INSTALLATION

Field apply heater tape and cut to fit as necessary, linearly along the length of pipe after piping has been pressure tested and approved by the Engineer. Secure the heater to piping with fiberglass tape. Label thermal insulation on the outside, "Electrical Heat Trace."

Install power connection, end seals, splice kits and tee kit components in accordance with IEEE 515 to provide a complete workable system. Terminate connection to the thermostat and ends of the heat tape in a junction box. Ensure cable and conduit connections are raintight.

3.7 HEAT TRACE CABLE TESTS

Test heat trace cable system in accordance with IEEE 515 after installation and before and after installation of the thermal insulation. Test heater cable using a 1000 vdc megger. Minimum insulation resistance is 20 to 1000 megohms regardless of cable length. With the heat trace system operating test voltage and amperage of each cable run to ensure they are within manufacturer's specifications. Document all test results

and provide to Engineer upon completion.

3.8 OPERATIONAL TEST

Upon completion of of piping and prior to heat tracing, insulating, and backfilling excavations, the Contractor shall subject the system to operating tests to demonstrate satisfactory installation, connections, adjustments, and functional and operational efficiency. Such operating tests shall include the following information in a report with conclusion as to the adequacy of the system:

a. Time, date, and duration of test.

b. Operation of each valve.

c. Results of smoke testing of piping system. Smoke testing shall be conducted while the system is under a vacuum of -100 inches water column (IWC) or the maximum attainable at each location while the Main SSDS is operating and be performed on all flanges, instrument connections and mechanical pipe joints and visual results documented.

3.9 OPERATION AND MAINTENANCE

Provide Operation and Maintenance Manuals consistent with manufacturer's standard brochures, schematics, printed instructions, general operating procedures and safety precautions. Submit test data that is clear and readily legible.

-- End of Section --

SECTION 23 07 00

THERMAL INSULATION FOR MECHANICAL SYSTEMS

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only. At the discretion of the Government, the manufacturer of any material supplied will be required to furnish test reports pertaining to any of the tests necessary to assure compliance with the standard or standards referenced in this specification.

ASTM INTERNATIONAL (ASTM)

ASTM B209	(2014) Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
ASTM C612	(2014; R 2019) Standard Specification for Mineral Fiber Block and Board Thermal Insulation
ASTM E84	(2020) Standard Test Method for Surface Burning Characteristics of Building Materials

1.2 SYSTEM DESCRIPTION

1.2.1 General

Provide field-applied insulation and accessories on mechanical systems as specified herein and as depicted on the Drawings.

1.3 SUBMITTALS

Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

Submit the three SD types, SD-02 Shop Drawings, SD-03 Product Data, and SD-08 Manufacturer's Instructions at the same time for each system.

SD-02 Shop Drawings

Pipe Insulation Systems and Associated Accessories

SD-03 Product Data

Pipe Insulation Systems

SD-08 Manufacturer's Instructions

Pipe Insulation Systems

1.4 QUALITY ASSURANCE

1.4.1 Installer Qualification

Qualified installers shall have successfully completed three or more similar type jobs within the last 5 years.

1.5 DELIVERY, STORAGE, AND HANDLING

Materials shall be delivered in the manufacturer's unopened containers. Materials delivered and placed in storage shall be provided with protection from weather, humidity, dirt, dust and other contaminants. The Engineer may reject insulation material and supplies that become dirty, dusty, wet, or contaminated by some other means. Packages or standard containers of insulation, jacket material, cements, adhesives, and coatings delivered for use, and samples required for approval shall have manufacturer's stamp or label attached giving the name of the manufacturer and brand, and a description of the material, date codes, and approximate shelf life (if applicable). Insulation packages and containers shall be asbestos free.

PART 2 PRODUCTS

2.1 STANDARD PRODUCTS

Provide materials which are the standard products of manufacturers regularly engaged in the manufacture of such products and that essentially duplicate items that have been in satisfactory use for at least 2 years. Submit a complete list of materials, including manufacturer's descriptive technical literature, performance data, catalog cuts, and installation instructions. The product number, k-value, thickness and furnished accessories including adhesives, sealants and jackets for each mechanical system requiring insulation shall be included.

2.1.1 Surface Burning Characteristics

Unless otherwise specified, insulation must have a maximum flame spread index of 25 and a maximum smoke developed index of 50 when tested in accordance with ASTM E84.

2.2 MATERIALS

Insulation exterior shall be cleanable, grease resistant, non-flaking and non-peeling. Materials shall be compatible and shall not contribute to corrosion, soften, or otherwise attack surfaces to which applied in either wet or dry state. Insulation to be a minimum of one inch rigid glass fiber (ASTM C612) with kraft paper vapor barrier jacket reinforced with glass fiber yam and bonded to aluminized film.

2.2.1 Jackets

2.2.1.1 Aluminum Jackets

Aluminum jackets shall be smooth sheet, 0.016 inch nominal thickness; ASTM B209, Temper H14, Temper H16, Alloy 3003, 5005, or 3105.

2.2.1.2 Vapor Barrier/Weatherproofing Jacket

Kraft vapor barrier jacked reinforced with glass fiber yam and bonded to

aluminized film. Vapor barrier/weatherproofing jacket shall be laminated self-adhesive.

PART 3 EXECUTION

3.1 APPLICATION - GENERAL

Insulation shall only be applied to unheated and uncooled piping and equipment.

3.1.1 Installation

Except as otherwise specified, material shall be installed in accordance with the manufacturer's written instructions. Insulation materials shall not be applied until tests and heat tracing specified in other sections of this specification are completed. Material such as rust, scale, dirt and moisture shall be removed from surfaces to receive insulation. Insulation shall be kept clean and dry. Insulation shall not be removed from its shipping containers until the day it is ready to use and shall be returned to like containers or equally protected from dirt and moisture at the end of each workday. Insulation that becomes dirty shall be thoroughly cleaned prior to use. If insulation becomes wet or if cleaning does not restore the surfaces to like new condition, the insulation will be rejected, and shall be immediately removed from the jobsite. Joints shall be staggered on multi layer insulation.

3.1.2 Pipes/Ducts/Equipment That Require Insulation

Insulation is required on all pipes, ducts, or equipment, as depicted on the Drawings.

-- End of Section --

SECTION 26 20 00

INTERIOR DISTRIBUTION SYSTEM

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE 100	(2000; Archived) The Authoritative Dictionary of IEEE Standards Terms
IEEE C2	(2017; Errata 1-2 2017; INT 1 2017) National Electrical Safety Code

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

ANSI C80.1	(2005) American National Standard for Electrical Rigid Steel Conduit (ERSC)
ANSI C80.3	(2015) American National Standard for Electrical Metallic Tubing (EMT)
NEMA ICS 1	(2000; R 2015) Standard for Industrial Control and Systems: General Requirements
NEMA RN 1	(2005; R 2013) Polyvinyl-Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit
NEMA TC 3	(2016) Polyvinyl Chloride (PVC) Fittings for Use With Rigid PVC Conduit and Tubing

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(2020; ERTA 20-1 2020; ERTA 20-2 2020; TIA 20-1; TIA 20-2; TIA 20-3; TIA 20-4) National Electrical Code
NFPA 70E	(2021) Standard for Electrical Safety in the Workplace
NFPA 780	(2017) Standard for the Installation of Lightning Protection Systems

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1910.147	The Control of Hazardous Energy (Lock Out/Tag Out)
29 CFR 1910.303	Electrical, General

UNDERWRITERS LABORATORIES (UL)

UL 1	(2005; Reprint Jan 2020) UL Standard for Safety Flexible Metal Conduit
UL 6	(2007; Reprint Sep 2019) UL Standard for Safety Electrical Rigid Metal Conduit-Steel
UL 50	(2015) UL Standard for Safety Enclosures for Electrical Equipment, Non-Environmental Considerations
UL 83	(2017; Reprint Mar 2020) UL Standard for Safety Thermoplastic-Insulated Wires and Cables
UL 360	(2013; Reprint Oct 2020) UL Standard for Safety Liquid-Tight Flexible Metal Conduit
UL 486A-486B	(2018) UL Standard for Safety Wire Connectors
UL 486C	(2019) UL Standard for Safety Splicing Wire Connectors
UL 489	(2016) UL Standard for Safety Molded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures
UL 510	(2020) UL Standard for Safety Polyvinyl Chloride, Polyethylene and Rubber Insulating Tape
UL 514A	(2013; Reprint Aug 2017) UL Standard for Safety Metallic Outlet Boxes
UL 514B	(2012; Reprint May 2020) Conduit, Tubing and Cable Fittings
UL 514C	(2014; Reprint Feb 2020) UL Standard for Safety Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers
UL 797	(2007; Reprint Mar 2017) UL Standard for Safety Electrical Metallic Tubing -- Steel
UL 943	(2016; Reprint Feb 2018) UL Standard for Safety Ground-Fault Circuit-Interrupters
UL 1660	(2019) Liquid-Tight Flexible Nonmetallic Conduit

1.2 DEFINITIONS

Unless otherwise specified or indicated, electrical and electronics terms used in these specifications, and on the drawings, are as defined in IEEE 100.

1.3 SUBMITTALS

Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Panelboards

Marking Strips Drawings

SD-03 Product Data

Circuit Breakers

Enclosed Circuit Breakers

Surge Protective Devices

SD-06 Test Reports

600-volt Wiring Test

Ground-fault Receptacle Test

SD-10 Operation and Maintenance Data

Electrical Systems, Data Package 5

1.4 QUALITY ASSURANCE

1.4.1 Fuses

Submit coordination data as specified in paragraph, FUSES of this section.

1.4.2 Regulatory Requirements

In each of the publications referred to herein, consider the advisory provisions to be mandatory, as though the word, "shall" or "must" had been substituted for "should" wherever it appears. Interpret references in these publications to the "authority having jurisdiction," or words of similar meaning, to mean the Engineer. Provide equipment, materials, installation, and workmanship in accordance with NFPA 70 unlessmore stringent requirements are specified or indicated.

1.4.3 Standard Products

Provide materials and equipment that are products of manufacturers regularly engaged in the production of such products which are of equal material, design and workmanship and:

a. Have been in satisfactory commercial or industrial use for 2 years prior to bid opening including applications of equipment and materials under similar circumstances and of similar size.

b. Have been on sale on the commercial market through advertisements, manufacturers' catalogs, or brochures during the 2-year period.

c. Where two or more items of the same class of equipment are required,

provide products of a single manufacturer; however, the component parts of the item need not be the products of the same manufacturer unless stated in this section.

1.4.3.1 Material and Equipment Manufacturing Date

Products manufactured more than 3 years prior to date of delivery to site are not acceptable.

1.5 MAINTENANCE

1.5.1 Electrical Systems

Submit operation and maintenance data in accordance with Section 02 62 16.13 10 OPERATION, MAINTENANCE, AND PROCESS MONITORING FOR SOIL SUB-SLAB DEPRESSURIZATION SYSTEMS (SSDS) and as specified herein. Submit operation and maintenance manuals for electrical systems that provide basic data relating to the design, operation, and maintenance of the electrical distribution system for the building. Include the following:

a. Single line diagram of the "as-built" building electrical system.

b. Schematic diagram of electrical control system (other than HVAC, covered elsewhere).

c. Manufacturers' operating and maintenance manuals on active electrical equipment.

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

As a minimum, meet requirements of UL, where UL standards are established for those items, and requirements of NFPA 70 for all materials, equipment, and devices.

2.2 CONDUIT AND FITTINGS

Conform to the following:

2.2.1 Rigid Metallic Conduit

2.2.1.1 Rigid, Threaded Zinc-Coated Steel Conduit

ANSI C80.1, UL 6.

2.2.2 Electrical, Zinc-Coated Steel Metallic Tubing (EMT)

UL 797, ANSI C80.3.

2.2.3 Plastic-Coated Rigid Steel and IMC Conduit

NEMA RN 1, Type 40(40 mils thick).

2.2.4 Flexible Metal Conduit

UL 1.

2.2.4.1 Liquid-Tight Flexible Metal Conduit, Steel

UL 360.

2.2.5 Fittings for Metal Conduit, EMT, and Flexible Metal Conduit

UL 514B. Ferrous fittings: cadmium- or zinc-coated in accordance with UL 514B.

2.2.5.1 Fittings for Rigid Metal Conduit

Threaded-type. Split couplings unacceptable.

2.2.5.2 Fittings for EMT

Compression type.

2.2.6 Fittings for Rigid Nonmetallic Conduit

NEMA TC 3 for PVC and UL 514B.

2.2.7 Liquid-Tight Flexible Nonmetallic Conduit

UL 1660.

2.3 OUTLET BOXES AND COVERS

UL 514A, cadmium- or zinc-coated, if ferrous metal. UL 514C, if nonmetallic.

2.4 CABINETS, JUNCTION BOXES, AND PULL BOXES

UL 50; volume greater than 100 cubic inches, NEMA Type 1 enclosure; sheet steel, hot-dip, zinc-coated. Where exposed to wet, damp, or corrosive environments, NEMA Type as indicated.

2.5 WIRES AND CABLES

Provide wires and cables in accordance applicable requirements of NFPA 70 and UL for type of insulation, jacket, and conductor specified or indicated. Do not use wires and cables manufactured more than 12 months prior to date of delivery to site.

2.5.1 Conductors

Provide the following:

a. Conductor sizes and capacities shown are based on copper, unless indicated otherwise.

2.5.1.1 Minimum Conductor Sizes

Provide minimum conductor size in accordance with the following:

a. Branch circuits: No. 12 AWG.

b. Class 1 remote-control and signal circuits: No. 14 AWG.

c. Class 2 low-energy, remote-control and signal circuits: No. 16 AWG.

d. Class 3 low-energy, remote-control, alarm and signal circuits: No. 22 AWG.

2.5.2 Color Coding

Provide color coding for service, feeder, branch, control, and signaling circuit conductors.

2.5.2.1 Ground and Neutral Conductors

Provide color coding of ground and neutral conductors as follows:

a. Grounding conductors: Green.

b. Neutral conductors: White.

c. Exception, where neutrals of more than one system are installed in same raceway or box, other neutrals color coding: white with a different colored (not green) stripe for each.

2.5.2.2 Ungrounded Conductors

Provide color coding of ungrounded conductors in different voltage systems as follows:

a. 208/120 volt, three-phase

(1) Phase A - black

(2) Phase B - red

(3) Phase C - blue

b. 480/277 volt, three-phase

(1) Phase A - brown

(2) Phase B - orange

(3) Phase C - yellow

c. 120/240 volt, single phase: Black and red

2.5.3 Insulation

Unless specified or indicated otherwise or required by NFPA 70, provide power and lighting wires rated for 600-volts, Type THWN/THHN conforming to UL 83.

2.6 SPLICES AND TERMINATION COMPONENTS

UL 486A-486B for wire connectors and UL 510 for insulating tapes. Connectors for No. 10 AWG and smaller diameter wires: insulated, pressure-type in accordance with UL 486A-486B or UL 486C (twist-on splicing connector). Provide solderless terminal lugs on stranded conductors.

2.7 PANELBOARDS

2.7.1 Circuit Breakers

UL 489, thermal magnetic-type having a minimum short-circuit current rating equal to the short-circuit current rating of the panelboard in which the circuit breaker will be mounted. Breaker terminals: UL listed as suitable for type of conductor provided. Series rated circuit breakers and plug-in circuit breakers are unacceptable.

2.7.1.1 Multipole Breakers

Provide common trip-type with single operating handle. Design breaker such that overload in one pole automatically causes all poles to open. Maintain phase sequence throughout each panel so that any three adjacent breaker poles are connected to Phases A, B, and C, respectively.

2.7.1.2 Circuit Breaker With Ground-Fault Circuit Interrupter

UL 943 and NFPA 70. Provide with auto-monitoring (self-test) and lockout features, "push-to-test" button, visible indication of tripped condition, and ability to detect and trip when current imbalance is 6 milliamperes or higher per requirements of UL 943 for Class A ground-fault circuit interrupter devices.

2.8 ENCLOSED CIRCUIT BREAKERS

UL 489. Individual molded case circuit breakers with voltage and continuous current ratings, number of poles, overload trip setting, and short circuit current interrupting rating as indicated. Enclosure type as indicated.

2.9 LOCKOUT REQUIREMENTS

Provide circuit breakers, disconnecting means, and other devices that are electrical energy-isolating capable of being locked out for machines and other equipment to prevent unexpected startup or release of stored energy in accordance with 29 CFR 1910.147, NFPA 70E and 29 CFR 1910.303. Comply with requirements of Division 23, "Mechanical" for mechanical isolation of machines and other equipment.

2.10 MANUFACTURER'S NAMEPLATE

Provide on each item of equipment a nameplate bearing the manufacturer's name, address, model number, and serial number securely affixed in a conspicuous place; the nameplate of the distributing agent will not be acceptable.

2.11 SURGE PROTECTIVE DEVICES

Provide SPDs per NFPA 780 for the lightning protection system as applicable to the existing building. If no system is present provide branch circuit surge suppression devices for all exterior routed wiring associated with the project installed in existing control cabinet locations.

PART 3 EXECUTION

3.1 INSTALLATION

Electrical installations, including weatherproof and hazardous locations and ducts, plenums and other air-handling spaces: conform to requirements of NFPA 70 and IEEE C2 and to requirements specified herein.

3.1.1 Wiring Methods

Provide insulated conductors installed in rigid steel conduit or EMT, except where specifically indicated or specified otherwise or required by NFPA 70 to be installed otherwise. Grounding conductor: separate from electrical system neutral conductor.Provide insulated green equipment grounding conductor for circuit(s) installed in conduit and raceways. Minimum conduit size: 1/2 inch in diameter for low voltage lighting and power circuits. Firestop conduit which penetrates fire-rated walls, fire-rated partitions, or fire-rated.

3.1.2 Conduit Installation

Install conduit parallel with or at right angles to ceilings, walls, and structural members where located above accessible ceilings and where conduit will be visible after completion of project.

3.1.2.1 Restrictions Applicable to EMT

a. Do not install underground.

b. Do not encase in concrete, mortar, grout, or other cementitious materials.

c. Do not use in areas subject to physical damage including but not limited to equipment rooms where moving or replacing equipment could physically damage the EMT.

d. Do not use outdoors.

3.1.2.2 Conduit Through Floor Slabs

Where conduits rise through floor slabs, do not allow curved portion of bends to be visible above finished slab. Where conduit rises through slab-on grade, seal all electrical penetrations to address radon mitigation and prevent infiltration of air, insects, and vermin.

3.1.2.3 Conduit Support

Support conduit by pipe straps, wall brackets, threaded rod conduit hangers, or ceiling trapeze. Fasten by wood screws to wood; by toggle bolts on hollow masonry units; by concrete inserts or expansion bolts on concrete or brick; and by machine screws, welded threaded studs, or spring-tension clamps on steel work. Threaded C-clamps may be used on rigid steel conduit only. Do not weld conduits or pipe straps to steel structures. Do not exceed one-fourth proof test load for load applied to fasteners. Provide vibration resistant and shock-resistant fasteners attached to concrete ceiling. Do not cut main reinforcing bars for any holes cut to depth of more than 1 1/2 inches in reinforced concrete beams or to depth of more than 3/4 inch in concrete joints. Fill unused holes. In partitions of light steel construction, use sheet metal screws. In

suspended-ceiling construction, run conduit above ceiling. Do not support conduit by ceiling support system. Conduit and box systems: supported independently of both (a) tie wires supporting ceiling grid system, and (b) ceiling grid system into which ceiling panels are placed. Do not share supporting means between electrical raceways and mechanical piping or ducts. Coordinate installation with above-ceiling mechanical systems to assure maximum accessibility to all systems. Spring-steel fasteners may be used for lighting branch circuit conduit supports in suspended ceilings in dry locations. Where conduit crosses building expansion joints, provide suitable watertight expansion fitting that maintains conduit electrical continuity by bonding jumpers or other means. For conduits greater than 2 1/2 inches inside diameter, provide supports to resist forces of 0.5 times the equipment weight in any direction and 1.5 times the equipment weight in the downward direction.

3.1.2.4 Directional Changes in Conduit Runs

Make changes in direction of runs with symmetrical bends or cast-metal fittings. Make field-made bends and offsets with hickey or conduit-bending machine. Do not install crushed or deformed conduits. Avoid trapped conduits. Prevent plaster, dirt, or trash from lodging in conduits, boxes, fittings, and equipment during construction. Free clogged conduits of obstructions.

3.1.2.5 Locknuts and Bushings

Fasten conduits to sheet metal boxes and cabinets with two locknuts where required by NFPA 70, where insulated bushings are used, and where bushings cannot be brought into firm contact with the box; otherwise, use at least minimum single locknut and bushing. Provide locknuts with sharp edges for digging into wall of metal enclosures. Install bushings on ends of conduits, and provide insulating type where required by NFPA 70.

3.1.2.6 Flexible Connections

Provide flexible steel conduit between 3 and 6 feet in length for equipment subject to vibration, noise transmission, or movement; and for motors. Install flexible conduit to allow 20 percent slack. Minimum flexible steel conduit size: 1/2 inch diameter. Provide liquid tight flexible conduit in wet and damp locations for equipment subject to vibration, noise transmission, movement or motors. Provide separate ground conductor across flexible connections.

3.1.3 Boxes, Outlets, and Supports

Provide boxes in wiring and raceway systems wherever required for pulling of wires, making connections, and mounting of devices or fixtures. Boxes for metallic raceways: cast-metal, hub-type when located in wet locations, when surface mounted on outside of exterior surfaces, and when specifically indicated. Boxes in other locations: sheet steel. Provide each box with volume required by NFPA 70 for number of conductors enclosed in box. Fasten boxes and supports with wood screws on wood, with bolts and expansion shields on concrete or brick, with toggle bolts on hollow masonry units, and with machine screws or welded studs on steel. Threaded studs driven in by powder charge and provided with lock washers and nuts.

3.1.4 Conductor Identification

Provide conductor identification within each enclosure where tap, splice,

or termination is made. For conductors No. 6 AWG and smaller diameter, provide color coding by factory-applied, color-impregnated insulation. For conductors No. 4 AWG and larger diameter, provide color coding by plastic-coated, self-sticking markers; colored nylon cable ties and plates; or heat shrink-type sleeves. Identify control circuit terminations in accordance with manufacturer's recommendations.

3.1.4.1 Marking Strips

Provide marking strips for identification of power distribution, control, data, and communications cables in accordance with the following:

a. Provide white or other light-colored plastic marking strips, fastened by screws to each terminal block, for wire designations.

b. Use permanent ink for the wire numbers

c. Provide reversible marking strips to permit marking both sides, or provide two marking strips with each block.

d. Size marking strips to accommodate the two sets of wire numbers.

e. Assign a device designation in accordance with NEMA ICS 1 to each device to which a connection is made. Mark each device terminal to which a connection is made with a distinct terminal marking corresponding to the wire designation used on the Contractor's schematic and connection diagrams.

f. The wire (terminal point) designations used on the Contractor's wiring diagrams and printed on terminal block marking strips may be according to the Contractor's standard practice; however, provide additional wire and cable designations for identification of remote (external) circuits for the Government's wire designations.

g. Prints of the marking strips drawings submitted for approval will be so marked and returned to the Contractor for addition of the designations to the terminal strips and tracings, along with any rearrangement of points required.

3.1.5 Splices

Make splices in accessible locations. Make splices in conductors No. 10 AWG and smaller diameter with insulated, pressure-type connector. Make splices in conductors No. 8 AWG and larger diameter with solderless connector, and cover with insulation material equivalent to conductor insulation. No splicing of wires for conduit runs will be accepted.

3.1.6 Covers and Device Plates

Install with edges in continuous contact with finished wall surfaces without use of mats or similar devices. Plaster fillings are not permitted. Install plates with alignment tolerance of 1/16 inch. Use of sectional-type device plates are not permitted. Provide gasket for plates installed in wet locations.

3.1.7 Electrical Penetrations

Seal openings around electrical penetrations as required.

3.1.8 Grounding and Bonding

Provide in accordance with NFPA 70 and NFPA 780. Ground exposed, non-current-carrying metallic parts of electrical equipment, metallic raceway systems, grounding conductor in metallic and nonmetallic raceways, telecommunications system grounds, and neutral conductor of wiring systems.

3.1.9 Equipment Connections

Provide power wiring for the connection of motors and control equipment under this section of the specification. Except as otherwise specifically noted or specified, automatic control wiring, control devices, and protective devices within the control circuitry are not included in this section of the specifications and are provided under the section specifying the associated equipment.

3.1.10 Repair of Existing Work

Perform repair of existing work as follows:

3.1.10.1 Workmanship

Lay out work in advance. Exercise care where cutting, channeling, chasing, or drilling of floors, walls, partitions, ceilings, or other surfaces is necessary for proper installation, support, or anchorage of conduit, raceways, or other electrical work. Repair damage to buildings, piping, and equipment using skilled craftsmen of trades involved.

3.1.10.2 Existing Concealed Wiring to be Removed

Disconnect existing concealed wiring to be removed from its source. Remove conductors; cut conduit flush with floor, underside of floor, and through walls; and seal openings.

3.1.10.3 Continuation of Service

Maintain continuity of existing circuits of equipment to remain. Maintain existing circuits of equipment energized. Restore circuits wiring and power which are to remain but were disturbed during demolition back to original condition.

3.1.11 Surge Protective Devices

Connect the surge protective devices in parallel to the power source, keeping the conductors as short and straight as practically possible. Maximum allowed lead length is 3 feet avoiding 90 degree bends.

3.2 FIELD QUALITY CONTROL

Furnish test equipment and personnel and submit written copies of test results to the Engineer upon completion.

3.2.1 Devices Subject to Manual Operation

Operate each device subject to manual operation at least five times, demonstrating satisfactory operation each time.

3.2.2 600-Volt Wiring Test

Test wiring rated 600 volt and less to verify that no short circuits or accidental grounds exist. Perform insulation resistance tests on wiring No. 6 AWG and larger diameter using instrument which applies voltage of 1,000 volts DC for 600 volt rated wiring and 500 volts DC for 300 volt rated wiring per NETA ATS to provide direct reading of resistance. All existing wiring to be reused shall also be tested.

3.2.3 Ground-Fault Receptacle Test

Test ground-fault receptacles with a "load" (such as a plug in light) to verify that the "line" and "load" leads are not reversed. Press the TEST button and then the RESET button to verify by LED status that the device is a self-test model as specified in UL 943.

-- End of Section --

SECTION 31 00 00

EARTHWORK
08/08, CHG 2: 02/21

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM D2487	(2017; E 2020) Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)

1.2 DEFINITIONS

1.2.1 Satisfactory Materials

Satisfactory materials comprise any materials classified by ASTM D2487 as suitable for bedding. Satisfactory materials for grading comprise stones less than one inch.

1.2.2 Unsatisfactory Materials

Materials which do not comply with the requirements for satisfactory materials man-made fills; trash; refuse; backfills from previous construction; and material classified as satisfactory which contains root and other organic matter or frozen material.

1.2.3 Topsoil

Material suitable for topsoils obtained from offsite are defined as: Natural, friable soil representative of productive, well-drained soils in the area, free of subsoil, stumps, rocks larger than one inch diameter, brush, weeds, toxic substances, and other material detrimental to plant growth. Amend topsoil pH range to obtain a pH of 5.5 to 7.

1.2.4 Initial Backfill Material

Initial backfill consists of select granular material or satisfactory materials free from rocks one inch or larger in any dimension.

1.3 SUBMITTALS

Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Excavation Permits

PART 2 PRODUCTS

2.1 REQUIREMENTS FOR OFFSITE SOILS

Unless NYSDEC allows use of prior material analysis, soil will be backfill soil analyzed according to Section 02 61 13 EXCAVATION AND HANDLING OF CONTAMINATED MATERIAL and results will be submitted to NYSDEC for approval of the material. Do not bring material onsite until tests have been approved by the Engineer.

2.2 MISCELLANEOUS MATERIALS

2.2.1 Grout

Provide durable grout composed of cement, water, an air-entraining admixture, and sand mixed in proportions of one part portland cement to two parts of sand, sufficient water to produce a workable mixture, and an amount of admixture which will entrain sufficient air, as determined by the Engineer.

2.2.2 Bentonite

Bentonite shall be a high-swelling sodium bentonite supplied as 1/4-inch chips.

2.2.3 Pea Gravel

Pea gravel shall be 1/4-inch crushed stone and washed prior to use to remove all fines.

PART 3 EXECUTION

3.1 EXCAVATION PERMITS

No excavation shall be conducted until the excavation permit has been approved by Lockheed Martin Corp. and the Engineer.

ACTIVITY	SUBMISSION DATE	SUBMISSION FORM
Excavation Permits	7 calendar days prior to work	Lockheed Martin Corp. (LMC) Dig Permit

Post permits at a conspicuous location in the construction area.

3.2 STRIPPING OF TOPSOIL

Where indicated or directed, strip topsoil to a depth of 4 inches. Spread topsoil on areas already graded and prepared for topsoil, or transported and deposited in stockpiles convenient to areas that are to receive application of the topsoil later, or at locations indicated or specified. Keep topsoil separate from other excavated materials, brush, litter, objectionable weeds, roots, stones larger than 2 inches in diameter, and other materials that would interfere with planting and maintenance operations. Remove from the site any surplus of topsoil from excavations and gradings.

3.3 GENERAL EXCAVATION

Perform excavation of every type of material encountered within the limits of the project to the lines, grades, and elevations indicated and as specified. Perform the grading in accordance with the typical sections shown and the tolerances specified in paragraph FINISHING. Excavate materials encountered within the limits of the work below grade and replace with satisfactory materials as directed. Dispose of excavated material as specified in paragraph DISPOSITION OF SURPLUS MATERIAL. During construction, perform excavation and fill in a manner and sequence that will provide proper drainage at all times.

3.3.1 Drainage

Provide for the collection and disposal of surface and subsurface water encountered during construction. Grade the construction area to provide positive surface water runoff away from the construction activity as required to maintain dry soils.

3.3.2 Underground Utilities

The Contractor is responsible for movement of construction machinery and equipment over pipes and utilities during construction. For work immediately adjacent to or for excavations exposing a utility or other buried obstruction, excavate by hand. Start hand excavation on each side of the indicated obstruction and continue until the obstruction is uncovered or until clearance for the new grade is assured. Support uncovered lines or other existing work affected by the contract excavation until approval for backfill is granted by the Engineer. Report damage to utility lines or subsurface construction immediately to the Engineer.

3.4 OPENING AND DRAINAGE OF EXCAVATION AND BORROW PITS

Notify the Engineer sufficiently in advance of the opening of any excavation. Transport overburden and other spoil material to designated spoil areas for sampling and analysis by the Engineer for disposal classificaton per Section 02 61 13 EXCAVATION AND HANDLING OF CONTAMINATED MATERIAL. Ensure that excavation of any area and storage of spoil material results in minimum detrimental effects on natural environmental conditions.

3.5 GROUND SURFACE PREPARATION

3.5.1 General Requirements

Remove and replace existing material with satisfactory materials, as directed by the Engineer as outlined in Section 02 61 13 EXCAVATION AND HANDLING OF CONTAMINATED MATERIAL, in excavated areas. When the subgrade is part fill and part excavation or natural ground, scarify the excavated or natural ground portion to a depth of 12 inches and compact it as specified for the adjacent fill.

3.6 UTILIZATION OF EXCAVATED MATERIALS

Excavated materials shall not be re-used on-site.

3.7 FILLING, BACKFILLING AND COMPACTION

Place fill and backfill beneath and adjacent to any and all type of

structures, in successive horizontal layers of loose material not more than 6 inches in depth when using hand-operated compaction equipment. Compact to at least 90 percent of laboratory maximum density for cohesive materials or 95 percent of laboratory maximum density for cohesionless materials, except as otherwise specified. Perform compaction in such a manner as to prevent wedging action or eccentric loading upon or against the structure.

Prepare ground surface on which backfill is to be placed and provide compaction requirements for backfill materials in conformance with the applicable portions of paragraphs GROUND SURFACE PREPARATION. Finish compaction by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, vibratory compactors, or other approved equipment.

3.8 FINISHING

Finish the surface of excavations, embankments, and subgrades to a smooth and compact surface in accordance with the lines, grades, and cross sections or elevations shown. Provide the degree of finish for graded areas within 0.1 foot of the grades and elevations indicated. Finish gutters and ditches in a manner that will result in effective drainage. Finish the surface of areas to be turfed from settlement or washing to a smoothness suitable for the application of turfing materials. Repair graded, topsoiled, landscaped, or backfilled areas prior to acceptance of the work, and re-established grades to the required elevations and slopes.

3.9 PLACING TOPSOIL

On areas to receive topsoil, prepare the compacted subgrade soil to a 2 inches depth for bonding of topsoil with subsoil. Spread topsoil evenly to a thickness of 2 inch and grade to the elevations and slopes shown. Do not spread topsoil when frozen or excessively wet or dry. Obtain material required for topsoil in excess of that produced by excavation within the grading limits from offsite.

3.10 DISPOSITION OF SURPLUS MATERIAL

Surplus material not required for filling or backfilling, and all excavated material, brush, refuse, stumps, roots, and timber shall be analyzed according to Section 02 61 13 EXCAVATION AND HANDLING OF CONTAMINATED MATERIAL, removed from the property and properly disposed of in accordance with all applicable laws and regulations. All materials removed from the site will be required to be disposed of at a Lockheed Martin and NYSDEC approved facility.

-- End of Section --

SECTION 32 92 23

SODDING

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

TURFGRASS PRODUCERS INTERNATIONAL (TPI)

TPI GSS	(1995) Guideline Specifications to Turfgrass Sodding

1.2 DEFINITIONS

1.2.1 Stand of Turf

100 percent ground cover of the established species.

1.3 RELATED REQUIREMENTS

Section 31 00 00 EARTHWORK and Section 32 96 00 TRANSPLANTING EXTERIOR PLANTS applies to this section for plant establishment requirements, with additions and modifications herein.

1.4 SUBMITTALS

Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Fertilizer

Include physical characteristics, and recommendations.

SD-07 Certificates

Sod farm certification for sods. Indicate type of sod in accordance with TPI GSS.

1.5 DELIVERY, STORAGE, AND HANDLING

1.5.1 Delivery

1.5.1.1 Sod Protection

Protect from drying out and from contamination during delivery, on-site storage, and handling.

1.5.1.2 Fertilizer and Lime Delivery

Deliver to the site in original, unopened containers bearing manufacturer's chemical analysis, name, trade name, trademark, and

indication of conformance to state and federal laws.

1.5.2 Storage

1.5.2.1 Sod Storage

Lightly sprinkle with water, cover with moist burlap, straw, or other approved covering; and protect from exposure to wind and direct sunlight until planted. Provide covering that will allow air to circulate so that internal heat will not develop. Do not store sod longer than 24 hours. Do not store directly on concrete or bituminous surfaces.

1.5.2.2 Handling

Do not drop or dump materials from vehicles.

1.6 TIME RESTRICTIONS AND PLANTING CONDITIONS

1.6.1 Restrictions

Do not plant when the ground is frozen, snow covered, muddy, or when air temperature exceeds 90 degrees Fahrenheit.

1.7 TIME LIMITATIONS

1.7.1 Sod

Place sod a maximum of thirty six hours after initial harvesting, in accordance with TPI GSS as modified herein.

PART 2 PRODUCTS

2.1 SODS

2.1.1 Classification

Nursery grown, certified as classified in the TPI GSS. Machine cut sod at a uniform thickness of 3/4 inch within a tolerance of 1/4 inch, excluding top growth and thatch. Each individual sod piece shall be strong enough to support its own weight when lifted by the ends. Broken pads, irregularly shaped pieces, and torn or uneven ends will be rejected.Wood pegs and wire staples for anchorage shall be as recommended by sod supplier.

2.1.2 Purity

Sod species shall be genetically pure, free of weeds, pests, and disease.

2.2 TOPSOIL

2.2.1 On-Site Topsoil

Surface soil stripped and stockpiled on site and modified as necessary to meet the requirements specified for topsoil. When available topsoil shall be existing surface soil stripped and stockpiled on-site in accordance with Section 31 00 00 EARTHWORK.

2.2.2 Off-Site Topsoil

Additional topsoil shall be furnished by the Contractor.

PART 3 EXECUTION

3.1 PREPARATION

3.1.1 Extent Of Work

Provide soil preparation, fertilizing, and sodding of all areas inside or outside the limits of construction that are disturbed by the Contractor's operations.

3.1.2 Soil Preparation

Provide 4 inches of off-site topsoil to meet existing finish grade. Remove debris and stones larger than 3/4 inch in any dimension remaining on the surface after finish grading. Correct irregularities in finish surfaces to eliminate depressions. Protect finished topsoil areas from damage by vehicular or pedestrian traffic.

3.2 SODDING

3.2.1 Finished Grade and Topsoil

Prior to the commencement of the sodding operation, the Contractor shall verify that finished grades are returned to original conditions; the placing of topsoil, smooth grading, and compaction requirements have been completed in accordance with Section 31 00 00 EARTHWORK.

The prepared surface shall be a maximum 1 inch below the adjoining grade of any surfaced area. New surfaces shall be blended to existing areas. The prepared surface shall be completed with a light raking to remove from the surface debris and stones over a minimum 5/8 inch in any dimension.

3.2.2 Placing

Place sod a maximum of 36 hours after initial harvesting, in accordance with TPI GSS as modified herein.

3.2.3 Finishing

After completing sodding, blend edges of sodded area smoothly into surrounding area. Air pockets shall be eliminated and a true and even surface shall be provided. Frayed edges shall be trimmed and holes and missing corners shall be patched with sod.

3.2.4 Watering

Start watering areas sodded as required by daily temperature and wind conditions. Apply water at a rate sufficient to ensure thorough wetting of soil to minimum depth of 6 inches. Run-off, puddling, and wilting shall be prevented. Unless otherwise directed, watering trucks shall not be driven over turf areas. Watering of other adjacent areas or plant material shall be prevented.

3.3 PROTECTION OF TURF AREAS

Immediately after turfing, protect area against traffic and other use.

3.4 RESTORATION

Restore to original condition existing turf areas which have been damaged during turf installation operations. Keep clean at all times at least one paved pedestrian access route and one paved vehicular access route to each building. Clean other paving when work in adjacent areas is complete.

-- End of Section --

SECTION 32 96 00

TRANSPLANTING EXTERIOR PLANTS

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM A580/A580M	(2018) Standard Specification for Stainless Steel Wire

TREE CARE INDUSTRY ASSOCIATION (TCIA)

TCIA A300P1	(2017) ANSI A300 Part1: Tree Care Operations - Trees, Shrubs and Other Woody Plant Maintenance Standard Practices - Pruning
TCIA Z133	(2017) American National Standard for Arboricultural Operations - Pruning, Repairing, Maintaining, and Removing Trees, and Cutting Brush - Safety Requirements

1.2 RELATED REQUIREMENTS

Section 31 00 00 EARTHWORK and Section 32 92 23 SODDING applies to this section for requirements, with additions and modifications herein.

1.3 SUBMITTALS

Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

State Landscape Contractor's License & Tree Relocation References

Permits

Photographs

SD-02 Shop Drawings

Transplanting Plan

SD-03 Product Data

Equipment

A listing of equipment to be used for the transplanting operation, including size model, year and type of mechanical tree

transplanting equipment.

Mulches Topdressing

Ground Stakes

Organic Mulch Materials

Staking Material

1.4 QUALITY ASSURANCE

1.4.1 State Landscape Contractor's License & Tree Relocation References

Contractor must be a professional tree moving company holding a landscape contractor's license in the state where the work is to be performed and have a minimum of 10 years tree relocation experience. Submit a copy of license and 3 references of tree relocation work in the past five years.

1.4.2 Permits

The Contractor must obtain and pay for permits and fees for the alteration of overhead lines or any other related moving permit or fee that requires compliance with Federal, State and local regulatory requirements.

1.4.3 Photographs

The contractor must provide a clear 4 inch by 6 inch minimum size color photograph of the plant material to be relocated. Trees must be documented by an individual photograph of each. Photographs must indicate the date and species of each plant on the back or front of each photo.

1.4.4 Transplanting Plan

A transplanting plan must be submitted showing existing and proposed locations of transplanted material. The plan must also delineate methods, dates, and times for root pruning, digging, balling, removing, storing, transporting, planting, watering, and maintenance to ensure survivability. The plan must also include equipment and anti-desiccant to be used. A listing of the plant material to be transplanted must be provided by common name and botanical name.

1.4.5 Pre-Installation Meeting

Convene a pre-installation meeting a minimum of one week prior to commencing work of this section. Require attendance of parties directly affecting work of this section. Review conditions of operations, procedures and coordination with related work. Agenda must include the following:

a. Tour, inspect, and discuss conditions of planting materials.

b. Review planting schedule and maintenance.

c. Review required inspections.

d. Review environmental procedures.

1.5 DELIVERY OF MATERIALS

1.5.1 Soil Conditioners Delivery and Storage

Soil conditioners must be delivered to the site in the original, unopened containers bearing the manufacturer's chemical analysis. Store in dry locations and away from contaminants.

1.6 PLANT MATERIAL IDENTIFICATION

Plant material to be transplanted must be tagged and/or shown on drawings. Transplanted plant material must be delivered with attached, durable, waterproof labels and weather-resistant ink or imprinted tags, stating the correct botanical and common plant name and size.

1.7 INSPECTION OF MATERIALS

Materials must be inspected for compliance with paragraph PRODUCTS and paragraph PLANT MATERIAL IDENTIFICATION. Open soil amendment containers or wet soil amendments must be rejected. Topsoil that contains slag, cinders, stones, lumps of soil, sticks, roots, trash or other material larger than 1-1/2 inch diameter must be rejected. Topsoil that contains viable plant material and plant parts must be rejected. Unacceptable material must be removed from the job site. The Engineer reserves the right to refuse any unacceptable plant material. All rejected plant material must be removed from the job site on the day of rejection.

1.8 HANDLING OF PLANT MATERIALS

Materials must not be dropped from vehicles. Plant material must be transported without scarring trunks or deforming crown branching. Materials found to be in unacceptable condition must be replaced at no additional cost.

1.9 TIME LIMITATION

If project conditions prevent the Contractor from transplanting and installing plant material on the same day, plant materials must be boxed or heeled in as required. Plant material must be maintained and protected by the Contractor.

1.10 GUARANTEE

Transplanted plant material must have a guarantee period of 365 days. All plants that die or have 25 percent or more of their branches that die during the construction operations or the guarantee period, must be replaced in kind in relation to size and species during the planting season.

1.11 TRANSPLANTED PLANT MATERIAL TIME AND CONDITIONS

Coordinate installation of planting materials during optimal planting seasons for each type of plant material required.

1.11.1 Transplanting Conditions

All transplanting operations must be performed only during periods when beneficial results can be obtained. When drought, excessive moisture, frozen ground or other unsatisfactory conditions prevail, the work must be stopped when directed. When special conditions warrant a variance to all

transplanting operations, proposed transplanting times must be submitted for approval.

1.11.2 Underground Utilities

The location of underground utilities and facilities at both the removal and installing sites must be verified and marked. Damage to underground utilities and facilities must be repaired at the Contractor's expense.

1.11.3 Protecting Existing Vegetation

When there are established lawns at either the removal or installing sites, the turf must be protected during the operation. Existing trees, shrubs, and plant beds at the removal sites that are to be preserved must be barricaded and protected from damage by a tree barricade or other measure. Damage to existing plant material must be mitigated by the Contractor at no additional cost.

1.11.4 Protection of Plant Material to be Transplanted

Protect plant material slated for transplanting that is not transplanted at the beginning of construction operations. Prior to construction operations, tag plants to be transplanted with plastic or vinyl tape tied to the plant caliper. Plants to be transplanted must be protected from root compaction and any other damage. Plastic tape and barrier fencing must not be removed until transplanting operations are ready to begin and or instructed by the Engineer. Water and prune plant material as necessary to keep healthy and vigorous, particularly when water is shut off. Water existing plant material to be transplanted from the start of construction operations until the maintenance period is over. Outside storage locations must be continually shaded and protected from the wind. Bare root plants must be heeled in. Plants stored on the project must be protected from any drying at all times covering the balls or roots with moist sawdust, wood chips, shredded bark, peat moss, or other similar mulching material.

1.11.5 Protection of Plant Material During Transplanting

Plant material must be protected during transplanting to prevent desiccation and damage to the branches, trunk, and root system. Branches of shrubs, palms, vines must be protected by tying-in. Exposed branches must be covered during transport. Plant material showing desiccation, abrasion, sun scald injury or structural branching damage must be replaced at no cost to the government.

PART 2 PRODUCTS

2.1 TOPSOIL

Topsoil to be placed around root balls of transplanted material at new planting site must match topsoil of existing site where material is transplanted from. Additional topsoil must be furnished by the Contractor. Soil conditioners may be added to topsoil to bring into compliance.

2.2 MULCHES TOPDRESSING

Free from noxious weeds, mold, pesticides, or other deleterious materials.

2.2.1 Organic Mulch Materials

Provide shredded hardwood or shredded redwood bark mulch that matches existing conditions.

2.3 STAKING AND GUYING MATERIAL

2.3.1 Staking Material

2.3.1.1 Tree Support Stakes

Rough sawn hard wood free of knots, rot, cross grain, bark, long slivers, or other defects that impair strength. Stakes must be minimum 2 inches square or 2-1/2 inch diameter, pointed at one end. Paint or stain wood stakes dark brown.

2.3.1.2 Ground Stakes

Rough sawn hard wood or plastic, 3 feet long.

2.3.2 Guying Material

2.3.2.1 Guying Wire

12 gauge annealed galvanized steel, ASTM A580/A580M.

2.3.2.2 Hose Chafing Guards

New or used 2 ply 3/4 inch diameter reinforced rubber or plastic hose, black or dark green, all of same color.

2.3.2.3 Metal Anchors

a. Driven Anchors

Malleable iron, arrow shaped, galvanized, sized as follows:

Tree Caliper	Anchor Size
2 inches and under	3 inches
3 to 6 inches	4 inches
6 to 8 inches	6 inches
8 to 10 inches	8 inches
10 to 12 inches	10 inches

b. Screw Anchors

Steel, screw type with welded-on 3 inch round helical steel plate, minimum 3/8 inch diameter, 15 inches long.

2.4 WATER

Unless otherwise directed, water is the responsibility of the Contractor.

Water must be potable, and may be supplied by an existing irrigation system.

PART 3 EXECUTION

3.1 PLANT MATERIAL PREPARATION AND HANDLING

3.1.1 Plant Material Preparation

Plant material designated for transplanting must be watered thoroughly several days before root pruning, digging or moving. Broken or interfering growth must be pruned. Relocate in new location with north facing same direction.

3.2 SITE PREPARATION

3.2.1 Protection

Protect existing and proposed landscape features, elements, and sites from damage or contamination. Plan equipment and vehicle access to minimize and confine soil disturbance and compaction to areas required for construction.

3.2.2 Finish Grade and Topsoil

Verify that finish grades are returned to preconstruction conditions, and that the placing of topsoil, the smooth grading, and the compaction requirements have been completed in accordance with Section 31 00 00 EARTHWORK, prior to the commencement of the transplanting operation.

3.2.3 Layout

Relocate plant material as closed to original location(s) as possible. Plant material locations may be adjusted to meet field conditions, only with Engineer approval.

3.3 SITE EXCAVATION

3.3.1 Obstructions Above or Below Ground

When obstructions above or below ground affect the work, any proposed adjustments to plant material location, and planting method must be submitted for Engineer approval.

3.3.2 Turf Removal and Replacement

Do not disturb topsoil and vegetation in areas outside those required for construction. Where the installation operation occurs in an existing lawn area, the turf must be protected from damage.

3.4 INSTALLATION

3.4.1 Setting Plant Material

Plant material must be set plumb and held in position until sufficient top soil has been firmly placed around root system or ball. In relation to the surrounding grade, the plant material must be set even with the grade at which it was grown. The root system must be spread out and arranged in its natural position. Damaged or girdled roots must be removed with a clean cut. The beginning of the root flare must be visible at soil level

when the tree is planted, since it is critical not to plant the tree too deep. The following must be performed:

a. Plumb plant materials and backfill half of the hole with topsoil.

b. Prior to backfilling, all metal, wood, and synthetic products must be removed from the ball or root system avoiding damage to the root system. Biodegradable burlap and tying material must be carefully opened and folded back from the top a minimum 1/3 depth from the top of the root ball.

c. Water the hole to collapse air pockets.

d. Backfill and gently firm topsoil.

e. Clear soil mounded against trunk.

f. An earth berm, consisting of backfill soil mixture, must be formed with a minimum 4 inch height around the edge of the plant pit to aid in water retention and to provide soil for settling adjustments.

3.4.2 Watering

A regular watering schedule must be established. Plant pits and plant beds must be watered immediately after backfilling, until completely saturated. Run-off and puddling must be prevented. Watering of other plant material or adjacent areas must be prevented.

3.4.3 Staking and Guying

Staking will be required when trees are unstable or will not remain set due to their size, shape, or exposure to high wind velocity. When required the following staking and guying procedures must apply:

3.4.3.1 One Bracing Stake

Trees 4 to 6 feet high must be firmly anchored in place with one bracing stake. The bracing stake must be placed on the side of the tree facing the prevailing wind. The bracing stake must be driven vertically into firm ground and must not injure the ball or root system. The tree must be held firmly to the stake with a double strand of guying material. The guying material must be firmly anchored at a minimum 1/2 tree height and must prevent girdling. A chafing guard must be used when metal is the guying material.

3.4.3.2 Two Bracing Stakes

Trees from 6 to 8 feet height must be firmly anchored in place with 2 bracing stakes placed on opposite sides. Bracing stakes must be driven vertically into firm ground and must not injure the ball or root system. The tree must be held firmly between the stakes with a double strand of guying material. The guying material must be firmly anchored at a minimum 1/2 tree height and must prevent girdling. Chafing guards must be used when metal is the guying material.

3.4.3.3 Three Bracing or Ground Stakes

Trees over a minimum 8 feet height and less than a maximum 6 inch caliper must be held firmly in place with 3 bracing or ground stakes spaced at

equal intervals around the tree. Ground stakes must be avoided in areas to be mowed. Stakes must be driven into firm ground outside the earth berm. The guying material must be firmly anchored at a minimum 1/2 tree height and must prevent girdling. For trees over a minimum 3 inch diameter at breast height, turnbuckles must be used on the guying material for tree straightening purposes. One turnbuckle must be centered on each guy line. Chafing guards must be used when metal is the guying material.

3.4.4 Flags

A flag must be securely fastened to each guy line between the tree, stake, deadmen, or earth anchor. The flag must be visible to pedestrians.

3.5 FINISHING

All planting operations must conform to TCIA Z133.

3.5.1 Plant Material

Prior to placing mulch, the installed area must be uniformly edged to provide a clear division line between the planted area and the adjacent turf area, shaped as indicated. The installed area must be raked and smoothed while maintaining the earth berms.

3.5.2 Placing Mulch

The placement of mulch must occur a maximum of 48 hours after planting. Mulch, used to reduce soil water loss, regulate soil temperature and prevent weed growth, must be spread to cover the installed area with a minimum 3 inch uniform thickness. Mulch must be kept out of the crowns of shrubs, ground cover, and vines and must be kept off buildings, sidewalks and other facilities.

3.5.3 Pruning

Pruning must be accomplished by a certified arborist. The pruning of trees and palms must be in accordance with TCIA A300P1. Only dead or broken material must be pruned from installed plants. The typical growth habit of individual plant material must be retained. Broken branches must be removed.

3.6 RESTORATION AND CLEAN UP

3.6.1 Restoration

Turf areas containing ruts or dead turf, as a result of work under this contract, must be graded smooth and sodded with the same species. All pavements and facilities that have been damaged from the transplanting operation must be restored to original condition at the Contractor's expense.

3.6.2 Clean Up

Excess and waste material must be removed from both removal site and the installed site and must be disposed of offsite. Adjacent paved areas must be cleared.

-- End of Section --

SECTION 40 60 00

PROCESS CONTROL

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI C12.1	((2014; Errata 2016) Electric Meters - Code for Electricity Metering

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(2020; ERTA 20-1 2020; ERTA 20-2 2020; TIA 20-1; TIA 20-2; TIA 20-3; TIA 20-4) National Electrical Code

NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST)

NIST SP 250	(1991) Calibration Services Users Guide

1.2 SUBMITTALS

Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Contractor Design Drawings

Draft As-Built Drawings

SD-03 Product Data

Control Drawings

Sensors and Meters

Performance Verification Test (PVT)

SD-06 Test Reports

Testing, Adjusting and Commissioning

Performance Verification Test(PVT)

SD-07 Certificates

Control and Sensor Wiring

Wiring

Installation

SD-10 Operation and Maintenance Data

Control System

SD-11 Closeout Submittals

Final As-Built Drawings

1.3 SEQUENCING

Sequence of submittals as specified in paragraph SUBMITTALS (denoted by an 'S' in the 'TYPE' column) and activities as specified in PART 3 EXECUTION (denoted by an 'E' in the 'TYPE' column).

1.3.1 Sequencing for Submittals

The sequencing specified for submittals is the deadline by which the submittal must be initially submitted to the Engineer. Following submission there will be a review period as specified in Section 01 33 00 SUBMITTAL PROCEDURES. If the submittal is not accepted by the Engineer, revise the submittal and resubmit it within 14 days of notification that the submittal has been rejected. Upon re-submittal there will be an additional review period. If the submittal is not accepted the process repeats until the submittal is accepted by the Engineer.

1.3.2 Sequencing for Activities

The sequencing specified for activities indicates the earliest the activity may begin.

PART 2 PRODUCTS

2.1 SYSTEM DESCRIPTION

This Section covers the operating functions and controls of the instruments and equipment for the Main Sub-Slab Depressurization System (Main SSDS) Expansion.

a. The "Main SSDS Expansion" consists of installation of two new extraction points and associated extraction lines, instrumentation and interconnection with the Main SSDS system (mechanical and controls) as listed below and as depicted on the drawings. Control descriptions for each unit process are described herein.

b. Operator controls and indications described herein shall be at the Supervisory Control and Data Acquisition (SCADA) System interface to the Programmable Logic Controller (PLC).

c. All PLC functions described herein refer to the process PLC located in the Main Control Panel (MCP).

d. CONTRACTOR shall be responsible for ensuring that all control loops operate properly, regardless of equipment supplier, vendor, or subcontractor. CONTRACTOR shall coordinate repair or replacement of any faulty process equipment, control equipment, wiring, or other system components.

e. The Drawings and Specifications are intended to provide process control requirements only. CONTRACTOR is responsible for determining the configuration, design, layout, and details of control loops.

f. Terms:

(1) Definitions:

(a) Soft Controls: Software, or Soft, controls are programmed controls available to the operator through Human Machine Interface (HMI) software screens at an Operator Interface Terminal (OIT) or computer workstation.

(b) Hard Controls: Hard controls refer to devices such as pushbuttons, hand switches, and potentiometers.

(2) Abbreviations:

(a) FCV - Flow Control Valve.

(b) HMI - Human Machine Interface.

(c) LCS - Local Control Station.

(d) MCC - Motor Control Center.

(e) OIT - Operator Interface Terminal.

(f) PC - Personal Computer.

(g) PLC - Programmable Logic Controller.

(h) SCADA - Supervisory Control and Data Acquisition.

The process control system must be used to monitor and control the operation of process equipment as specified and in accordance with the sequence of operation and control schematics shown on the drawings. The process control system must provide for operator interaction, overall process control system supervision, and process equipment control and monitoring. Provide hardware configured and sized to support expansion as specified and shown on the drawings.

The process control system must be complete including sensors, field preamplifiers, signal conditioners, offset and span adjustments, amplifiers, transducers, transmitters, control devices, engineering units conversions and algorithms for the applications; and must maintain the specified end-to-end process control loop accuracy from the sensor to display and final control element. Connecting conductors must be suitable for installed controls. Enclosers installed as part of this project where there is the potential for exposure to weather must be rated for NEMA 4X (weatherproof).

2.1.1 Operation

The process control system provided under this specification must operate using a combination of sequential function charts, function block diagrams, structured text, instruction, and ladder logic type as defined in IEC 61131-3 and supervisory control to provide the required sequences

of operation. Input data to the controller must be obtained by using instruments and controls interfaced to mechanical, electrical, utility systems and other systems as shown and specified. All required setpoints, settings, alarm limits, and sequences of operation must be as identified in the database/ settings tables and sequences of operation indicated.

2.1.2 Points

Provide inputs to and outputs from the process control system in accordance with the Drawings. Each connected analog output (AO), analog input (AI), binary output (BO), binary input (BI), pulse accumulator (PA) input and other input or output device connected to the control system must represent a "point" where referred to in this specification.

2.1.3 System Reliability

The system must be designed for maximum reliability, safety and integrity while maintaining an availability of 99.99% or better.

2.2 MATERIALS AND EQUIPMENT

2.2.1 Product Certifications

Computing devices, as defined in FCC Part 15, supplied as part of the process control system must be certified to comply with the requirements of Class B computing devices.

2.2.2 Standard Products

Materials and equipment must be standard unmodified products of a manufacturer regularly engaged in the manufacturing of such products. Units of the same type of equipment must be products of a single manufacturer. Items of the same type and purpose must be identical and supplied by the same manufacturer, unless replaced by a new version approved by the Engineer.

2.2.3 Nameplates

Each major component of equipment must have the manufacturer's name and address, and the model and serial number in a conspicuous place.

2.3 GENERAL REQUIREMENTS

Equipment located outdoors, not provided with climate controlled enclosure, must be capable of operating in the ambient temperature range. Electrical equipment will conform to Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM. Equipment and wiring must be in accordance with NFPA 70, with proper consideration given to environmental conditions such as moisture, dirt, corrosive agents, and hazardous area classification.

2.4 SENSORS

2.4.1 Transmitter

Unless indicated otherwise, each sensor must be provided with a transmitter, selected to match the sensor. Except where specifically indicated otherwise on the drawings, the transmitter must be provided with a four digit or analog visual display of the measured parameter and shall must a 4 to 20 mAdc output signal proportional to the level of the

measured parameter. Accuracy must be plus or minus 0.5 percent of full scale reading with output error not exceeding plus or minus 0.5 percent of full scale. Transmitter must be located where indicated, mounted integrally with the sensor, pipe mounted, wall mounted or installed in the control panel. The distance between the sensor and transmitter must not exceed the manufacturer's recommendation. Field preamplifiers and signal conditioners must be included when necessary to maintain the accuracy from sensor to the programmable logic controller.

2.4.2 Off-Gas or Vapor Service

Sensors and meters in vapor service must be rated for continuous duty service at fluid approach velocities from 500 to 2500 fpm with correspondingly higher constriction velocities over a fluid temperature range from 0 degrees F to 150 degrees F at pressures from minus 5 psi gage up to 0 psi gage.

2.4.3 Flow Rate Sensors and Meters

Vapor flow indication must be provided in cubic feet per minute. Pressure taps must incorporate appropriate snubbers. Unless indicated otherwise, the flow transmitter must produce a signal that is proportional to the volumetric flow rate, compensated for fluid temperature, and must have an accuracy of plus or minus 1 percent of the actual flow. Flow transmitter must be located within 15 feet of the flow element. The flow transmitter must include a digital readout of the volumetric flow rate to 3 significant figures. The controller must provide a 4-20 mAdc output signal to the programmable logic controller, proportional to the measured parameter. The controller must be provided with an internal battery to maintain operation for a minimum of 12 hours if power is lost.

2.4.3.1 Orifice Plates

Orifice plate must be made of 316 series stainless steel sheet. The outlet side of the bore must be beveled at a 45 degree angle. The thickness of the cylindrical face of the orifice must [not exceed one-fiftieth of the pipe inside diameter or one-eighth of the orifice bore, whichever is smaller] [be 0.125 inch nominal]. The orifice plate must be flat within 20 mils. The orifice surface roughness must not exceed 0.02 mils. Orifice plates must be concentric plates with a square and sharp upstream edge of the orifice. Orifice bore must be designed to match the operating parameters stated in the drawings. Plate must be permanently identified with line size, flange rating, orifice bore diameter, plate thickness and material. The accuracy must be plus or minus 1 percent of full flow. Orifice plate meters shall be Rosemount type 1595 or approved equal.

2.4.4 Pressure Instrumentation

Pressure taps shall incorporate appropriate snubbers.

2.4.4.1 Pressure Sensor and Transducer

The sensing element must be either diaphragm or solid state type. The vacuum transducer must withstand up to 150 percent of rated pressure, with an accuracy of plus or minus 1.0 percent of full . Vacuum must be measured in inches of water column (I.W.C.) with a range, plus or minus 10 percent of design range and must be furnished with display to the nearest 0.1 I.W.C. The transmitter output error must not exceed 0.1 percent of

calibrated span. Pressure transmitters shall be Rosemount Type 3051 with a range of -250 to 250 inches of water column or approved equal.

2.4.4.2 Differential Pressure

The sensor/transmitter assembly accuracy must be plus or minus 1 percent of full scale. The over pressure rating must be a minimum of 150 percent of the operating pressure. Transmitter must be suitable for installation with the low pressure connection removed. Transmitters shall be Rosemount Type 3051 constructed out of stainless steel with a range of -3 to 3 inches water column or approved equal.

2.5 PROGRAMMABLE LOGIC CONTROLLER (PLC)

2.5.1 PLC General Requirements

Project scope of adding new vapor extraction points to a large existing centralized system requires little to no new PLC equipment or hardware and is limiting to the installation of new devices and reprogramming/modifications to existing plant PLCs and associated I/O modules, power supplies, and accessories already in use. Spare capacity is available in the existing system architecture to support the new work and shall leveraged for new work are required. If new I/O modules, power supplies, or supplemental components are used to facilitate system integration they shall match existing equipment manufacturer, make, and model unless specifically approved. Existing system human machine interfaces (HMI's), graphics, alarms, and interfaces shall be updated to included new components in keeping with existing system operations.

All programming will be based on the current verson (10.00.00 CFR 9 SR 10, Build number 290). Updated central plant programming and displays shall be fully commissioned following installation during a planned plant shut-down period to be coordinated with building owner and occupants.

PART 3 EXECUTION

3.1 OPERATING DESCRIPTIONS

3.1.1 Supervisory Control and Data Acquisition (SCADA) System

a. The purpose of the process control system is to maintain the desired vacuum in the sub slab environment and provide treatment for all extracted vapor.

b. The SCADA System shall provide a graphical interface for monitoring, control and alarming of the system. The SCADA System shall allow for adjustment of setpoints and timers as applicable for alarms and control loops, trending of values, and historical archiving of parameter data.

c. Access to the SCADA System will be available to the operator either from the Main Control Panel (MCP) Operator Interface Terminal (OIT) or SCADA workstation computers via the Human Machine Interface (HMI) screens.

3.1.2 Setpoints and Settings

All setpoints, settings and timers shown on the HMI shall be adjustable between +/100% of the initial setting listed. Limits to setting entries

shall be refined in the field during startup and configured.

3.1.3 Mismatch Alarms

All command outputs from SCADA, analog or discrete, shall have an associated "Mismatch Alarm". The mismatch alarm shall compare the desired output (i.e. valve position) to the measured variable (valve position) and, if after an adjustable period of time the measured value is not within 5% of the desired value, annunciate an alarm.

3.1.4 Out of Range Alarms

For all analog 4-20mA values, provide "Out of Range Alarms" if the signal value drops below 4ma or above 20mA for more than 5 seconds.

3.1.5 Trending

All analog values and controller setpoints shall be trended locally on the SCADA software. All valve statuses shall also be trended.

3.1.6 Totalizations

All flows and runtimes shall be totalized and displayed on the screen.

3.1.7 Unit Process: Extraction Points

a. Reference Drawings: IC-2

b. Major Equipment: Extraction points

c. Analog Control Loops: Pressure Control Loop

(1) Key Devices in Loop: PIT-XXX, FCV-XXX and FE/FIT-XXX, where "XXX" denotes the extraction point loop number.

3.1.7.1 General

a. Each extraction point shall be equipped with instrumentation to monitor and control vapor extracted at the give location. Vapor flow from each extraction point shall be controlled by a flow control valve (FCV) which shall be capable of manual and automatic operation.

3.1.7.2 Manual Operation

a. Manual operation shall be utilized for testing and maintenance purposes only.

b. Local Operation: Manual operation of the extraction point shall be possible by operation of the FCV-XXX clutch and positioning of the butterfly valve in any lockable position.

c. Remote Operation: The option to manually position the valve shall be available at the HMI.

3.1.7.3 Automatic Operation

a. In Automatic mode, FCV-XXX shall be modulated to maintain the desired operator adjustable flow setpoint.

b. Vapor flow and pressure readings shall be used to determine if the extraction point is operating correctly. Correct operation shall be defined as the process operating within a set pressure and flow range.

(1) Vapor pressure shall be measured by PIT-XXX. Deviation from high and low pressure operator adjustable setpoints shall alarm at the HMI.

(2) Vapor flow shall be monitored by FE/FIT-XXX. Deviation from high and low flow operator adjustable setpoints shall alarm at the HMI.

3.1.7.4 Emergency Operation

a. On FCV-XXX motor or control power fail, the valve shall be powered open by the emergency power pack and a "Valve Mismatch" alarm shall annunciate at the HMI. If the battery pack were to fail, the valve shall fail in the last position.

b. As described above, in normal operation, the valve shall be close to open. Thus, on a power failure, only a small amount of battery power shall be required to push it fully open. It shall then remain in that position until power is restored. If the battery backup drains during that period of time, the valve shall remain in the last state, hence open.

c. Include anti-reset windup on the PID Integral parameter to allow the valve loop to quickly return to normal operation on resumption of power.

3.1.7.5 Quick Connect Valve

A quick connect valve located upstream of the FCV shall be used for sampling purposes.

3.1.7.6 Loop Integrity Testing

a. Provide a loop integrity sequence for all extraction points.

b. Each X days (adjustable between 30 and 60 days) cycle each extraction valve between 0% and 100%. Hold the valve closed 10 seconds and confirm response of instruments within certain thresholds. Automatically repeat for each valve 30 minutes (adjustable between 15 and 90 minutes) apart. Proceed with a loop integrity test for all extraction point valves.

c. At the conclusion of the test, provide an output to the operator identifying any alarms, threshold excursions, or failures.

3.1.7.7 Enable/Disable of Each Extraction Point

Provide a disable / enable button / switch for each extraction point at SCADA. This allows the operator to control each extraction point individually and provides the ability for maintenance at a specific extraction point while the system is still in operation.

3.1.7.8 Interlocks

a. On extraction point low pressure and Enabled, the associated FCV shall close (Interlock 6).

b. b. On extraction point high pressure and Enabled, the associated FCV shall open (Interlock 7).

c. On signal of system shutdown, all flow control valves shall open (Interlock S).

3.1.7.9 Integration with Existing Main SSDS Control Logic

a. The new extraction points shall be programmed to operate in conjunction with the existing extraction points.

b. The new extraction points will be represented in the program and on the HMI in an identical fashion to the existing extraction points including but not limited to, process overview, unit process overviews, equipment overlays, controller faceplates, diagnostic and network status screens as necessary to provide a complete operator interface to the system.

3.2 EQUIPMENT INSTALLATION REQUIREMENTS

3.2.1 Installation

Install system components and appurtenances in accordance with the manufacturer's instructions and provide necessary interconnections, services, and adjustments required for a complete and operable system. Adjust or replace devices not conforming to the required accuracies. Replace factory sealed devices, rather than adjusting. Installation, adjustment, and operation of the equipment specified must be supervised by a manufacturer's representative experienced in the installing, adjusting, and testing of the equipment.

a. Install instrumentation and communication equipment and cable grounding as necessary to preclude ground loops, noise, and surges from adversely affecting system operation.

b. Install wiring in exposed areas, including low voltage wiring, in rigid conduit as specified in Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM. Wiring in air plenum areas installed without conduit must be plenum-rated in accordance with NFPA 70.

c. Submit detail drawings containing complete piping, wiring, schematic, flow diagrams and any other details required to demonstrate that the system has been coordinated and will properly function as a unit. Piping and Instrumentation (P&ID) drawings prepared using industry recognized device symbols, clearly defined and describing piping designations to define the service and materials of individual pipe segments and instrument tags employing Instrument Society of America suggested identifiers. Include in the Drawings, as appropriate: product specific catalog cuts; a drawing index; a list of symbols; a series of drawings for each process control system using abbreviations, symbols, nomenclature and identifiers as shown.

3.2.1.1 Isolation, Penetrations and Clearance from Equipment

Dielectric isolation must be provided where dissimilar metals are used for connection and support. Penetrations through and mounting holes in the building exteriors must be made watertight. Holes in concrete, brick, steel and wood walls must be drilled or core drilled with proper equipment; conduits installed through openings must be sealed with

materials which are compatible with existing materials. Openings must be sealed with materials which meet the requirements of NFPA 70. Installation must provide clearance for control-system maintenance. Process control system installation must not interfere with the clearance requirements for mechanical and electrical system maintenance.

3.2.1.2 Device Mounting

Devices must be installed in accordance with manufacturers' recommendations and as shown. Control devices to be installed in piping must be provided with required gaskets, flanges, thermal compounds, insulation, piping, fittings, and manual valves for shutoff, equalization, purging, and calibration. Any deviations must be documented and submitted to the Engineer for approval prior to mounting. Damaged insulation must be replaced or repaired after devices are installed to match existing work. Damaged galvanized surfaces must be repaired by touching up with zinc paint.

3.2.2 Sequences of Operation

Study the operation and sequence of local equipment controls, as a part of the conditions report, and note any deviations from the described sequences of operation on the contract drawings. Perform necessary adjustments to make the equipment operate in an optimum manner and must fully document changes made.

3.3 INSTALLATION OF EQUIPMENT

Install equipment as specified, as shown and as required in the manufacturer's instructions for a complete and fully operational control system.

3.3.1 Flow Measuring Device

The minimum straight unobstructed piping for the flowmeter installation must be 10.0 pipe diameters upstream and 5.0 pipe diameters downstream.

3.3.1.1 Orifice Plates

Orifice plates must be installed for ease of accessibility for periodic maintenance. For gas measurement, the orifice plate flanges must be installed so that the pressure taps are 45 degrees or more above the horizontal plane with the centerline of the pipe. For gas measurement the required differential pressure transmitter must be physically installed above the orifice taps.

3.3.2 Pressure Instruments

Pressure sensors and pressure transducers must be verified by calibration. All pressure taps must incorporate appropriate snubbers. Pressure sensors and pressure switches must have valves for isolation,

venting, and taps for calibration. Pressure transducers, differential pressure sensors and differential pressure switches must have nulling valves.

3.3.3 Instrument Shelters

Instruments located in shelters must be mounted in the 3-dimensional center of the open space of the shelter allowing access for maintenance and calibration.

3.3.4 Enclosures

All enclosure penetrations must be from the bottom of the enclosure, and must be sealed to preclude entry of water using a silicone rubber sealant.

3.4 WIRE, CABLE AND CONNECTING HARDWARE

3.4.1 Metering and Sensor Wiring

Metering and sensor wiring must be installed in accordance with the requirements of ANSI C12.1, NFPA 70 and Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM.

3.4.1.1 Sensor and Control Wiring Surge Protection

Digital and analog inputs must be protected against surges induced on control and sensor wiring.

3.5 SOFTWARE INSTALLATION

Load software required for an operational process control system, including databases (for points specified and shown), operational parameters, and system, command, and application programs. Adjust, tune, debug, and commission all software and parameters for controlled systems to assure proper operation in accordance with the sequences of operation and database tables.

3.6 FIELD TESTING AND ADJUSTING EQUIPMENT

Provide personnel, equipment, instrumentation, and supplies necessary to perform site testing. The Engineer will witness field testing, and written permission must be obtained from the Engineer before proceeding with the testing. Original copies of data produced, including results of each test procedure, must be turned over to the Engineer at the conclusion of each phase of testing prior to approval of the test. The test procedures must cover actual equipment and functions specified for the project. Field testing requirements and I/O check out will be done in accordance with On?Site Panel Demonstration Test Checklist, which is included as Table 1 of the Site's Startup and Testing Workplan.

3.6.1 Testing, Adjusting and Commissioning

Once the installation has been completed, tested, adjusted, and commissioned each control loop and system in accordance with NIST SP 250 and must verify proper operation of each item in the sequences of operation, including hardware and software. Calibrate field equipment, including control devices, adjust control parameters and logic (virtual) points including control loop setpoints, gain constants, constraints, and verify data communications before the system is placed online. Calibrate

each instrumentation device connected to the process control system control network by making a comparison between the reading at the device and the display at the workstation, using a standard at least twice as accurate as the device to be calibrated. Check each control point within the process control system control network by making a comparison between the control command at the central station and field-controlled device. Verify operation of systems in the specified failure modes upon Process control system network failure or loss of power, and verify that systems return to process control system control automatically upon a resumption of process control system network operation or return of power. Deliver a report describing results of functional tests, diagnostics, calibrations and commissioning procedures including written certification to the Engineer that the installed complete system has been calibrated, tested, adjusted and commissioned and is ready to begin the PVT. The report must also include a copy of the approved PVT procedure.

3.6.2 Performance Verification Test (PVT)

Submit test procedures for the PVT. The test procedure must describe all tests to be performed and other pertinent information such as specialized test equipment required and the length of the PVT. The test procedures must explain, in detail, step-by-step actions and the expected results, to demonstrate compliance with all the requirements of the drawings and this specification. The test procedure must be site-specific and based on the inputs and outputs, required calculated points and the sequence of control. Refer to the actions and expected results to demonstrate that the process control system performs in accordance with the sequence of control. Include a list of the equipment to be used during the testing plus manufacturer's name, model number, equipment function, the date of the latest calibration and the results of the latest calibration.

Demonstrate that the completed Process control system complies with the contract requirements. All physical and functional requirements of the project including communication requirements must be demonstrated and shown. Demonstrate that each system operates as required in the sequence of operation. The PVT as specified must not be started until after receipt of written permission by the Engineer, based on the written report including certification of successful completion of testing, adjusting and commissioning as specified, and upon successful completion of training as specified. Upon successful completion of the PVT, furnish test reports and other documentation.

3.7 FIELD TRAINING

3.7.1 Preliminary Operator Training

Prior to the start of field testing, preliminary operator training must be taught at the project site for 4 consecutive training hours. Upon completion of this course, each student, using appropriate documentation, should be able to perform elementary operations with guidance and describe the general hardware architecture and functionality of the system. This course must include: general system architecture; and functional operation of the system modifications.

3.7.2 Maintenance Training

Following PVT training must be provided for designated personnel on maintenance of the equipment. The training must include: physical layout of each piece of hardware, calibration procedures, preventive maintenance

procedures, schedules, troubleshooting, diagnostic procedures and repair instructions.

3.7.3 Specialized Training

3.7.3.1 Flow Meter Training

Each type of flow meter, to include calibration, maintenance and testing of flow elements and transducers.

3.8 OPERATION AND MAINTENANCE DATA REQUIREMENTS

Outline the step-by-step procedures required for system startup, operation and shutdown. Include in the instructions layout, wiring and control diagrams of the system as installed, the manufacturer's name, model number, service manual, parts list and a brief description of all equipment and their basic operating features. List routine maintenance procedures, possible breakdowns and repairs and troubleshooting guides.

-- End of Section --

APPENDIX C – CONSTRUCTION COST ESTIMATE

(not included in submission to NYSDEC**)**

APPENDIX D – PIPE HEAD LOSS CALCULATIONS

Job No.	3617207521	Sheet	1 of 1	
Phase	08	Task	08A	
Job Name	LMC-SSDS Expansion 90% Design			
By	EWT	Date	5/11/2021	
Checked By	ERC	Date	5/11/2021	

511 Congress Street
Portland, ME 04101
+1 (207) 775-5401 Fax +1 (207) 772-4762

Purpose: Evaluate head loss incurred at high and low flow scenarios by additional conveyance piping for two new sub slab soil vapor extraction points tied into existing sub slab depressurization system.

Method: Use empirical formula for friction loss in a circular galvanized steel duct with turbulent flow: 'HL=0.109136$q^{1.9}$/$de^{5.02}$
Formula inputs and outputs must be imperial units. Dependent variable is head loss (HL) with units inches water column per 100 feet of pipe. Independent variables are flow rate (q) and pipe diameter (de).
Calculate minor losses using the Equivalent Length Method for Fittings: ML=(HL)(EqvL)(#Fittings)/100
Formula inputs include head loss as calculated by empirical formula, equivalent length, and number fittings to be used.
Equivalent length is defined as Length/Diameter (L/D) ratio divided by 3.

Constants and Input Empirical friction loss formula: HL=0.109136$q^{1.9}$/$de^{5.02}$

	Value	Unit
High flow rate	200	CFM
Low flow rate	100	CFM
Pipe diameter	4	in
Southwest Tie in at EP-O03.5 pipe length	350	ft
Northwest Tie in at EP-C05 pipe length	400	ft
Equivalent Length Multiplier	0.333	

Equivalent Length Method for Fittings: ML=(HL)(EqvL)(#Fittings)/100

	Fitting	L/D	EqvL	# Fittings
EP-A1	Elbows (Long Sweep)	20	6.67	10
	Butterfly Valves (Fully Open)	40	13.33	4
	Tee (Side Entry)	60	20.00	1
	Pitot Flowmeter (assumed)	10	3.33	1
EP-Q1	Elbows (Long Sweep)	20	6.67	14
	Butterfly Valves (Fully Open)	40	13.33	4
	Tee (Side Entry)	60	20.00	1
	Pitot Flowmeter (assumed)	10	3.33	1

Calculations:

Step 1 - Calculate major (friction) losses by multiplying the result of the empirical formula provided above for each extraction point, at each flow scenario (high and low) by the pipe length divided by 100.

Step 2 - Calculate the minor losses due to fittings using the Equivalent Length Method for Fittings provided above for each fitting type at each extraction point and flow scenario. This formula uses the head loss for each scenario calculated in Step 1 as an input, in addition to the fitting specific constants listed above.

Step 3 - Add major losses and all minor losses for each scenario to estimate total head loss added by the connection of each additional extraction point under each flow condition.

Conclusion:

		High Flow (200 CFM)	Low Flow (100 CFM)
EP-A1	Major Losses	9.8	2.6
	Minor Losses	3.50	0.94
	Total Losses	**13.3**	**3.6**
EP-Q1	Major Losses	9	2.3
	Minor Losses	4.15	1.11
	Total Losses	**12.7**	**3.4**

All units inches of water column.

Appendix B - ORR Forms

Appendix B – LMC ORR Process Documents

ORR Agenda

A. For planning purposes, the CONTRACTOR shall assume that each readiness review session will take a minimum of 2 hours. The session shall be attended by the following CONTRACTOR and subcontractor staff:

1. CONTRACTOR: The CONTRACTOR shall have the following staff in attendance:

    a. Project Manager
    b. Superintendent
    c. Field ENGINEERs
    d. Quality Control personnel
    e. H&S personnel
    f. Plant operators

2. Subcontractors: All Subcontractors that will be involved in that particular phase of work. Each subcontractor shall have the following staff in attendance:

    a. Project Manager
    b. Superintendent
    c. Working Foreman

B. The following is the agenda for each readiness review session:

1. Introductions (sign-in sheet)

2. Purpose (to confirm and document the readiness of project team)

3. Roles and Responsibilities

4. Communication Protocol
    a. OWNER and CONTRACTOR (primary points of contact)
    b. Weekly Progress Updates at Weekly Job Meetings
    c. Communication with Regulatory and Public Agencies
    d. Communication with the Public/Community

5. Weather Protocols
    a. Earth Quake Procedures
    b. Flood & Evacuation Procedures

6. Lockheed Martin Rules
    a. Lockheed Martin Required Site Safety Orientation
    b. Site Access Control
    c. Health and Safety
    d. No tobacco use onsite, professional attire and behavior

e. Minimum PPE requirements (reflective vest, steel toe boots, safety glasses, long pants, hard hat, hearing protection when near noisy machinery)
f. Daily Tailgate Safety Meetings
g. Permitted Work Hours and Days
h. Noise and Traffic Requirements
i. Deliveries (including MSDS pre-approval for all chemicals)
j. Equipment and Material Storage Requirements

7. Review Scope of Construction Work/Operations (discuss in detail sequence of work, Subcontractors involved, equipment, materials, etc.)

   a. Site Preparation Activities (temporary offices/facilities, erosion control and temporary stormwater controls, site access and haul routes, material and equipment staging areas, test labs in place, surveying, etc.)
   b. Construction Activities
   c. Startup and Testing
   d. Operations
   e. QA/QC
   f. Health and Safety
   g. Special Environmental Requirements (transportation and disposal procedures, air monitoring, soil disposal, water disposal, waste management, sampling & analysis, storage of fuel onsite, etc.)
   h. Interfacing with Existing Facilities and Contractors
   i. Cleanup and Demobilization
   j. Record Keeping
   k. Inspections

8. Documentation Readiness

   a. OM&M Manual
   b. Work Plans
   c. Permits and Notices
   d. Test Reports
   e. Calibration Records
   f. Product Data/Cut Sheets
   g. Photographs/Videos
   h. Well Logs & Other Construction Reports
   i. Operator Exams
   j. Maintenance Tool Inventory
   k. Startup and Testing Procedures
   l. Other Pre-Work or Startup and Operations Procedures
   m. Certificates (OSHA Hazwoper, state licenses, certificates of disposal, etc.)
   n. Bill of Materials
   o. As-Built Drawings

9. Equipment Readiness

   a. Review Checklist

b. Physical Inspection and Positive Verification that Installed Equipment Meets Project Requirements
c. Check As-Builts
d. Testing and Acceptance of Piping, Equipment, and Systems (check inspection records, test results, local/state agency certificates in place to occupy or operate, etc.)
e. Construction Equipment Readiness (no leaking hoses, etc.)
f. Inspect Systems (electrical, mechanical, HVAC, I&C, and structural)

10. Material Readiness

    a. Positive Verification that Materials Received Onsite Match Project Requirements
    b. Type and Quantity of Materials Onsite
    c. Materials Laydown and Storage
    d. Security

11. Construction/Operation Worker Readiness (are workers qualified and ready to perform their duties?)

    a. Walkthrough of Equipment, Systems, and Controls
    b. Mimic SOPs and DOPs in the Field
    c. Review Regular System Checks

Lockheed Martin Corporation

Operations Readiness Review Compliance Checklist

	Location/Project Name:				
	Type of Work:				
	Date:				
	Completed by:				
No.	**Item**	**Yes**	**No**	**N/A**	**Comments**
	Permits and Notifications				
1	Verify all regulatory permits are in hand and copies are at the site				
	Safety Systems				
2	Do all workers have the required PPE available? Review the required PPE.				
3	Are any special PPE required for hazardous conditions at the site (carbon/chemical handling, electrical arc flash, etc.)				
4	Has an arc flash study been performed, and are arc flash labels present on ALL electrical panels?				
5	Is a current, complete and signed HASP readily available to all working at the site?				
6	Hazardous Material Summary Correct and up to date?				
7	Are MSDSs available and have they been reviewed for all on-site chemicals? Verify location of MSDS's.				
8	Has a joint Lockheed Martin and contractor safety walkthrough been performed?				
9	Are obstacles such as low overheads, step-ups, and step-downs clearly marked?				
10	Is work area lighting adequate?				
11	Are escape routes/emergency exits provided and identified?				
12	Have signs requiring hearing protection, no smoking, warning for presence of any hazards, load rating of elevated walkways, exclusion zones, emergency contact numbers, etc. been prominently displayed?				
13	Do the workers know who to call in the case of a life or death emergency?				
14	Do the workers know who to call in the case of a chemical spill greater than 5 gallons?				
15	Are fire extinguishers present?				
16	Have all workers been trained on the use of the fire extinguishers?				
17	Are personal injury hazards (e.g. protruding bolts, sharp edges) identified and mitigated?				

No.	Item	Yes	No	N/A	Comments
18	Have site tripping hazards or “head knockers” been identified and addressed?				
19	Have emergency shutdown devices been verified to be operating properly?				
	Building/Facility/Grounds				
20	Are all applicable utilities in working order (water, sewer, power, phone, internet, compressed air)				
21	Verify the work area is in a neat condition and clear of all obstructions and debris. Verify the floors are swept clean and work areas are neat and organized.				
22	Has Lockheed Martin conducted a housekeeping inspection of all working areas including offices?				
23	Verify that all hoses and electrical cords are rolled up and stored appropriately (not left out for trip hazard).				
24	Is all waste being stored and labeled per regulatory requirements?				
25	Will wastes generated be disposed of at a facility on the Lockheed Martin approved list?				
26	Are secondary containment structures and drum pads in place?				
27	Are trash and recycling receptacles in place?				
28	Are restroom facilities available to workers?				
29	Is all equipment properly grounded?				
30	Have all interior and exterior facility lighting systems been checked and functioning properly?				
	Workers				
31	Have all onsite personnel received site-specific safety orientation?				
32	Are all on-site personnel properly trained by individual equipment vendors to operate specific pieces of equipment?				
33	Verify that the workers know their chain of command and who to call in the case of an emergency.				
34	Do workers know what to do in the event of a chemical spill?				
35	Do workers know what to do in the event of a severe weather event (tornado, flood, hurricane)?				

Appendix C – Daily Logs

DAILY LOG OF CONSTRUCTION

M T W T F

Lockheed Martin Corporation

PROJECT:

LOCATION	PROJECT NO.	DATE
Former Unisys Facility Great Neck, Lake Success, NY		

CONTRACTOR	CONTRACTOR REPRESENTATIVE ON JOB

WEATHER (*Rain, Snow, Cloudy, Windy, etc.)*	TEMP. High	TEMP. Low	GROUND CONDITIONS (*Dry, Damp, Wet, Frozen)*

NO. CONTRACTOR'S MEN BY JOB CATEGORIES (INCL START/END TIMES)	NO. SUBCONTRACTOR'S MEN BY JOB CATEGORIES (INCL START/END TIMES)

EQUIPMENT ON JOB Brief description of size	No. Units	Working Yes	Working No

MATERIALS DELIVERED

None

OFFICIAL VISITORS TO JOB SITE

STATUS OF WORK

ITEM No.	Brief description of work in progress, questionable performance, etc. Include tests made and samples taken. *(Use comments section on reverse for other information, if necessary)*
1.	

SIGNATURE	TITLE:
	Field Representative

CRITICAL POINT/MILESTONE INSPECTIONS (*Describe item inspected, observations, problems, action items)*

WORK COMPLETED BY OTHERS OR MATERIALS PROVIDED BY OTHERS

SAFETY COMMENTS

DIFFICULTIES WITH CONTRACTOR OR REPRESENTATIVE

UNFORESEEN DEVELOPMENTS (*Describe conditions, action taken; person contacted, recommended actions)*

OTHER COMMENTS OR PERTINENT FACTS REGARDING JOB

1. Labor hours

PHOTOGRAPHS

AMEC E&E PC
Daily Tailgate Safety Briefing Form

Project Name: SSD Booster System		Project Number: 3617207521
Date:	Start Time:	Completed Time:
Site Location: 1111 Marcus Avenue, New Hyde Park, NY		
Type of Work (general):		

SAFETY ISSUES

Tasks (this shift):
PPE Requirements:
Chemical Hazards:
Air Monitoring Requirements:
Physical Hazards:
Control Measures:
Hazard Communication Overview (SDSs):
Special Topics (i.e., incidents, near misses, etc.)

DAILY CHECKLIST

HSE Plan up to date and present onsite?	Yes	No
Air monitoring equipment present, working, and calibrated?	Yes	No
Personnel training current?	Yes	No
Hospital Route Map and Emergency Phone Numbers posted onsite?	Yes	No
PPE present and worn by personnel?	Yes	No
Comments:		

ATTENDEES	
Name (Print)	**Signature**
Meeting conducted by:	

ADDITIONAL NOTES/COMMENTS

Appendix D – Performance Monitoring Plan

Appendix D - Performance Monitoring Plan

Location		Sample/ Measurement Type	Units of Measurement	Schedule									
				Pre-Construction Baseline[1]	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 14	Day 30
EP-A1	**Vacuum Gauge**	Record Value	inches WC		X	X	X	X	X	X	X	X	X
	Flow Meter	Record Value	cfm		X	X	X	X	X	X	X	X	X
EP-Q1	**Vacuum Gauge**	Record Value	inches WC		X	X	X	X	X	X	X	X	X
	Flow Meter	Record Value	cfm		X	X	X	X	X	X	X	X	X
Northwest Indoor Air[2]		Summa (20 minute) sample for VOCs by EPA TO-15	N/A	X									
Southwest Indoor Air[2]		Summa (20 minute) sample for VOCs by EPA TO-15	N/A	X									
Sub-Slab Monitoring Points[3]	**SS-Q1R**	Differential Pressure	inches WC	X	X	X	X	X	X	X	X	X	X
	SS-P2	Differential Pressure	inches WC	X	X	X	X	X	X	X	X	X	X
	SS-N2	Differential Pressure	inches WC	X	X	X	X	X	X	X	X	X	X
	SS-A1	Differential Pressure	inches WC	X	X	X	X	X	X	X	X	X	X
	SS-C1	Differential Pressure	inches WC	X	X	X	X	X	X	X	X	X	X
	SS-B1.7	Differential Pressure	inches WC	X	X	X	X	X	X	X	X	X	X

Notes:

WC - Water Column

CFM - Cubic Feet per Minute

N/A - Not Applicable

(1) Pre-Construction Baseline monitoring to be performed immediately prior to any excavation activities.

(2) Indoor air samples will be collected as a baseline prior to starting the construction work. Additional indoor air sample may be collected at the local building corner at the same indoor location if sustained organic vapor levels within 20 feet of the building exceed 1.0 parts per million per Community Air Monitoring Plan.

(3) EP vacuum setpoint may be adjusted during testing to establish an optimal flow condition that reliably meets -0.004 inches WC criteria.

Appendix E – Traffic Control Plan Map

NOTES:
1) OFF SHIFT WORK WILL REQUIRE ADDITIONAL TRAFFIC CONTROL AS NECESSARY TO SAFELY INSTALL EXTRACTION POINTS AND MOVE MATERIALS TO ROOFTOP.
2) NOT ALL TRAFFIC CONTROL DEVICES SHOWN FOR CLARITY.

Traffic Control Plan - West Building Access Road
Normal Construction Activity Plan


Legend
Temporary Fence
Traffic Direction
Traffic Barricade Line
Traffic Sign (One Way)
Pedestrian Access Walk
N
LANES TO REMAIN OPEN
ROOF ACCESS TO NORTHWEST BAY
ENTRANCE TO REMAIN OPEN
LANES TO REMAIN OPEN
ROUTE TO CONTRACTOR STAGING AREA 1 (SEE NORMAL CONSTRUCTION ACTIVITY PLAN)
ONE LANE TRAFFIC WITH FLAGMEN
LANES TO REMAIN OPEN
ENTRANCE TO REMAIN OPEN
ROOF ACCESS TO SOUTHWEST BAY
LANES TO REMAIN OPEN
ONE LANE TRAFFIC WITH FLAGMEN
ROUTE TO CONTRACTOR STAGING AREA 2 (SEE NORMAL CONSTRUCTION ACTIVITY PLAN)
LANES TO REMAIN OPEN
Traffic Control Plan - West Building Access Road
Heavy, Task Specific Construction Activity Plan
Google Earth
40°45'23.55" N 73°42'08.29" W elev 132 ft eye alt 845 ft

Appendix F – Project-Specific HASP

HEALTH AND SAFETY PLAN
SSDS EXPANSION CONSTRUCTION
Former Unisys Site
Lake Success, New York
NYSDEC Site No. 130045

Prepared for:
Lockheed Martin Corporation

Prepared by:
AMEC E&E, P.C.

Approved by:
Lockheed Martin Corporation

Revision: 1

Stuart C. Pearson, P.E. Project Manager

Jeff Tweeddale, H&S Representative

Site: Main SSDS Building (Former Unisys Facility) Job #/Task # 3617207521

Street Address: 1111 Marcus Avenue, Lake Success, NY 11042

Proposed Date(s) of Construction: September through November 2021

Prepared by: Zachary Pierce Date: 8/25/2021

*Approved by: Jeff Tweeddale Date: 9/1/2021

Site Description: **(attach map)** Former manufacturing facility. Construction is to occur in north west and south west building corners, which are occupied by Northwell Health Center.

Comments:

*Approval also serves as certification of a Hazard Assessment as required by 29 CFR 1910.132

EMERGENCY CONTACTS

NAME	TELEPHONE NUMBERS		DATE OF PRE-EMERGENCY NOTIFICATION (if applicable)
Fire Department: Manhasset-Lakeville Fire Department ****You must then notify the 1111 Marcus Ave Security Command – 516-592-4504****	516-466-4411		
Hospital: Long Island Jewish Medical Center	516-470-7500		
WorkCare (Early case management)	1-888-449-7787		
Police Department:	911		
	Office	**Cell**	
Site Health And Safety Officer: Jack Feng	646-392-5252	347-836-4343	
Client Contact: Glenda Clark	817-378-2573	817-901-9933	
Project Manager: Stuart Pearson	207-828-3426	207-776-4251	
*Eastern Group HSE Manager: Cindy Sundquist	207-828-3309	207-650-7593 (Cell) 207-892-4402 (Home)	
Corporate VP of HSE – Vlad Ivensky	610-877-6144	484-919-5175 (Cell) 215-947-0393 (Home)	
Region 2, US EPA	1-877-251-4575		
Ambulance – Manhasset-Lakeville Fire Department	516-466-4411		
Radiological Coordinator – Amy Jones	970-778-4608	970-296-0303	

*See Incident Flow Chart for additional Group HSE Manager's Contact Information

TASKS:

AMEC	Other contractor	Task Description	AHA
☒	☐	Construction Oversight/Management	
☐	☒	Construction of Extraction Points / SSDS	
☐	☐		
☐	☐		

AHAs: Check and attach all that apply (add applicable AHAs not already listed):

Activity Specific AHAs:

☒	Mobilization/Demobilization and Site Preparation
☒	Field Work - Oversight
☐	Decontamination
☒	Utility Clearance Activities
☐	Groundwater Sampling
☒	Soil Sampling
☐	Drilling Operation (Driller)
☐	Geoprobe (Geoprobe Operator)
☐	Excavations and Backfilling
☒	Construction Inspection
☒	Power Tools
☒	Roof Work

Hazard Specific AHAs:

☐	Insect Stings and Bites
☐	Gasoline
☐	Working with Preservatives (Acids)
☐	
☐	
☐	
☐	
☐	
☐	
☐	
☐	

Dates of Required Training and Medical Surveillance (to be filled out following scheduling and staffing of field event for most accurate information**):**

Job duties:	**Health and Safety Officer/ Field Oversight**
Names:	**Jack Feng**
	Dates
Medical Surveillance	5/25/2021
-Exam Type (A[4], B, C)	A
40-Hour Initial	5/18/20218
8-Hour Supervisor [3]	9/1/2021
8-Hour Refresher	6/24/2021
First Aid	NA
CPR	NA
OSHA 10 Construction Safety	9/1/2021

[2] At least one worker must be trained in First Aid/CPR and should have received Bloodborne Pathogen Training
[3] Required for Site Manager and Site Health and Safety Officer
[4] **Medical Surveillance Exam A has no respiratory clearance so can only be used for Level D PPE.** Exam A (basic HAZWOPER), Exam B (respirator & HAZWOPER under 40 years old), Exam C (respirator & HAZWOPER over 40 years old), Exam E (DOT), Exam F (asbestos monitoring), Exam G (lead monitoring) etc. **Contact HSE Coordinator or Cindy Sundquist to determine type of exam employee received.**

Known or Suspected Contaminants (include PELs/TLVs):

Contaminants of Concern (COC) (Attach Fact Sheets*)	**Maximum Concentrations**		**PEL/TLV**
	Soil (mg/kg)	**Water/Groundwater (µg/l)**	
Perchloroethylene	N/A	N/A	25 ppm
Trichloroethylene	N/A	N/A	10 ppm
Cis-1,2 dichloroethylene	N/A	N/A	200 ppm
Vinyl chloride	N/A	N/A	1 ppm

*Workers must be made aware of the signs, symptoms, and first aid for each COC. Information is located on the COC fact sheets.

Air Monitoring Action Levels:

PID/FID Reading[1]	Detector Tube[1]	Dust Meter[1]	LEL[2]/O_2[1]	Action
Below 1 ppm in worker breathing zone (above background)				Continue work.
At or above 1 ppm (above background) sustained in worker breathing zone for more than 15 minutes				Conduct indoor air screening to ensure background levels are not being exceeded indoors.
Vinyl Chloride	0.5 ppm			Screen area for Vinyl chloride if PID reading are 1 ppm above background. If detector tube is greater than 0.5, Leave work area, let area ventilate and re-assess. Contact PM and HSR for guidance.
At or above 5 ppm (above background) sustained in worker breathing zone for more than 15 minutes				Temporarily seal building penetration, leave work area, let area ventilate and re-assess. Contact PM and HSR for guidance.
		100 µg/m^3		Continuous monitoring and logging/documentation of PM10 using dedicated monitoring equipment. Should the alarm be triggered (particulate concentration >100 µg/m^3 above the upwind background concentration), work should stop, the PM and HSR should be called and dust mitigation measures should be introduced.

[1] Sustained readings measured in the breathing zone
[2] Readings are measured at the source (borehole, well, etc.)

HAZARD IDENTIFICATION SUMMARY

Complete the checklist for summarizing the hazards identified in the JHAs

Standard Hazards			
☒ Falling Objects	☒ Slips and trips	☒ Pinch points	☒ Rotating equipment
☒ Falls	☒ Power equipment/tools	☒ Elevated work surfaces	☐ _____
Eye Hazards			
☒ Particulates	☐ Liquid splashes	☐ Welding Arc	☐ _____
Hearing Hazards			
☐ None	☒ Impact noise	☐ High frequency noise	☐ High ambient noise

Respiratory Hazards						
☐ None	☒ Dust/aerosols/particulates	☒ Organic Vapors	☐ Acid Gases	☐ O_2 deficient	☐ Metals	☐ Asbestos

Chemical Hazards			
☐ None	☐ Organic solvents	☐ Reactive metals	☐ PCBs
☐ Acids / bases	☐ Oxidizers	☐ Volatiles/Semi-volatiles	☐ _____

Environmental Hazards				
☐ None	☒ Cold Stress	☐ Heat Stress	☐ Wet location	☐ Bio hazards (snakes, insects, spiders, poisonous plants, etc.)
☐ Explosive vapors	☐ Confined space	☐ Engulfment Hazard	☐ _____	

Electrical Hazards				
☐ None	☒ Energized equipment or circuits	☐ Overhead utilities	☒ Underground utilities	☐ Wet location

Fire Hazards			
☒ None	☐ Cutting, welding, or grinding generated sparks or heat sources	☐ Flammable materials present	☐ Oxygen enriched location

Ergonomic Hazards					
☒ Lifting	☒ Bending	☒ Twisting	☐ Pulling/tugging	☐ Repetitive motion	☐ Carrying
Computer Use in the: ☐ Office ☐ Field			☐ _____	☐ _____	

Radiological Hazards						
☒ None	☐ Alpha	☐ Beta	☐ Gamma/X-rays	☐ Neutron	☐ Radon	☐ Non-Ionizing

Other Hazards

☒ **Due to the novel coronavirus pandemic, additional precautions are to be taken for prevention of Covid-19 exposure at home and travelling to and from and working on the Project Site.**

Employees must follow the latest guidance provided by the following:

1. **Centers for Disease Control and Prevention https://www.cdc.gov/**
2. **New York State Department of Health https://health.ny.gov/**
3. **Activity Hazard Analysis (AHA) for Site Activities during Covid-19 Pandemic (refer to Attachment)**

PPE and Monitoring Instruments

Initial Level of PPE *			
☒ Level D	☐ Modified Level D	☐ Level C	* Cannot use Short Form HASP for Level B or A work

Standard PPE					
☒ Hard Hat	☒ Safety boots	☒ Safety glasses	☐ Chem. Resistant Boots	☒ High visibility vest	☐ Other:_____

Eye and Face Protection			
☐ Face shield	☐ Vented goggles	☐ Unvented goggles	☐ Indirect vented goggles

Hearing Protection			
☒ Ear plugs	☐ Ear Muffs	☐ Ear plugs and muffs	☐ Other _____

Respiratory Protection					
☒ None	☐ Dust mask	☐ Full Face APR	☐ Half Face APR	Cartridge Type: _____	Change Cartridges: _____

Protective Clothing			
☒ Work uniform	☐ White uncoated Tyvek®	☐ Poly-coated Tyvek®	☐ Saranex®
☐ Boot covers	☒ Reflective vest	☐ Chaps or Snake Legs	☐ Other ___

Hand Protection					
☒ None	☐ Cotton gloves	☐ Leather gloves	☐ Glove liners	☐ Cut-resistant gloves	☐ Other _____
☐ Outer Gloves: List Type_____			☐ Inner Gloves: List Type_____		

Monitoring Instruments Required*

Periodic monitoring shall be conducted when the possibility of an IDLH condition or flammable atmosphere has developed or when there is indication that exposures may have risen over permissible exposure limits or published exposure levels since prior monitoring. Situations where it shall be considered whether the possibility that exposures have risen are as follows:

- When work begins on a different portion of the site.
- When contaminants other than those previously identified are being handled.
- When a different type of operation is initiated (e.g., drum opening as opposed to exploratory well drilling.)
- When employees are handling leaking drums or containers or working in areas with obvious liquid contamination (e.g., a spill or lagoon.)

☐ LEL/O2 Meter	☒ PID: ☒ 10.0-10.6 eV Lamp ☐ 11.7 eV Lamp	☐ FID	☐ Hydrogen Sulfide/Carbon Monoxide
☐ Dräger Pump (or equivalent) List Tubes_____	☒ Dust Meter: ☒ Respirable dust ☐ Total dust		☐ Other _____

*Monitoring instruments will be calibrated daily in accordance with manufacturer's instructions. Results will be recorded in the field logbook.

Chemicals Brought to the Site:
List all chemicals brought to the site (e.g., preservatives, decon solutions, calibration gases, gasoline, etc.).

Chemicals (Note: Name listed must match name on label and SDS)	**SDS Attached?**
ISOBUTYLENE (SDS STORED WITH EQUIPMENT)	☒
	☐

Chemicals will be kept in their original containers. If transferred to another container, aside from days use by one individual, the new container will be clearly labeled with the name of the chemical (product identifier), signal word, hazard statement, pictogram(s), precautionary statement, and name, address and telephone number of the chemical manufacturer, importer or other responsible party.

Work Zones:
The work zones will be defined relative to the location of the work activity. The Exclusion Zone is considered the area within a 10-foot diameter of the sampling location. The Contamination Reduction Zone is considered to be the area with in a 20-foot diameter of the sampling location. The Decontamination Zone is to be located upwind of the work area. Work zones will be maintained through the use of:

☒ Warning Tape
☒ Cones and Barriers
☒ Visual Observations

Decontamination Procedures and Equipment:
Note: See Decontamination JHA for further information

Level D Decontamination Procedures

Decontamination Solution:	Detergent and Water
Station 1: Equipment Drop	Deposit equipment used on-site (tools, sampling devices and containers, monitoring instruments, radios, etc. on plastic drop cloths. Segregation at the drop reduces the probability of cross contamination. During hot weather operations, a cool-down station may be set up within this area.
Station 2: Outer Boots, and Gloves Wash and Rinse (if worn)	Scrub outer boots, and outer gloves decon solution or detergent water. Rinse off using copious amounts of water.
Station 3: Outer Boot and Glove Removal (if worn)	Remove outer boots and gloves. Deposit in plastic bag.
Station 4: Inner glove removal	Remove inner gloves and place in plastic bag.
Station 5: Field Wash	Hands and face are thoroughly washed. Shower as soon as possible.

Modified Level D and Level C PPE Decontamination Procedures

Decontamination Solution:	Detergent and Water
Station 1: Equipment Drop	Deposit equipment used on-site (tools, sampling devices and containers, monitoring instruments, radios, etc. on plastic drop cloths. Segregation at the drop reduces the probability of cross contamination. During hot weather operations, a cool-down station may be set up within this area.
Station 2: Outer Garment, Boots, and Gloves Wash and Rinse	Scrub outer boots, outer gloves, and splash suit with decon solution or detergent water. Rinse off using copious amounts of water.
Station 3: Outer Boot and Glove Removal	Remove outer boots and gloves. Deposit in container with plastic liner.
Station 4: Canister or Mask (Level C only) Change	If worker leaves exclusion zone to change canister (or mask), this is the last step in the decontamination procedure. Worker's canister is exchanged, new outer gloves and boot covers are donned, joints are taped, and worker returns to duty.
Station 5: Boot, Gloves and Outer Garment Removal	Boots, chemical resistant splash suit, and inner gloves are removed and deposited in separate containers lined with plastic.
Station 6: Face Piece Removal (Level C only)	Facepiece is removed. Avoid touching face with fingers. Facepiece is deposited on plastic sheet.
Station 7: Field Wash	Hands and face are thoroughly washed. Shower as soon as possible.

Site Communication:

- ☒ Verbal
- ☐ Two-way radio
- ☒ Cellular telephone
- ☒ Hand signals
  - Hand gripping throat ..... Out of air, can't breathe
  - Grip partner's wrist or both hands around waist ..... Leave area immediately
  - Hands on top of head ..... Need assistance
  - Thumbs up ..... OK, I am all right, I understand
  - Thumbs down ..... No, negative
- ☐ Horn
- ☐ Siren
- ☐ Other:

Emergency Equipment:

The following emergency response equipment is required for this project and shall be readily available:

- ☒ Field First Aid Kit (including bloodborne pathogen kit/supplies)
- ☒ Fire Extinguisher (ABC type)
- ☐ Eyewash (Note: 15 minutes of free-flowing fresh water)
- ☐ Other: _____

EMERGENCY PROCEDURES

- The SHSO (or alternate) should be immediately notified via the on-site communication system. The HSO assumes control of the emergency response.
- The SHSO notifies the Project Manager and client contact of the emergency.
- If the emergency involves an injury to an AMEC employee, the HSE Coordinator or Site Manager are to implement the AMEC Early Injury Case Management program. See procedures and Flow Diagram below:
- If applicable, the SHSO shall notify off-site emergency responders (e.g. fire department, hospital, police department, etc.) and shall inform the response team as to the nature and location of the emergency on-site.
- If applicable, the SHSO evacuates the site. Site workers should move to the predetermined evacuation point (See Site Map).
- For small fires, flames should be extinguished using the fire extinguisher. Large fires should be handled by the local fire department.
- In an unknown situation or if responding to toxic gas emergencies, appropriate PPE, including SCBAs (if available), should be donned. If appropriate PPE is unavailable, site workers should evacuate and call in emergency personnel.
- For chemical spills, follow the job specific JHA for spill containment
- If chemicals are accidentally spilled or splashed into eyes or on skin, use eyewash and wash affected area. Site worker should shower as soon as possible after incident.
- If the emergency involves toxic gases, workers will back off and reassess. Prior to re-entering the work zone, the area must be determined to be safe. Entry will be using Level B PPE and utilize appropriate monitoring equipment to verify that the site is safe.
- An injured worker shall be decontaminated appropriately.
- Within 24 hours after any emergency response, the Incident Analysis Report (and Vehicle Incident Report if vehicle incident) shall be completed and returned to the Group HSE Manager. Injuries requiring medical treatment beyond first aid (as well as work-related vehicle incidents) will require the employee to submit a post incident drug test.

Wood Early Injury Case Management Program

NON-EMERGENCY INCIDENT	EMERGENCY INCIDENT
Steps 1 & 2 must be completed before seeking medical attention other than local first aid. 1. Provide first-aid as necessary. Report the situation to your immediate supervisor AND HSE coordinator (all incidents with the apparent starting event should be reported within 1 hour of occurrence). 2. Injured employee:	1. Provide emergency first aid. Supervisor on duty must immediately call 911 or local emergency number; no employee may respond to outside queries without prior authorization. Any outside media calls concerning this incident must be referred immediately to Lauren Gallagher at 602-757-3211. 2. Once medical attention is sought and provided, the supervisor must:
Call WorkCare 24/7 Hotline* (888) II-XPRTS or (888) 449-7787	
WorkCare will assess the situation and determine whether the incident requires further medical attention. During this process, WorkCare will perform the following: • Explain the process to the caller. • Determine the nature of the concern. • Provide appropriate medical advice to the caller. • Determine appropriate path forward with the caller. • Maintain appropriate medical confidentiality. • Help caller to execute path forward, including referral to the appropriate local medical facility. • Send an email notification to the Corporate HSE Department.	WorkCare will be responsible for performing the following: • Contact the treating physician. • Request copies of all medical records from clinic. • Send an email update to the Corporate HSE Department.

3. IMMEDIATELY after contacting WorkCare send a brief email notification AND inform verbally (direct contact is required) ONE of HSE corporate representatives See Figure 11.3.
4. Make all other local notifications and client notifications.
5. Review and follow client and E&IS post-incident alcohol and drug testing requirements.

   E&IS Canada Post-Incident D&A Info

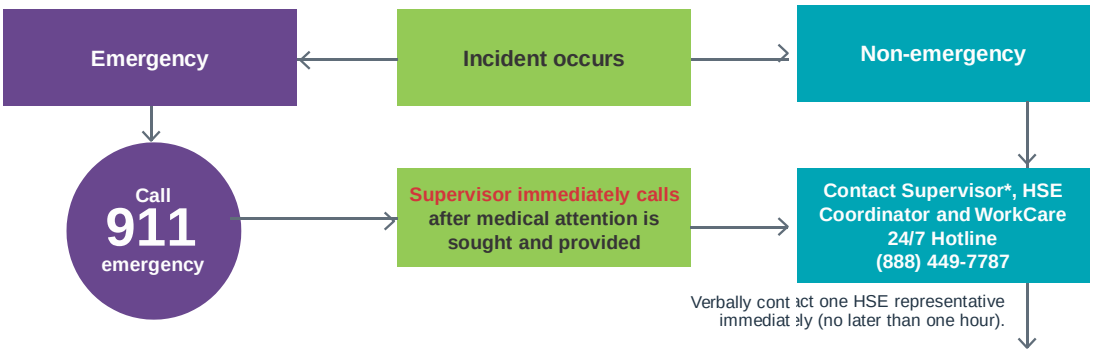
   E&IS U.S. Post-Incident D&A Info
6. WITHIN 24 HOURS - Local Supervisor, HSE Coordinator, Project HSE Officer and any applicable safety committees to complete preliminary investigation, using the Incident Analysis Report Form, and supporting forms for Vehicle Incident or Ground Disturbance and provide to Corporate HSE Department.
7. Corporate Loss Prevention Manager to complete Worker's Compensation Insurance notifications as needed.
8. Corporate HSE to conduct further incident notifications, investigation, include in statistics, classify, and develop lessons learned materials.

* - **NOTE: Step 2 is only applicable to the North-American operations and to incidents involving WOOD personnel. High potential near misses, subcontractors' incidents, regulatory inspections, spills and property damages above $1,000 should be reported immediately, following directions from Step 3.**

Site Specific Procedures are as follows:

Incident flow chart

Call immediately



E&IS Corporate HSE department contact list

Name/email	Office location	Contact information
Bruce Voss bruce.voss@woodplc.com	San Diego, CA	951.897.6381 (cell)
Chad Barnes chad.barnes@woodplc.com	Phoenix, AZ	602.733.6000 (office) 480.495.9846 (cell)
Cindy Sundquist cynthia.sundquist@woodplc.com	Portland, ME	207.828.3309 (office) 207.650.7593 (cell) 207.892.4402 (home)
Gabe Sandholm gabe.sandholm@woodplc.com	Minneapolis, MN	612.252.3785 (office) 206.683.9190 (cell)
Lori Dowling lori.dowling@woodplc.com	Prince George, BC	250.564.3243 (office)
Philip Neville philip.neville@woodplc.com	Thorold, ON	905.687.6616 (office) 905.380.4465 (cell)
Tim Kihn tim.kihn@woodplc.com	Edmonton, AB	780.944.6363 (office) 780.717.5058 (cell)
Vladimir Ivensky (can call 24/7) vladimir.ivensky@woodplc.com	Plymouth Meeting, PA	610.877.6144 (office) 484.919.5175 (cell) 215.947.0393 (home)
Kirby Lastinger kirby.lastinger@woodplc.com	Lakeland, FL	836-667-2345 x207 (office) 863-272-4775 (cell)
Stephen Paxton stephen.paxton@woodplc.com	Kennesaw, GA	770-499-6842 (office) 678-270-0980 (mobile)
Chris Miele christopher.miele@woodplc.com	Capital Projects - Kirkland, WA	425-368-0946 (office) 425-864-9011 (mobile)

High potential near misses, unsafe work refusals, workplace violence/harassment and security incidents, subcontractor incidents, regulatory inspections, spills, and property damage should be reported immediately to one of the above HSE Representatives.

*Supervisor Responsible For:

- D&A Testing Coordination as per client and Wood E&IS requirements, Local/Client Notifications, and Completing Initial IAR within 24 hours and forwarding to Corporate HSE.

E&IA, North America | Rev. Nov 2019

FIELD TEAM REVIEW: I acknowledge that I understand the requirements of this HASP, and agree to abide by the procedures and limitations specified herein. I also acknowledge that I have been given an opportunity to have my questions regarding the HASP and its requirements answered prior to performing field activities. Health and safety training and medical surveillance requirements applicable to my field activities at this site are current and will not expire during on-site activities.

Name: _____ Date: _____

Name: _____ Date: _____

Name: _____ Date: _____

Name: _____ Date: _____

Name: _____ Date: _____

Routes to Emergency Medical Facilities

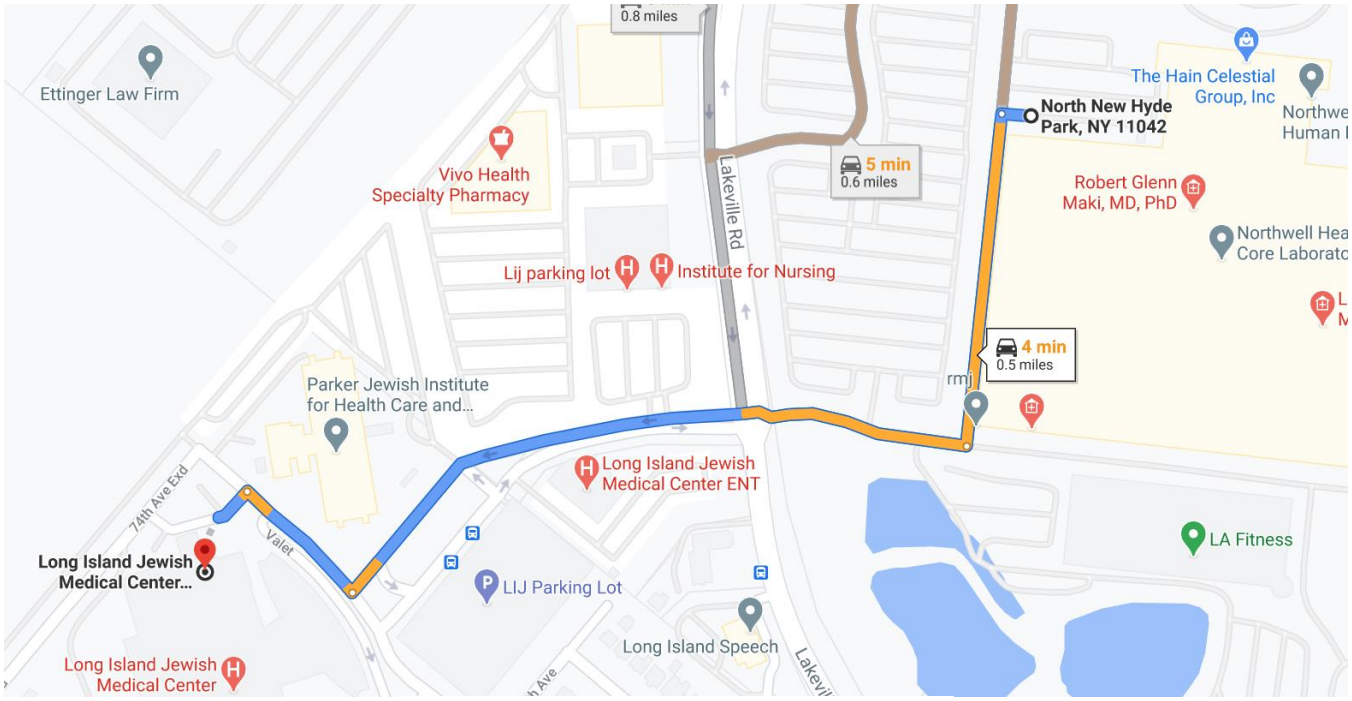
HOSPITAL(for immediate emergency treatment):

Facility Name: Long Island Jewish Medical Center

Address: 270-05 76th Ave, Queens, NY 11040

Telephone Number: 718-470-7500

DIRECTIONS TO PRIMARY HOSPITAL:



1. Head west — 59 ft
2. Turn left — 0.1 mi
3. Turn right — 0.3 mi
4. Turn right — 318 ft
5. Turn left
   Destination will be on the left — 85 ft

Long Island Jewish Medical Center Emergency Room
270-05 76th Ave, Queens, NY 11040

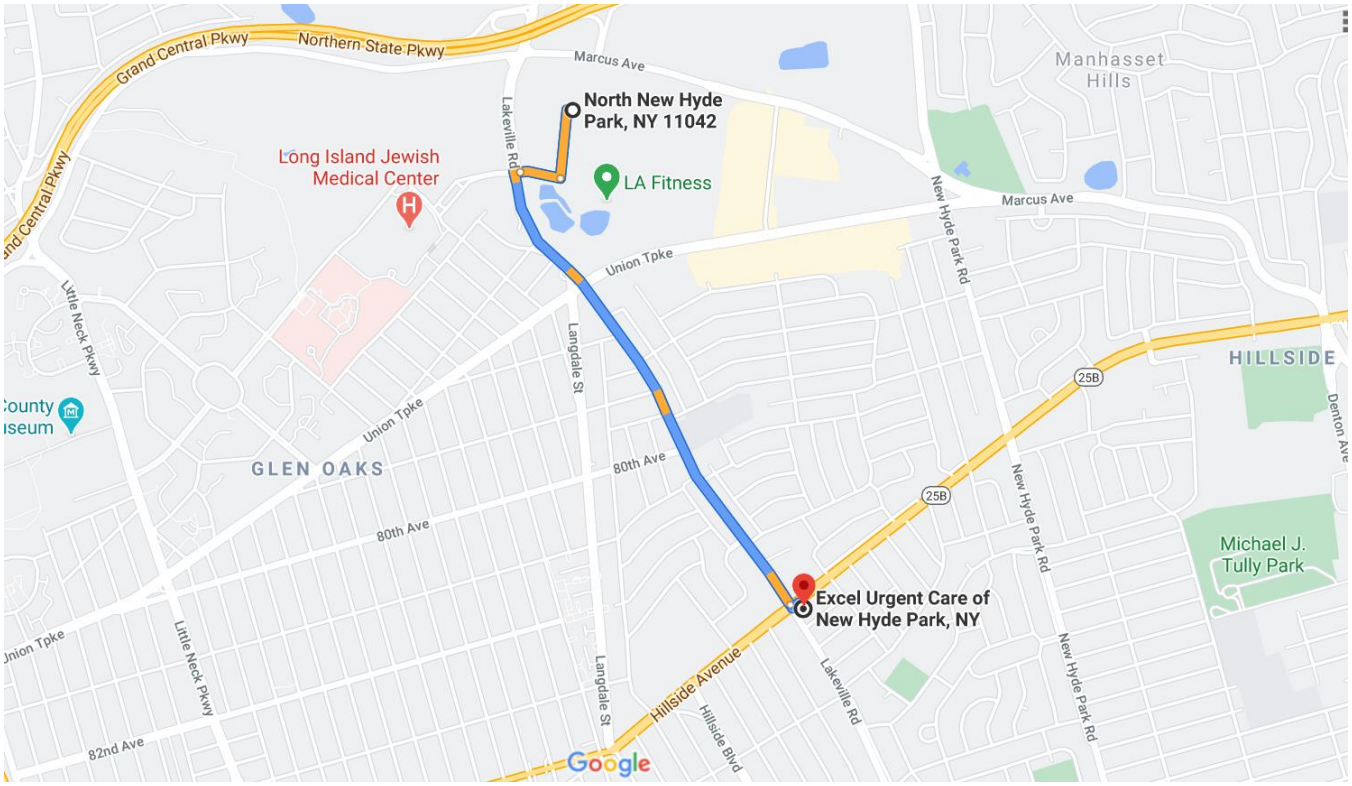
CLINIC (for non-emergency medical treatment)

Facility Name: Excel Urgent Care of New Hyde Park, NY

Address: 900 Hillside Avenue, New Hyde Park, NY 11040

Telephone Number: 516-519-8400

DIRECTIONS TO CLINIC:



1. Head west toward Lakeville Rd — 59 ft
2. Turn left — 0.1 mi
3. Turn right toward Lakeville Rd — 436 ft
4. Turn left onto Lakeville Rd — 1.1 mi
5. Turn left onto Hillside Avenue — 131 ft
   Destination will be on the right

Excel Urgent Care of New Hyde Park, NY
900 Hillside Avenue, New Hyde Park, NY 11040

Tailgate Safety Meeting Report

Check One:

☐ Initial Kickoff Safety Meeting ☐ Regular/Daily Tailgate Safety Meeting ☐ Unscheduled Tailgate Safety Meeting

Date: _____ Site: _____

Site Manager: _____ Site Health and Safety Officer: _____
Print *Print*

Order of Business

Topics Discussed (Check all that apply)

- ☐ Scope of Work
- ☐ Site History/Site Layout
- ☐ Personnel Responsibilities
- ☐ Training Requirements
- ☐ Hazard Analysis of Work Tasks (chemical, physical, biological and energy health hazard effects)
- ☐ Applicable SOPs (e.g., Hearing Conservation Program, Safe Driving, etc.)
- ☐ Safe Work Practices
- ☐ Engineering Controls
- ☐ Chemical Hazards and Controls
- ☐ Signs and symptoms of over exposure to site chemicals
- ☐ Medical Surveillance Requirements
- ☐ Action Levels
- ☐ Monitoring Instruments and Personal Monitoring
- ☐ Perimeter Monitoring, Type and Frequency
- ☐ PPE Required/PPE Used
- ☐ Define PPE Levels, Donning, Doffing Procedures
- ☐ Decontamination Procedures for Personnel and Equipment
- ☐ Physical Hazards and Controls (e.g., overhead utility lines)
- ☐ Anticipated Weather (snow, high winds, rain)
- ☐ Temperature Extremes (heat or cold stress symptoms and controls)
- ☐ Biological Hazards and Controls (e.g., poison ivy, spiders)
- ☐ Site Control (visitor access, buddy system, work zones, security, communications)
- ☐ Sanitation and Illumination
- ☐ Logs, Reports, Recordkeeping
- ☐ Incident Reporting Procedures
- ☐ Near Misses/Hazard ID including worker suggestions to correct and work practices to avoid similar occurrences
- ☐ General Emergency Procedures (e.g., locations of air horns and what 1 or 2 blasts indicate)
- ☐ General Emergency Response Procedures (e.g., earthquake response, typhoon response, etc.)
- ☐ Medical Emergency Procedures (e.g., exposure control precautions, location of first aid kits, etc.)
- ☐ Route to Hospital and Medical Care Provider Visit Guidelines
- ☐ Site/Regional Emergency Response Procedures (e.g., exposure control precautions, location of first aid kits, etc.)
- ☐ Hazardous Materials Spill Procedures

Safety Suggestions by Site Workers: _____

Action Taken on Previous Suggestions: _____

Injuries/Incidents/Personnel Changes since last meeting: _____

Tailgate Safety Meeting Report

Observations of unsafe work practices/conditions that have developed since previous meeting: _____

Location of (or changes in the locations of) evacuation routes/safe refuge areas: _____

Additional Comments: _____

Attendee signatures below indicate acknowledgment of the information and willingness to abide by the procedures discussed during this safety meeting

Name (Print)	Company	Signature

Meeting Conducted by: _____ Title: _____
Print

Signature: _____ Time: _____
Print

Wood Environment & Infrastructure Solutions, Inc.
Short Form HASP

PPE Selection Guidelines

When selecting the appropriate PPE for the job, consider the following:

- **Safety glasses** – general eye protection – source of hazard, typically coming from straight on, required at most sites
- **Tinted Safety Glasses** – same as above, but when working in direct sunlight. May need two both tinted and un-tinted if working in both sunlight and shade/overcast skies.
- **Safety goggles** – needed for splash hazard, more severe eye exposures coming from all directions. Non-vented or indirect venting for chemical splash, non-vented for hazardous gases or very fine dust, vented for larger particulates coming from all directions.
- **Face shield** – needed to protect face from cuts, burns, chemicals (corrosives or chemicals with skin notation), etc.
- **Safety boots** – needed if danger of items being dropped on foot that could injure foot
- **Hard hat** – danger from items falling on head – any overhead work, tools, equipment, etc. that is above the head and could fall on head of item fails, or falls off work platform. Typically required at most sites as a general PPE
- **Thin, chemical protective inner gloves** (e.g., thin Nitrile, PVC – do not use latex – many people are allergic to latex) –needed to protect hands from incidental contact with low risk contamination at very low concentrations (ppb or low ppm concentrations in groundwater or soil) or used in combination with outer gloves as a last defense against contamination. Need to specify type
- **Outer gloves** – thicker gloves (e.g., Nitrile, Butyl, Viton, etc.) – used when potential for high concentrations of contaminants (e.g., floating product, percent ranges of contaminant, opening drums, handling pure undiluted chemicals, etc.). Need to specify type.
- **Leather gloves, leather palm, cotton** – good in protecting hands against cuts – no protection from chemicals. May be used in combination with chemical protective gloves.
- **Boot Covers –** when there is contamination in surface soils or waking surface in general. When safety boots need protection from contact with contaminants.
- **White (uncoated) Tyveks** – protect clothing from getting dirty, good for protection against solid, non-volatile chemicals (e.g., asbestos, metals) – no chemical protection.
- **Polycoated Tyveks** – least protective of chemical protective clothing. Used when some risk of contamination getting on skin or clothing. Usually, lower ppm ranges of contaminants.
- **Saranex** – Greater protection against contamination than Polycoated Tyveks. Used to protect against PCBs or higher concentrations of contaminants in the soil or groundwater.
- **Other Chemical protective clothing** – if significant risk of dermal exposure, contact H&S to determine best kind.
- **Long sleeved shirts, long pants** – if working in areas with poison ivy/oak/sumac, poisonous insects, etc. and no chemicals exposure. May want to use uncoated Tyveks for work in areas where poisonous plants are known to be to protect clothing.
- **Cartridge Respirator (Level C PPE)** – Need to calculate change schedule (contact Division EH&S Manager for this) to determine length of use. To be able to use cartridge respirators, need to know contaminants, estimate levels to be encountered in the breathing zone, need to ensure that cartridge will be effective against COCs, and need to be able to monitor for COCs using PID, FID, Dräeger tubes, etc. If can't do any of these, then Level B PPE is probably going to be needed.
- **High Visibility Vest** – needed for any road work (within 15 feet of a road) or when working on a site with vehicular traffic or working around heavy equipment. Needed if work tasks would take employee concentration away from movement of vehicles and workers would have to rely on the other driver's ability to see the employee in order not to hit them. This includes heavy equipment as well as cars and trucks, on public roads or the jobsite. Not needed if wearing Polycoated Tyveks – as they are already high visibility.
- **Reflective Vest** – see above, but for use at night.
- **Hearing Protection** – needed if working at noise levels above 85 dBA on a time weighted average. If noise measurements are not available, use around noisy equipment, or in general, if you have to raise your voice to be heard when talking to someone standing two feet away.
- **Protective Chaps –** required when using a machete or chain saw or any other cut hazard to legs.

Incident Report Forms

1. Incident Analysis Report (IAR)
2. Vehicle Incident Report (VIR)
3. Ground Disturbance Incident Report(GDR)

Check one
Initial Report: ☐
Update: ☐
Final Report: ☐ ___

INCIDENT ANALYSIS REPORT (IAR)

Wood E&IS

Confidential - Privileged

Incident Potential Severity
Letter: Select One
Number: Select One
Investigation Level: Select One
Severity Matrix (LINK)

Group: Select One Group HSE Manager: ____ Incident Review Panel Team (if applicable): ____

Incident Date: _____ Report Date: _____ Incident Assigned to: Select One

Section 1 – General Information

Employee Name: ____ Sex: ☐ M ☐ F Date of Birth: ____ or Age Range: Select One

Job Position: Select One Hire Date: ____ Time employee began work: _____ Time of incident: ____ ☐ am | ☐ pm

Business Line: Select One Department Number: ____ Project Manager: ____

Project Name: ____ Project Number: ____ Client: ____

Employee home office: ____ State/Province: ____ Immediate Supervisor: ____ Hours employee worked during last 7 days: ____ hrs

Location: Select One Is this a Company controlled work site: ☐ Yes ☐ No Location description: ____

Section 2 – Incident Type - Process (**mark at least ONE BOLD TYPE** and all that apply)

☐ **Fatality** ☐ **Environmental** ☐ **Injury/Illness Incident** If Injury/illness: Select One

☐ **Security** ☐ **Near Miss/Hazard ID** ☐ **Property Damage** If Damage: Select One ☐ 3rd Party?

☐ Hospitalization ☐ **Regulatory Inspection** ☐ **Notice of Violation or Citation** ☐ Agency Reportable

☐ Motor Vehicle Incident Involving Injury ☐ Other (describe): ___

Outcome/Result: Select One If "other", specify: ___ Source of Hazard: Select One If "other", specify: ___

Immediate Cause: Select One

A. If **injury/illness**: Indicate the part of the body: Select One If "other", specify: ___

Indicate body part location: Select One If "other", specify: ___

Injury Type: Select One If "other" specify: ___ Illness Type: Select One If "other", specify: ___

☐ Bleeding? Select One If yes, "First Aider" name: ___ ☐ Contact with blood/infectious material? Select One

Exposure Control Precautions taken by First Aider (check all that apply):

- ☐ None (If none, contact WorkCare)
- ☐ Immediate Personal Hygiene
- ☐ Eye protection
- ☐ Gloves
- ☐ One-way CPR valve
- ☐ Face mask
- ☐ Previous HBV Immunization
- ☐ Recommended for HBV Immunization
- ☐ Other (describe): ____

☐ Blood contaminated work area / surface? If contaminated, describe cleanup/disposal: ___

☐ Medical treatment provided (i.e. prescriptions, referrals, etc.). If medical treatment, describe: ___

☐ Physical limitations received from physician? If limitations, describe: ___ ☐ Modified Work Offer provided.

☐ Second medical opinion? If second opinion, describe: ___

☐ Workers Compensation claim filed? If filed, claim number: ___

B. If **property damage**: describe what happened and estimate ($) of damage to all objects involved? ___

C. If **environmental**: Environmental incident category: ☐ Pollution Event ☐ Non-conformance

Was Regulatory Action Taken: Select One If "Yes" describe: ___

Type of pollution event: Select One Type of substance: Select One Name, CAS#, physical state: ___

Quantity: ___ Substance Unit: Select One Source of release: Select One If "other", specify: ___

Duration of Breach: Select One Receiving Environment: Select One If "other", specify: ___

Level of Non-conformance: Select One Describe Non-conformance: ___

D. If **security**: Security Incident Type: Select One If Physical: Select One If Criminal: Select One If Intellectual: Select One

E. If an **inspection by a regulatory agency**, what agency, who were the inspectors, inspector contact information? ___

Section 3 – Incident Description

Attach and number additional pages, as needed, to ensure all details related to the incident are captured.

A. List the names of all persons involved in the incident, and employer information: ___

B. List the names of any witnesses, their employer, and a local/company telephone number or address: ___

C. Name of Employee's supervisor: ___ Contact phone number for supervisor: ___

D. What specific job/task or action was the employee(s) doing just prior to the incident: ___

E. Was a tool or equipment involved? ☐ Yes ☐ No What was it: ___ Last Inspection Date: ___Defects: ___

F. Explain in **detail** what happened: ___

G. Explain in **detail** what object or substance directly harmed the employee: ___

H. What were the weather conditions at time of incident?: ___

I. What was the lighting like at time of incident? Bright ☐ Shadows ☐ Dark ☐ Other: ___

J. List any damaged equipment or property (other than motor vehicles). Provide model and serial number **and** estimated costs to repair/replace damaged equipment or property, if applicable: ___

Section 4 - Incident Analysis

A. Was a Health and Safety Plan (HASP) or Activity Hazard Analysis (AHA) completed for the work being performed? ☐ Yes ☐ No
If "yes", Who prepared the document?: ___

B. Who and when was the last manager (Project, Unit, etc.) at the site of the incident?: ___

C. When and what safety training **directly related** to the incident has the person(s) involved had?: ___

D. List attached documentation (HASP acknowledgement forms, kickoff/daily/weekly meetings, inspections, photographs): ___

Section 5 - Incident Investigation Results and Corrective Actions

This section to be completed by the HSE Manager/IRP with support from location where incident occurred, in accordance with A-Z List of Accident Causes and Glossary of A-Z Causes (click links).

Causal Factors (Acts or Omissions / Conditions)

(Attach and number any additional pages as needed to completely address this section)

	IMMEDIATE CAUSE	IMMEDIATE CAUSE SUB-TYPE	DESCRIPTION
1	Select One	_____	_____
2	Select One	_____	_____
3	Select One	_____	_____
4	Select One	_____	_____

Root Cause(s) Analysis - The below items represents major root cause categories which have been determined to be Less Than Adequate (LTA). A more detailed determination of the root cause will be facilitated, if needed, by the applicable Group HSE Manager / IRP.

	ROOT CAUSE TYPE	ROOT CAUSE SUB-TYPE	DESCRIPTION
1	Select One	_____	_____

2	Select One	____	____
3	Select One	____	____
4	Select One	____	____

Life Saving Rules and **Safety Essentials** (click links).

Life Saving Rules Select all applicable breaches of rules or ☐ None		Safety Essentials Select all applicable breaches of behavioral expectations or ☐ None	
☐ Confined Space ☐ Working at Height ☐ Permit to Work ☐ Isolations (energy) ☐ Dropped Objects (height) ☐ Excavations	☐ Personal Security ☐ Moving and Energized Equipment ☐ Working over or close to water ☐ Overhead electricity ☐ Driving ☐ Suspended Loads	☐ Always Take Care ☐ Follow the Rules ☐ Do a Risk Assessment	☐ You Must Intervene ☐ Manage Any Change ☐ Wear the Correct PPE

Corrective Actions

Root Cause #	Corrective Actions Taken (Attach additional pages as needed to completely address this section)	Responsible Person	Proposed Completion Date	Closed on Date	Verified by and Date Verified
____	____	____	____	____	____
____	____	____	____	____	____
____	____	____	____	____	____
____	____	____	____	____	____
____	____	____	____	____	____

Section 6 - Notifications, Certification & Approvals

Check the appropriate boxes indicating the applicable reports have been made to the following applicable organizations:

Auto Insurance Carrier was called ☐ HSE Manager Notified ☐

WorkCare was called ☐ Post-incident Drug/Alcohol Testing Performed ☐

Incident Report prepared by: ___

Employee (s): ___	Date: ___	Employee's Supervisor: ___	Date: ___
HSE Coordinator/Project/Unit Manager: ___	Date: ___	Group HSE Manager: ___	Date: ___

VEHICLE INCIDENT REPORT (VIR)

Amec Foster Wheeler E&I

Confidential - Privileged

Section 1 - General Information Date of Incident: _____

Time incident occurred: _____ ☐ am | ☐ pm | Illumination: ☐ Dark ☐ Dusk ☐ Light | Road Condition: ☐ Dry ☐ Wet ☐ Icy/snow

Were police summoned to scene? ☐ Yes ☐ No Police Department and Location: _____

Report #; _____ Officer's Name: _____ Officer's Badge Number: _____

Section 2 - Company Driver and Vehicle

Driver's name: _____ D/L #: _____ State: _____

Driver's home office address: _____ Driver's Phone #: _____

Company Vehicle #: _____ Year: _____ Model: _____ License #: _____ State: _____

Company car?: ☐ Yes ☐ No Personal Vehicle?: ☐ Yes ☐ No Rental Vehicle?: ☐ Yes ☐ No

If rental, rented from: _____

Passenger/Witness Name(s): _____ Address: _____ Telephone: _____

Passenger/Witness Name(s): _____ Address: _____ Telephone: _____

Damage to vehicle: _____

Was an employee injured?: ☐ Yes ☐ No If yes, please describe: _____

Injuries to others?: ☐ Yes ☐ No If yes, please describe: _____

Vehicle was being used for: Company business ☐ Yes ☐ No Personal business ☐ Yes ☐ No

Towed?: ☐ Yes ☐ No If yes, by whom?: _____ To Where?: _____

Section 3 - Other Driver and Vehicle Information

Driver's Name: _____ D/L # : _____ State: _____

Current address: _____ City: _____ State: _____

Telephone: _____ Work: _____ Cell: _____

Registered Owner's Name: _____ Address: _____ City: _____ State: _____

(verify registration document)

The Other Vehicle: Make: _____ Model: _____ Year: _____ License #: _____ State: _____

Insurance company name: _____ Address: _____ Phone #: _____

Policy No.: _____ Contact Person: _____ Phone #: _____

Passenger/Witness Name(s): _____ Address: _____ Telephone: _____

Passenger/Witness Name(s): _____ Address: _____ Telephone: _____

Damage: (*Make note of pre-existing damage and take pictures if possible – you may attach additional pages if necessary):* _____

Injuries to other driver/passengers: _____

Section 4 – Approvals (signatures required)

Form completed by (please print): _____ Date: _____

Signature: _____

Office/Project Manager (please print): _____ Date: _____

Signature: _____

Things to Do First In The Event Of a Motor Vehicle Incident

GENERAL INFORMATION

1. Do not decide on your own whether a particular incident is "covered" by insurance. Should there be any doubt, it is always preferable to report an occurrence, as this allows underwriters, the Risk Management Department and insurance adjusters to determine if a covered loss has taken place.

2. Policy Conditions do require that all losses and occurrences, which may result in a claim be promptly reported.

3. Do not admit liability or offer your opinion of liability to anyone.

4. Complete this IAR/VIR form promptly and forward with all applicable supporting documentation. It is essential both division and location information be provided.

5. For automobile collisions within the **United States**, please indicate on the IAR form that you have contacted Zurich at:

Zurich Insurance Company
1-800-987-3373 or
1-877-928-4531
24 hours a day, 7 days a week

6. For automobile collisions within **Canada**, please indicate on the IAR form that you have contacted Zurich at:

Crawford Adjusters Canada
Claims Alert
1-888-218-2346
24 hours a day, 7 days a week

7. Information on the use of rental and personal vehicles at work and insurance are at the links for **Canada** and **US**.

The more details you have the better but, don't delay reporting if you don't have all of the information - that may be obtained later. A Zurich trained operator will answer your call and ask for all relevant information regarding the incident. The initial information required includes:

- Your division,
- Office location and division contact name – advise that you are an AMEC Company
- Name, drivers license and phone number of the driver involved in the loss
- Description of the vehicle which he/she was driving (i.e., year, make, model, license plate number, serial number)
- Date, time and location of incident
- Passenger information (if applicable)
- Third party information (i.e., name, phone number, address, vehicle information, insurance information)
- If any injuries occurred (if applicable)
- Police information
- Witness information (if applicable)

Call 911 if there are serious injuries!

If you are injured or think you were injured, **contact your supervisor and call WorkCare at 888-449-7787**. Your supervisor will notify your HSE Coordinator and your Group HSE Manager. For additional instructions on what to do, go to Amec Foster Wheeler's HSE website at:

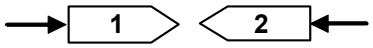
http://ee.amecnet.com/she/sheweb/incident_reporting.htm

1. Call for an officer if the incident occurred on public property (streets, highways or roads). Disputes often arise between the parties involved as to who was at fault; therefore, a police report is important. If an officer is unable to attend the scene of the collision, a counter police report may be filed at most stations. Insurance companies rely on police reports to determine liability.
2. Complete the Incident Investigation Report and the Vehicle Incident Report forms. It is important that both these forms are completed in detail. Include a diagram of the incident on the provided sheet. Incomplete information may lead to delays in processing associated claims and in helping to prevent this type of incident from occurring again.
3. Give only information that is required by the authorities or as directed by Amec Foster Wheeler contractual requirements.
4. Sign only those statements required by the authorities or as directed by Amec Foster Wheeler contractual requirements. Do not sign away your or the company's rights.

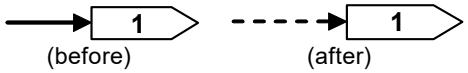
Vehicle Incident Diagram

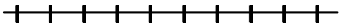
This or a similar diagram must be completed with all VIRs

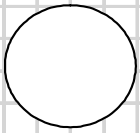
Instructions:

1. Number each vehicle and show directions 

2. Use a solid line to show path before incident and use a dotted line to show path after incient



3. Show pedestrian/non-motorist by: 
4. Show railroad by: 
5. Indicate north by arrow as: 
6. Show street or highway names or numbers
7. Show signs, signals, warning and traffic controls.



Indicate North
by Arrow

Prepared by: _____ Date: _____

GROUND DISTURBANCE INCIDENT REPORT (GDR)

Amec Foster Wheeler E&I

Section 1 – General Information

Employee Name: _____ Time of incident: _____ ☐ am | ☐ pm Time Reported:_____ ☐ am | ☐ pm Report Date: _____

Project Name: _____ Project Number: _____ Client: _____

List of All Parties Present

Name	Company	Telephone No.	Role
____	____	____	____
____	____	____	____
____	____	____	____
____	____	____	____
____	____	____	____

Describe the chronological description of the incident and response:____

Section 2 – Date and Location of Event

A. *Date of Event: (MM/DD/YYYY)

B. ***Country** ***State** ***County** **City**

C. **Street address** **Nearest Intersection**

D. *Right of Way where event occurred

E. Public: ☐ City Street ☐ State Highway ☐ County Road ☐ Interstate Highway ☐ Public-Other

F. Private: ☐ Private Business ☐ Private Land Owner ☐ Private Easement

G. ☐ Pipeline ☐ Power /Transmission Line ☐ Dedicated Public Utility Easement

☐ Federal Land ☐ Railroad ☐ Data not collected ☐ Unknown/Other

List attached documentation (Public Utility Locates, Private Utility Locates, Copy of notifications submitted to Owner or other utility Owners, photographs): _____

Section 3 – Affected Facility Information

***What type of facility operation was affected?**

☐ Cable Television ☐ Electric ☐ Natural Gas ☐ Liquid Pipeline ☐ Sewer (Sanitary Sewer)

☐ Steam ☐ Telecommunications ☐ Water ☐ Unknown/Other

***What type of facility was affected?**

☐ Distribution ☐ Gathering ☐ Service/Drop ☐ Transmission ☐ Unknown/Other

Was the facility part of a joint trench?

☐ Unknown ☐ Yes ☐ No

Was the facility owner a member of One-Call Center?

☐ Unknown ☐ Yes ☐ No

Section 4 – Excavation Information

***Type of Excavator**

☐ Contractor ☐ County ☐ Developer ☐ Farmer ☐ Municipality ☐ Occupant
☐ Railroad ☐ State ☐ Utility ☐ Data not collected ☐ Unknown/Other

***Type of Excavation Equipment**

☐ Auger ☐ Backhoe/Trackhoe ☐ Boring ☐ Drilling ☐ Directional Drilling
☐ Explosives ☐ Farm Equipment ☐ Grader/Scraper ☐ Hand Tools ☐ Milling Equipment
☐ Probing Device ☐ Trencher ☐ Vacuum Equipment ☐ Data Not Collected ☐ Unknown/Other

***Type of Work Performed**

☐ Agriculture ☐ Cable Television ☐ Curb/Sidewalk ☐ Bldg. Construction ☐ Bldg. Demolition
☐ Drainage ☐ Driveway ☐ Electric ☐ Engineering/Survey ☐ Fencing
☐ Grading ☐ Irrigation ☐ Landscaping ☐ Liquid Pipeline ☐ Milling
☐ Natural Gas ☐ Pole ☐ Public Transit Auth. ☐ Railroad Maint. ☐ Road Work
☐ Sewer (San/Storm) ☐ Site Development ☐ Steam ☐ Storm Drain/Culvert ☐ Street Light
☐ Telecommunication ☐ Traffic Signal ☐ Traffic Sign ☐ Water ☐ Waterway Improvement
☐ Data Not Collected ☐ Unknown/Other

Section 5 – Pre-Excavation Notification

***Was the One-Call Center notified?**

☐ Yes ☐ No If Yes, which One-Call Center? Ticket number:

Was Private Contract Locator used?

☐ Yes ☐ No

Section 6 – Locating and Marking

***Type of Locator**

☐ Utility Owner ☐ Contract Locator ☐ Data Not Collected

***Were facility marks visible in the area of excavation?**

☐ Yes ☐ No ☐ Data Not Collected

***Were facilities marked correctly?**

☐ Yes ☐ No ☐ Data Not Collected

What technology was used to locate utilities?

☐ Maps ☐ Active(transmitter+receiver) ☐ Passive (receiver only) ☐ GPR
☐ Acoustic ☐ Magnetic ☐ Infrared ☐ Unknown/Other

What Factors affected the ability to locate services?

☐ Soil Type:_____ ☐ Non-Grounded ☐ Common Bonded ☐ Depth
☐ Electromagnetic interference ☐ Parallel facilities ☐ Congested facilities ☐ Unknown/Other

Section 7 – Excavator Downtime

Did Excavator incur down time?

☐ Yes ☐ No

If yes, how much time?

☐ Unknown ☐ Less than 1 hour ☐ 1 hour ☐ 2 hours ☐ 3 or more hours Exact Value _____If

Estimated cost of down time?

☐ Unknown ☐ $0 ☐ $1 to 500 ☐ $501 to 1,000 ☐ $1,001 to 2,500 ☐ $2,501 to 5,000
☐ $5,001 to 25,000 ☐ $25,001 to 50,000 ☐ $50,001 and over Exact Value _____

Section 8 – Description of Damage

***Was there damage to a facility?**
☐ Yes ☐ No (i.e. near miss)
***Did the damage cause an interruption in service?**
☐ Yes ☐ No ☐ Data Not Collected ☐ Unknown/Other
If yes, duration of interruption
☐ Unknown ☐ Less than 1 hour ☐ 1 to 2 hrs ☐ 2 to 4 hrs ☐ 4 to 8 hrs ☐ 8 to 12 hrs ☐ 12 to 24 hrs
☐ 1 to 2 days ☐ 2 to 3 days ☐ 3 or more days ☐ Data Not Collected Exact Value _____
Approximately how many customers were affected?
☐ Unknown ☐ 0 ☐ 1 ☐ 2 to 10 ☐ 11 to 50 ☐ 51 or more Exact Value _____
Estimated cost of damage / repair/restoration
☐ Unknown ☐ $0 ☐ $1 to 500 ☐ $501 to 1,000 ☐ $1,001 to 2,500 ☐ $2,501 to 5,000
☐ $5,001 to 25,000 ☐ $25,001 to 50,000 ☐ $50,001 and over Exact Value _____
Number of people injured
☐ Unknown ☐ 0 ☐ 1 ☐ 2 to 9 ☐ 10 to 19 ☐ 20 to 49 ☐ 50 to 99
☐ 100 or more Exact Value _____
Number of fatalities
☐ Unknown ☐ 0 ☐ 1 ☐ 2 to 9 ☐ 10 to 19 ☐ 20 to 49 ☐ 50 to 99
☐ 100 or more Exact Value _____

Was there a Product Release?
Product Release: ☐ No ☐ Yes ☐ N/A Type: ____ **If Yes, Incident Type is Environmental Report.**
Volume: ____ Spill Controls: ____
Repair Process: ____

Section 9 – Description of the Root Cause Link to GDR Root Cause Tip Card

Please choose one

One-Call Notification Practices Not Sufficient
☐ No notification made to the One-Call Center
☐ Notification to one-call center made, but not sufficient
☐ Wrong information provided to One Call Center

Locating Practices Not Sufficient
☐ Facility could not be found or located
☐ Facility marking or location not sufficient
☐ Facility was not located or marked
☐ Incorrect facility records/maps

Excavation Practices Not Sufficient
☐ Failure to maintain marks
☐ Failure to support exposed facilities
☐ Failure to use hand tools where required
☐ Failure to test-hole (pot-hole)
☐ Improper backfilling practices
☐ Failure to maintain clearance
☐ Other insufficient excavation practices

Miscellaneous Root Causes
☐ One-Call Center error
☐ Abandoned facility
☐ Deteriorated facility
☐ Previous damage
☐ Data Not Collected
☐ Other

Provide explanation of selected root cause/s:____

Section 10 - Notifications, Certification & Approvals

Check the appropriate boxes indicating the applicable reports have been made to the following applicable organizations:

One Call was called ☐ **Spills Reporting Agency Notified ☐**

Emergency Responders (Fire) was called ☐ **Post-incident Drug/Alcohol Testing Performed**

List of All Agencies Contacted

Name/Agency	Phone #	Date	Time

Incident Report prepared by: ____

Employee (s): ____	Date: ____	Employee's Supervisor: ____	Date: ____
HSE Coordinator/Project/Unit Manager: ____	Date: ____	Group HSE Manager:____	Date: ____

Activity Hazard Analysis (AHAs)

1. Mobilization/Demobilization and Site Preparation
2. Field Work – Oversight
3. Utility Clearance Activities
4. Construction Inspection
5. Roof Work
6. Soil Sampling
7. Power Tools
8. Covid-19 Risk
9. AHA Template

AHA - - Mobilization/Demobilization and Site Preparation Activity Description

Activity/Work Task:	Mobilization/Demobilization and Site Preparation		
Project Location:	Lake Success, NY		
Contract Number:	3617207521		
Date Prepared:	**11/26/2018**	**Date Accepted:**	**12/7/2018**
Prepared by (Name/Title):	Ben Hess / Environmental Technician		
Reviewed by (Name/Title):	Glen Gordon/ Site Safety Officer		

Notes: (Field Notes, Review Comments, etc.)

This AHA involves the following:

- Establishing site specific measures
-

This AHA is not an exhaustive summary of all hazards associated with the Site. Refer to the site HASP for additional requirements. Contractor to follow general site safety controls for Slips Trips and Falls, Biological hazards, cuts lacerations and pinch points, and emergency procedures.

Overall Risk Assessment Code (RAC) (Use highest code) **M**

Risk Assessment Code (RAC) Matrix

Severity	Probability				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

Job Steps	Hazards	Controls	RAC
1. Prepare for Site Visit	1A) N/A	Prior to leaving for site: ▪ Obtain and review HASP prior to site visit, if possible ▪ Determine PPE needs – bring required PPE to the site, if not otherwise being provided at the site (e.g., steel toed boots) ▪ Determine training and medical monitoring needs and ensure all required Health and Safety training and medical monitoring has been received and is current ▪ Ensure all workers are fit for duty (alert, well rested, and mentally and physically fit to perform work assignment) ▪ If respiratory protection is required/potentially required, ensure that training and fit-testing has occurred within the past year. ▪ Familiarize yourself with route to the site	**M**

AHA - - Mobilization/Demobilization and Site Preparation
Activity Description

Job Steps	Hazards	Controls	RAC
	1b) Vehicle defects	Inspect company owned/leased vehicle for defects such as: ▪ Flat tires ▪ Windshield wipers worn or torn ▪ Oil puddles under vehicle ▪ Headlights, brake lights, turn signals not working	L
	1c) Insufficient emergency equipment, unsecured loads	Insufficient emergency equipment, unsecured loads: ▪ Ensure vehicle has first aid kit and that all medications are current (if first aid kits are not provided at the site) ▪ Ensure vehicle is equpped with warning flashers and/or flares and that the warning flashers work ▪ Cell phones are recommended to call for help in the event of an emergency ▪ Vehicles carrying tools must have a safety cage in place. All tools must be properly secured ▪ Vehicles must be equipped with chocks if the vehicle is to be left running, unattended. ▪ Ensure sufficient gasoline is in the tank	L
2. Operating vehicles	2a) Collisions, unsafe driving conditions	Drive Defensively!: ▪ Seat belts must be used at all times when operating any vehicle on company business. ▪ Drive at safe speed for road conditions ▪ Maintain adequate following distance ▪ Pull over and stop if you have to look at a map ▪ Try to park so that you don't have to back up to leave. ▪ If backing in required, walk around vehicle to identify any hazards (especially low level hazards that may be difficult to see when in the vehicle) that might be present. Use a spotter if necessary	M
3. Driving to the jobsite (mobilization)	3a) Dusty, winding, narrow roads	Dusty, winding, narrow roads ▪ Drive confidently and defensively at all times. ▪ Go slow around corners, occasionally clearing the windshield.	M

AHA - - Mobilization/Demobilization and Site Preparation
Activity Description

Job Steps	Hazards	Controls	RAC
	3b) Rocky or one-lane roads	Rocky or one-lane roads: ▪ Stay clear of gullies and trenches, drive slowly over rocks. ▪ Yield right-of-way to oncoming vehicles---find a safe place to pull over.	**M**
	3c) Stormy weather, near confused tourists	Stormy weather, near confused tourists: ▪ Inquire about conditions before leaving the office. ▪ Be aware of oncoming storms. ▪ Drive to avoid accident situations created by the mistakes of others.	**L**
	3d) When angry or irritated	When angry or irritated: ▪ Attitude adjustment; change the subject or work out the problem before driving the vehicle. Let someone else drive.	**M**
	3e) Turning around on narrow roads	Turning around on narrow roads: ▪ Safely turn out with as much room as possible. ▪ Know what is ahead and behind the vehicle. ▪ Use a backer if available.	**M**
	3f) Sick or medicated	Sick or medicated: ▪ Let others on the crew know you do not feel well. ▪ Let someone else drive.	**M**
	3g) On wet or slimy roads	On wet or slimy roads ▪ Drive slow and safe, wear seatbelts.	**M**
	3h) Animals on road	Animals on road ▪ Drive slowly, watch for other animals nearby. ▪ Be alert for animals darting out of wooded areas	**M**
4. Gain permission to enter site	4a) Hostile landowner, livestock, pets	Hostile landowner, livestock, pets ▪ Talk to land owner, be courteous and diplomatic ▪ Ensure all animals have been secured away from work area	**L**
5. Mobilization/ Demobilization of	5a) Struck by Heavy Equipment/Vehicles	Struck by heavy equipment: ▪ Be aware of heavy equipment operations.	**M**

AHA - - Mobilization/Demobilization and Site Preparation
Activity Description

Job Steps	Hazards	Controls	RAC
Equipment and Supplies		▪ Keep out of the swing radius of heavy equipment. ▪ Ground personnel in the vicinity of heavy equipment operations will be within the view of the operator at all times ▪ Employees shall wear a high visibility vest or T-shirt (reflective vest required if working at night). ▪ Ground personnel will be aware of the counterweight swing and maintain an adequate buffer zone. ▪ Ground personnel will not stand directly behind heavy equipment when it is in operation.	
	5b) Struck by Equipment/Supplies	Struck by Equipment/Supplies: ▪ Workers will maintain proper space around their work area, if someone enters it, stop work. ▪ When entering another worker's work space, give a verbal warning so they know you are there.	**L**
	5c) Overexertion Unloading/Loading Supplies	Overexertion Unloading/Loading Supplies: ▪ Train workers on proper body mechanics, do not bend or twist at the waist while exerting force or lifting. ▪ Tightly secure all loads to the truck bed to avoid load shifting while in transit.	**M**
	5d) Overexertion Unloading/Loading Supplies	Caught in/on/between: ▪ Do not place yourself between two vehicles or between a vehicle and a fixed object.	**M**
	5e) Slip/Trip/Fall	Slip/Trip/Fall: ▪ Mark all holes and low spots in area with banner tape. Instruct personnel to avoid these areas. ▪ Drivers will maintain 3 point contact when mounting/dismounting vehicles/equipment. ▪ Drivers will check surface before stepping, not jumping down.	**L**
	5f) Vehicle accident	Vehicle accident: ▪ Employees should follow AMEC vehicle operation policy and be aware of all stationary and mobile vehicles.	**L**

AHA - - Mobilization/Demobilization and Site Preparation
Activity Description

Job Steps	Hazards	Controls	RAC
6. Site Preparation	6a) Slip/Trip/Fall	Slip/Trip/Fall: ▪ Mark all holes and low spots in area with banner tape. Instruct personnel to avoid these areas	**L**
7. Installation of soil erosion and sediment controls	7a) Overexertion	Overexertion: ▪ Workers will be trained in the proper method of placing erosion controls. ▪ Do not bend and twist at the waist while lifting or exerting force.	**M**
	7b) Struck by Equipment/Supplies	Struck by Equipment/Supplies: ▪ Workers will maintain proper space around their work area, if someone enters it, stop work. ▪ When entering another worker's work space, give a verbal warning so they know you are there.	**M**
8. Driving back from the jobsite	7c) See hazards listed under item #3	See safe work practices under item #3	**M**

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
PPE (Respirator with P-100 cartridge, Hard Hat, safety glasses, gloves, steel toe work boots, high visibility safety vest, hearing protection) Note: When initially entering the site the following PPE must be donned: • Work Uniform or Work Clothes • Hard Hat • Safety Glasses • Steel Toe Boots • Reflective Vests	**Competent / Qualified Personnel:** Name – Position/Employer **Training requirements:** List specific certification (as applicable) Site Specific HASP Orientation Toolbox safety meeting Task kick-off meeting	Daily inspection of equipment per manufacturer's instructions. Tag tools that are defective and remove from service. Inspect power cord sets prior to use. Inspect all PPE prior to use

AHA – Field Work Oversight

Activity/Work Task:	Field Work - Oversight		
Project Location:	Lake Success, NY		
Contract Number:	3617207521		
Date Prepared:	**11/26/2018**	**Date Accepted:**	**12/7/2018**
Prepared by (Name/Title):	Ben Hess / Environmental Technician		
Reviewed by (Name/Title):	Glen Gordon / Health and Safety Officer		

Notes: (Field Notes, Review Comments, etc.)

This AHA involves the following:

- Establishing site specific measures

This AHA is not an exhaustive summary of all hazards associated with the Site. Refer to the site HASP for additional requirements. Contractor to follow general site safety controls for Slips Trips and Falls, Biological hazards, cuts lacerations and pinch points, and emergency procedures.

Overall Risk Assessment Code (RAC) (Use highest code)	**M**

Risk Assessment Code (RAC) Matrix

Severity	**Probability**				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	**E**	**E**	**H**	**H**	**M**
Critical	**E**	**H**	**H**	**M**	**L**
Marginal	**H**	**M**	**M**	**L**	**L**
Negligible	**M**	**L**	**L**	**L**	**L**

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

AHA – Field Work Oversight

Job Steps	Hazards	Controls	RAC
1. Prepare for site visit	1A) N/A	▪ Obtain and review HASP prior to site visit, if possible ▪ Determine PPE needs – bring required PPE to the site, if not otherwise being provided at the site (e.g., steel toed boots) ▪ Determine training and medical monitoring needs and ensure all required Health and Safety training and medical monitoring has been received and is current ▪ Ensure all workers are fit for duty (alert, well rested, and mentally and physically fit to perform work assignment) ▪ First aid kits shall be available at the work site and on each transport vehicle. ▪ Familiarize yourself with route to the site ▪ Check weather forecast. Pack appropriate clothing and other items (e.g., sunscreen) for anticipated weather conditions ▪ Verify that subsurface utilities have been identified.	**L**
2. Traveling to the site by vehicle	2A) See JHA for Mobilization, Demobilization and Site Preparation	• See JHA for Mobilization, Demobilization and Site Preparation	**M**
3. Initial Arrival - Assess Site Conditions	3A) Communication	▪ Talk to each other. Develop communication methods (agree on hand signals, warning alarms) ▪ Log all workers and visitor on and off the site. ▪ Let other crewmembers know when you see a hazard. ▪ Avoid working near known hazards. ▪ Always know the whereabouts of fellow crewmembers. ▪ Carry a radio and spare batteries or cell phone Hold tailgate meetings	**L**
	3B) Insect Bites and Stings	▪ Discuss the types of insects expected at the Site and be able to identify them. ▪ Look for signs of insects. ▪ Inform crew members if allergic to insects and what to do if you need assistance. ▪ Avoid wearing heavy fragrances. ▪ Carry first-aid and sting relief kits. ▪ Carry identification of known allergies and necessary emergency medication. ▪ Spray clothing with insect repellant as a barrier. ▪ Wear light colored clothing that fits tightly at the wrists, ankles, and waist. ▪ Cover trouser legs with high socks or boots. ▪ Tuck in shirt tails.	**L**

	3C) Poisonous plants	▪ Wear long sleeves, long pants and boots ▪ Ensure all field workers can identify the plants. Mark identified poisonous plants with high visibility spray paint if working at a fixed location. ▪ Look for signs of poisonous plants and demark area to aid in avoiding plant. ▪ Do not touch any plant part to any part of your body/clothing. ▪ Use commercially available products such as Ivy Block or Ivy Wash as appropriate.	**M**
	3D) Vermin, leaches, animal borne disease	▪ Survey the area for dens, nests, etc. ▪ Identify areas where biological hazards may be present. ▪ Wear long sleeve shirt and full length pants	**L**
	3E) Chemical Hazards	▪ Wear chemical resistant PPE as identified in the HASP ▪ Use monitoring equipment, as outlined in HASP, to monitor breathing zone ▪ Read MSDSs for all chemicals brought to the site ▪ Be familiar with hazards associated with site contaminants. ▪ Ensure that all containers are properly labeled	**M**
	3F) Overhead Power Lines	▪ Identify the location of all overhead power lines at the site. ▪ Maintain clearances depending on voltage - All equipment will stay a minimum of 10 feet from overhead energized electrical lines (50 kV or less). This distance will increase by 4 inches for each 10 kV above 50 kV. Rule of Thumb: Stay 10 feet away from all overhead power lines known to be 50 kV or less and 35 feet from all others.) ▪ Re-locate work so it is not close to power lines ▪ Avoid storing materials under overhead power lines	**M**
	3G) Underground Utilities	▪ All utilities will be marked prior to excavation activities ▪ For areas where utility locations cannot be verified, workers must hand dig for the first 3 feet ▪ Use lineman's gloves when locating underground power lines ▪ Work at adequate offsets from utility locations ▪ Immediately cease work if unknown utility markings are discovered.	**M**

	3H) Cold Stress	▪ Dress in layers with wicking garments (those that carry moisture away from the body – e.g. synthetics) and a weatherproof slicker. A waterproof breathable outer shell is recommended. ▪ Take layers off as you heat up; put them on as you cool down. ▪ Wear head protection that provides adequate insulation and protects the ears. ▪ Maintain your energy level. Avoid exhaustion and over-exertion which causes sweating, dampens clothing, and accelerates loss of body heat and increases the potential for hypothermia. ▪ Acclimate to the cold climate to minimize discomfort. ▪ Maintain adequate water/fluid intake to avoid dehydration. ▪ Be aware of signs of hypothermia, its prevention, detection and treatment. ▪ Have extra protection available, in case of an emergency such as blankets and heating devices. ▪ Don't work under extremely adverse weather conditions ▪ Stay in tune to current weather and extended forecasts.	**L**
	3I) Heat Stress	▪ Remain constantly aware of the four basic factors that determine the degree of heat stress (air temperature, humidity, air movement, and heat radiation) relative to the surrounding work environmental heat load. ▪ Know the signs and symptoms of heat exhaustion, heat cramps, and heat stroke. Heat stroke is a true medical emergency requiring immediate emergency response action. ▪ Maintain adequate water intake by drinking water periodically in small amounts throughout the day (flavoring water with citrus flavors or extracts enhances palatability). ▪ Lessen work load and/or duration of physical exertion the first days of heat exposure to allow gradual acclimatization. ▪ Alternate work and rest periods. More severe conditions may require longer rest periods and electrolyte fluid replacement.	**L**
	3J) Lightning and Thunder	▪ Monitor weather channels to determine if electrical storms are forecasted. ▪ Plan ahead and identify safe locations to be in the event of a storm. (e.g., sturdy building, vehicle, etc.) ▪ Suspend all field work at the first sound of thunder. You should be in a safe place when the time between the lightning and thunder is less than 30 seconds.	**L**
	3K) Severe Weather	▪ Watch for clouds and incoming weather. ▪ Monitor weather forecasts. ▪ Train workers about weather and appropriate precautions. ▪ Identify a shelter and a safe place in event of tornado etc	**L**

	3L) Sun	▪ Keep body protected ▪ Wear sunscreen, wide brimmed hat or hardhat. ▪ Schedule work for cool part of day. ▪ Take breaks in the shade.	**L**
	3M) High Crime Areas	▪ Do not enter areas where threats are present. ▪ Contract security where applicable. Use the buddy system. ▪ Maintain contact with support such as radio or cell phone ▪ Do not work after dark.	**L**
	3N) Operations conducted at an active facility	▪ Stay well clear of operations being conducted at the facility ▪ Keep alert for moving materials, equipment or vehicles ▪ Determine client specific PPE needs prior to arriving at the site ▪ Determine client specific emergency response procedures and follow as appropriate ▪ Participate in client required safety training ▪ Get copies of Clients SDSs for any client chemicals that workers may be exposed to. ▪ Provide SDSs to client for all chemicals brought to the site.	**M**
	3O) Remote Locations	▪ Carry a two-way radio and know how to use it. ▪ Work in teams. ▪ Make sure someone on crew is certified in first aid. ▪ Carry a first aid kit.	**M**
4. Walk around the Site	4A) Poisonous plants	▪ Wear long sleeves, long pants and boots. ▪ Ensure all field workers can identify the plants. Mark identified poisonous plants with high visibility spray paint if working at a fixed location. ▪ Do not touch any plant part to any part of your body/clothing. ▪ Use commercially available products such as Ivy Block or Ivy Wash as appropriate.	**M**
	4B) Vermin, leaches, animal borne disease	▪ Survey the area for dens, nests, etc. ▪ Identify areas where biological hazards may be present. ▪ Be aware of your surroundings. ▪ Wear long sleeve shirt and full length pants ▪ Wear appropriate footwear (snake boots, etc.) ▪ Avoid high grass areas if possible ▪ Do not put hand/arm into/under an area that you cannot see into/under clearly ▪ Perform routine inspections for ticks, leaches, etc. of yourself and co-workers.	**L**

	4C) Chemical Hazards	▪ See HASP for appropriate level of PPE ▪ Wear chemical resistant PPE as identified in the HASP ▪ Use monitoring equipment, as outlined in HASP, to monitor breathing zone ▪ Read MSDSs for all chemicals brought to the site ▪ Be familiar with hazards associated with site contaminants. ▪ Ensure that all containers are properly labeled	**L**
	4D) Slips/Trips/Falls	▪ Wear slip resistant footwear ▪ Pay attention to where you place your feet ▪ Slow down and use extra caution around logs, rocks, and animal holes. ▪ Extremely steep slopes (>50%) can be hazardous under wet or dry conditions; consider an alternate route. ▪ Site SHSO will inspect the entire work area to identify and mark hazards. ▪ Clear area of trip hazards; mark or barricade those that cannot be moved; ▪ Use caution when walking around excavated areas ▪ Use caution when walking on or around loose soil.	**M**
5. Oversight during drilling, or construction operations	5A) Heavy Equipment/ Vehicles	▪ Spotters will be used when backing up trucks and heavy equipment and when moving equipment. ▪ Ground personnel in the vicinity of vehicles or heavy equipment operations will be within the view of the operator at all times. ▪ Ground personnel will be aware of the swing radius and maintain an adequate buffer zone. ▪ Ground personnel will not stand directly behind heavy equipment when it is in operation. ▪ Personnel are prohibited from riding on the buckets, or elsewhere on the equipment except for designated seats with proper seat belts or lifts specifically designed to carry workers. Ground personnel will stay clear of all suspended loads. ▪ Ground personnel will wear high visibility vests ▪ Eye contact with operators will be made before approaching equipment.	**M**
	5B) Eye Injury	▪ Wear appropriate safety glasses (tinted for sun). ▪ Watch where you walk, especially around trees and brush with protruding limbs.	**L**
	5C) Foot Injury	▪ Wear steel toed boots when working around heavy equipment, materials, and tools. ▪ Wear insulated boots during winter ▪ Ensure shoes/boots have good traction ▪ Pay attention to where you place your feet, especially when walking on uneven terrain	**L**

	5D) Head Injury	▪ Wear hardhat when working around overhead hazards. ▪ Do not walk or work under scaffolding or other elevated work unless there are guardrails and toeboards in place ▪ Flag or mark protruding objects at head level	**L**
	5E) Chemical Hazards	▪ Wear chemical resistant PPE as identified in the HASP ▪ Use monitoring equipment, as outlined in HASP, to monitor breathing zone ▪ Read SDSs for all chemicals brought to the site ▪ Be familiar with hazards associated with site contaminants. ▪ Ensure that all containers are properly labeled ▪ Wash hands and face prior to consumption of food, beverage or tobacco.	**M**
	5F) Dust - particulates (respiratory)	▪ Use dust suppression methods ▪ Stand upwind of point of dust generation	**L**
	5G) Overhead Power Lines	▪ Maintain clearances depending on voltage - All equipment will stay a minimum of 10 feet from overhead energized electrical lines (50 kV or less). This distance will increase by 4 inches for each 10 kV above 50 kV. Rule of Thumb: Stay 10 feet away from all overhead power lines known to be 50 kV or less and 35 feet from all others.)	**M**
	5H) Underground Utilities	▪ All utilities will be marked prior to excavation activities. ▪ Work at adequate offsets from utility locations ▪ Immediately cease work if unknown utility markings are discovered.	**M**
	5I) Standing/Static Posture	▪ Change posture on a frequent basis ▪ Stretch prior to any physical activity	
	5J) Slips/Trips/Falls	▪ Pay attention to where you place your feet ▪ Slow down and use extra caution around logs, rocks, and animal holes. ▪ Extremely steep slopes (>50%) can be hazardous under wet or dry conditions; consider an alternate route. ▪ Wear laced boots with a minimum 8" high upper and non-skid soles for ankle support and traction. ▪ Clear area of trip hazards; mark or barricade those that cannot be moved. ▪ Use caution when walking around excavated areas ▪ Stay back at least 5 feet from excavated areas ▪ Use caution when walking on or around loose soil. ▪ Be aware of surroundings. Avoid muddy areas if possible.	**L**

6. Sampling Oversight	6A) Chemical Hazards	▪ See HASP for appropriate level of PPE ▪ Wear chemical resistant PPE as identified in the HASP ▪ Use monitoring equipment, as outlined in HASP, to monitor breathing zone ▪ Be familiar with hazards associated with site contaminants. ▪ Wash hands and face prior to consumption of food, beverage or tobacco. ▪ Calibrate meters in a clean, well ventilated area ▪ Store calibration gases in well vented area. Ensure chemical labels and warnings are legible.	**M**
	6B) Decontamination	▪ Refer to SDS for specific hazards associated with decon solutions ▪ Monitor breathing zone for decon solutions (e.g., methanol, hexane, etc.), if appropriate (see HASP) ▪ Removal of PPE will be performed by the following tasks in the listed order: o Gross boot wash and rinse and removal o Outer glove removal o Suit removal o Respirator removal (if worn). o Inner glove removal ▪ Contaminated PPE is to be placed in the appropriate, provided receptacles. ▪ Employees will wash hands, face, and any other exposed areas with soap and water. ▪ Portable eyewash stations and showers will be available should employees come into direct contact with contaminated materials. ▪ Decon solutions will be disposed of according to the work plan.	**M**
	6C) Lifting	▪ Good lifting techniques (lift with legs not back) ▪ Mechanical devices (e.g., hand truck, cart, forklift, etc.) should be used to reduce manual handling of materials. ▪ Team lifting should be utilized if mechanical devices are not available. (mandatory for items over 50 lbs) ▪ Split heavy loads in to smaller loads ▪ Make sure that path is clear prior to lift. ▪ Redesign work area to avoid low lifts ▪ Stretch prior to lifting ▪ Maintain a healthy life style and level of physical fitness.	**M**

	6D) Hand Tools	▪ Cut resistant work gloves will be worn when dealing with sharp objects. ▪ All hand and power tools will be maintained in safe condition. ▪ Do not drop or throw tools. Tools shall be placed on the ground or work surface or handed to another employee in a safe manner. ▪ Guards will be kept in place while using hand and power tools. ▪ Daily inspections will be performed. ▪ Remove broken or damaged tools from service and tag out as defective ▪ No tampering with electrical equipment is allowed (e.g., splicing cords, cutting the grounding prong off plug, etc.) ▪ Do not use excessive force or impact ▪ Do not use tool improperly. Ensure all workers are trained	**L**
	6E) Slips/Trips/ Falls	▪ Pay attention to where you place your feet ▪ Slow down and use extra caution around logs, rocks, and animal holes. ▪ Extremely steep slopes (>50%) can be hazardous under wet or dry conditions; consider an alternate route. ▪ Wear laced boots with a minimum 8" high upper and non-skid soles for ankle support and traction. ▪ Clear area of trip hazards; mark or barricade those that cannot be moved; ▪ Use caution when walking around excavated areas ▪ Stay back at least 5 feet from excavated areas ▪ Use caution when walking on or around loose soil. ▪ Be aware of surroundings. Avoid muddy areas if possible.	**L**

	6F) Struck by Vehicle	▪ Ground personnel in the vicinity of vehicles operations will be within the view of the operator at all times. ▪ Ground personnel will not stand directly behind vehicles when it is in operation ▪ Drivers will keep workers on foot in their vision at all times, if you lose sight of someone, Stop! ▪ High visibility vests will be worn when workers are exposed to vehicular traffic at the site or on public roads. ▪ Try to park so that you don't have to back up to leave. ▪ If backing in required, walk around vehicle to identify any hazards (especially low level hazards that may be difficult to see when in the vehicle) that might be present. Use a spotter if necessary ▪ Place cones in the font and rear of the vehicle ▪ Prior to driving off, walk around vehicle to collect cones and identify any hazards - especially low level hazards that may be difficult to see when in the vehicle. ▪ Set up "Workers in the Road" or similar warning signs and cones to alert traffic. ▪ Use emergency flashers and roof top flashing light (recommended) to alert oncoming vehicular traffic. ▪ Remain alert at all times as to the traffic outside the vehicle. Step to the side of the road when distracted by by-standers. Keep unofficial personnel out of the work area. ▪ Exit vehicle with caution. ▪ Wear High Visibility Vest when outside the vehicle. ▪ Utilize vehicle as a shield from oncoming traffic, as practical	**L**
7. IDW pickup oversight	• Foot Injury	▪ Wear steel toed boots ▪ Pay attention to where you place your feet, especially when walking on uneven terrain	
	• Chemical Hazards	▪ See HASP for appropriate level of PPE ▪ Wear chemical resistant PPE as identified in the HASP ▪ Use monitoring equipment, as outlined in HASP, to monitor breathing zone ▪ Be familiar with hazards associated with site contaminants. ▪ Wash hands and face prior to consumption of food, beverage or tobacco.	**L**
	• Lifting	▪ Good lifting techniques (lift with legs not back) ▪ Use mechanical devices (e.g., hand truck, cart, forklift, etc.) to move drums. ▪ Team lifting should be utilized if mechanical devices are not available. (mandatory for items over 50 lbs)	**M**

	• Slips/Trips/ Falls	▪ Pay attention to where you place your feet ▪ Slow down and use extra caution around logs, rocks, and animal holes. ▪ Extremely steep slopes (>50%) can be hazardous under wet or dry conditions; consider an alternate route. ▪ Clear area of trip hazards; mark or barricade those that cannot be moved; ▪ Use caution when walking around excavated areas ▪ Stay back at least 5 feet from excavated areas ▪ Use caution when walking on or around loose soil. ▪ Be aware of surroundings. Avoid muddy areas if possible.	**L**
8. Return to office/ home	8A) See Mobilization/ Demobilization and Site Preparation JHA	**See Mobilization/ Demobilization and Site Preparation JHA**	**L**

AHA – Field Work Oversight

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
PPE (Respirator with P-100 cartridge, Hard Hat, safety glasses, gloves, steel toe work boots, high visibility safety vest, hearing protection)	**Competent / Qualified Personnel:** Name – Position/Employer – See HASP **Training requirements:** List specific certification (as applicable) Site Specific HASP Orientation Toolbox safety meeting Task kick-off meeting	Daily inspection of equipment per manufacturer's instructions. Tag tools that are defective and remove from service. Inspect power cord sets prior to use. Inspect all PPE prior to use

AHA – Utility Clearance

Activity/Work Task:	Utility Clearance Activities		
Project Location:	Lake Success, NY		
Contract Number:	3617207521		
Date Prepared:	**11/26/2018**	**Date Accepted:**	**12/7/2018**
Prepared by (Name/Title):	Ben Hess / Environmental Technician		
Reviewed by (Name/Title):	Glen Gordon / Health and Safety Officer		

Notes: (Field Notes, Review Comments, etc.)

This AHA involves the following:

- Establishing site specific measures

This AHA is not an exhaustive summary of all hazards associated with the Site. Refer to the site HASP for additional requirements. Contractor to follow general site safety controls for Slips Trips and Falls, Biological hazards, cuts lacerations and pinch points, and emergency procedures.

Overall Risk Assessment Code (RAC) (Use highest code)	**H**

Risk Assessment Code (RAC) Matrix

Severity	**Probability**				
	Frequent	Likely	Occasional	Seldom	Unlikely
		E	**H**	**H**	**M**
Critical	**E**	**H**	**H**	**M**	**L**
Marginal	**H**	**M**	**M**	**L**	**L**
Negligible	**M**	**L**	**L**	**L**	**L**

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

AHA – Utility Clearance

Job Steps	Hazards	Controls	RAC
1. Utility Clearance	1A) **Utilities Not Cleared (damage to utilities, worker injury)**	1A) Do not perform intrusive work until all utilities have been cleared. ▪ Provide sufficient time and budget to ensure that utilities have been adequately located, prior to the start of up of work. ▪ Contact One Call Utility identifier organization at least 6 days prior to the project start date. ▪ Cite or have subcontractor cite a start date of at least 3 working days prior to actual planned start date (provides window to inspect locations prior to job start-up. ▪ Verify via emails or phone that all utilities have visited the site and marked their respective utilities. ▪ If subcontractor calls One Call organization, require them to forward all e-mail responses from member utilities as they receive them. ▪ If verification cannot be done remotely, send worker to site to inspect ground for markings (cheaper to identify issues prior to mobilization to the site). ▪ Document all phone communications with driller about utility clearance issues and requests (e-mail the conversation highlights or document in a field notebook – it becomes part of the file record) ▪ Call any member utilities that have not responded indicating they have cleared or marked-out utilities. Place the call morning of ticket start date (e.g., 3 days prior to actual start date). Document the phone conversations in notes or e-mails to the file. ▪ If town services (e.g., sanitary sewer, storm sewer, water) aren't listed as a One Call member, contact the town office to schedule mark-out, obtain copies of utility networks, and identify the appropriate town contacts. ▪ If town maps have lateral connections to private lots marked and /or if we are drilling along road right-of way opposite developed properties, identify the locations of the lateral connections. This may mean contacting abutters and asking to look in basements for location of pipes. If possible do this during a site visit prior to field start. If not, it should occur during the first day of work so any issues can be identified and decisions made on the risk of proceeding. **Walk all planned locations with the subcontractor, prior to start of excavation/drilling to identify marked utilities and note any uncertainties. Field Lead should call PM and relay any issues. Document this inspection in the field book and note subcontractor's responses to any MACTEC concerns.**	**H**

	1B) **Locating Utilties on Private Property**	1B) Locating Utilities on Private Property ▪ Hire private utility locater company ▪ Locate underground utilities by ground penetrating radar, electromagnetic, deep metal detector, pipe transmitter, vibracator, etc ▪ Review locations with property owner, member of operations and maintenance. ▪ Check as built drawings when available. Be aware possible drawing error or construction drawings may not be representative of actual locations. ▪ Use field clues such as manhole covers, repaved areas, depressions, disturbed areas, signs and postings, etc. as indications of access to utilities or recently installed/moved utilities.	**M**
	1C) Lack of Reliable Data on Utility Locations	1C) Lack of Reliable Data on Utility Locations ▪ If the surveys are not providing reliable data, plan to use non-destructive means to drill/excavate e.g., soil vacuum, water jet, air knife and/or hand tools. ▪ Use caution and proper PPE when using hand tools (hand augers, posthole diggers, shovels, steel rods, etc.). **1)** Involve the Project Manager, Technical Lead and/or Office Manager to make a decision to proceed or move the location	**L**
	1D) Slips/Trips/Falls	1D) Slips/Trips/Falls ▪ Keep work area free of excess material and debris ▪ Remove all trip hazards by keeping materials/objects organized and out of walkways ▪ Keep work surfaces dry when possible ▪ Wear appropriate PPE (see HASP) including non-slip rubber boots if working on wet or slick surfaces ▪ Install rough work surface covers where possible ▪ Stay aware of footing and do not run	**L**
	1E) Heat/Cold Stress	1E) Heat/Cold Stress ▪ Take breaks if feeling faint or overexerted ▪ Consume adequate food/beverages (water, sports drinks) ▪ If possible, adjust work schedule to avoid temperature extremes	**L**

AHA – Utility Clearance

2. Walking Around Site Identifying Utility Clearances.	2A) Biological Hazards: Insects, Snakes, Wildlife, Vegetation	2A) Biological Hazards: Insects, Snakes, Wildlife, Vegetation ▪ Inspect work areas when arrive at site to identify hazard(s) ▪ Use insect repellant if observe mosquitoes/gnats ▪ Survey site for presence of biological hazards and maintain safe distance ▪ Wear appropriate PPE including leather gloves, long sleeves and pants, and snake chaps as warranted by site conditions	**M**
	2B) Traffic (including pedestrian)	2B) Traffic (including pedestrian) ▪ Notify attendant or site owner/manager of work activities and location ▪ Use cones, signs, flags or other traffic control devices ▪ Wear appropriate PPE including high visibility clothing such as reflective vest ▪ Inspect area behind vehicle prior to backing and use spotter	**M**

AHA – Utility Clearance

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
PPE (Hard Hat, safety glasses, gloves, steel toe work boots, high visibility safety vest, hearing protection)	**Competent / Qualified Personnel:** Name – Position/Employer See HASP	Daily inspection of equipment per manufacturer's instructions. Tag tools that are defective and remove from service. Inspect power cord sets prior to use. Inspect all PPE prior to use

AHA – Construction Inspection

Activity/Work Task:	Construction Inspection		
Project Location:	Lake Success, NY		
Contract Number:	3617207521		
Date Prepared:	**11/26/2018**	**Date Accepted:**	**12/7/2018**
Prepared by (Name/Title):	Ben Hess / Environmental Technician		
Reviewed by (Name/Title):	Glen Gordon / Health and Safety Coordinator		

Notes: (Field Notes, Review Comments, etc.)

This AHA involves the following:

- Establishing site specific measures

This AHA is not an exhaustive summary of all hazards associated with the Site. Refer to the site HASP for additional requirements. Contractor to follow general site safety controls for Slips Trips and Falls, Biological hazards, cuts lacerations and pinch points, and emergency procedures.

Overall Risk Assessment Code (RAC) (Use highest code)	**M**

Risk Assessment Code (RAC) Matrix

Severity	**Probability**				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	**E**	**E**	**H**	**H**	**M**
Critical	**E**	**H**	**H**	**M**	**L**
Marginal	**H**	**M**	**M**	**L**	**L**
Negligible	**M**	**L**	**L**	**L**	**L**

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

AHA – Construction Inspection

Job Steps	Hazards	Controls	RAC
1. Prepare for site visit	1A) N/A	▪ Obtain and review HASP prior to site visit. ▪ Determine PPE needs – bring required PPE to the site, if not otherwise being provided at the site (e.g., steel toed boots) ▪ Determine training and medical monitoring needs and ensure all required Health and Safety training and medical monitoring has been received and is current ▪ Ensure all workers are fit for duty (alert, well rested, and mentally and physically fit to perform work assignment) ▪ First aid kits shall be available at the work site and on each transport vehicle. ▪ Familiarize yourself with route to the site ▪ Check weather forecast. Pack appropriate clothing and other items (e.g., sunscreen) for anticipated weather conditions ▪ Verify that subsurface utilities have been identified.	L
2. Traveling to the site by vehicle	2A) See AHA for Mobilization, Demobilization and Site Preparation	See AHA for Mobilization, Demobilization and Site Preparation	L
3. Initial Arrival - Assess Site Conditions	Communication	▪ Talk to each other. Develop communication methods (agree on hand signals, warning alarms) ▪ Log all workers and visitor on and off the site. ▪ Let other crewmembers know when you see a hazard. ▪ Avoid working near known hazards. ▪ Always know the whereabouts of fellow crewmembers. ▪ Carry a radio and spare batteries or cell phone ▪ Hold tailgate meetings	L
	3A) Insect Bites and Stings	▪ Discuss the types of insects expected at the Site and be able to identify them. ▪ Look for signs of insects. ▪ Inform crew members if allergic to insects and what to do if you need assistance. ▪ Avoid wearing heavy fragrances. ▪ Carry first-aid and sting relief kits. ▪ Carry identification of known allergies and necessary emergency medication. ▪ Spray clothing with insect repellant as a barrier. ▪ Wear light colored clothing that fits tightly at the wrists, ankles, and waist. ▪ Cover trouser legs with high socks or boots. ▪ Tuck in shirt tails.	L

	3B) Poisonous plants	▪ Wear long sleeves, long pants and boots ▪ Ensure all field workers can identify the plants. Mark identified poisonous plants with high visibility spray paint if working at a fixed location. ▪ Look for signs of poisonous plants and demark area to aid in avoiding plant. ▪ Do not touch any plant part to any part of your body/clothing. ▪ Use commercially available products such as Ivy Block or Ivy Wash as appropriate.	**M**
	3C) Vermin, leaches, animal borne disease	▪ Survey the area for dens, nests, etc. ▪ Identify areas where biological hazards may be present. ▪ Wear long sleeve shirt and full length pants	**L**
	3D) Chemical Hazards	▪ Wear chemical resistant PPE as identified in the HASP ▪ Use monitoring equipment, as outlined in HASP, to monitor breathing zone ▪ Read MSDSs for all chemicals brought to the site ▪ Be familiar with hazards associated with site contaminants. ▪ Ensure that all containers are properly labeled	**M**
	3E) Overhead Power Lines	▪ Identify the location of all overhead power lines at the site. ▪ Maintain clearances depending on voltage - All equipment will stay a minimum of 10 feet from overhead energized electrical lines (50 kV or less). This distance will increase by 4 inches for each 10 kV above 50 kV. Rule of Thumb: Stay 10 feet away from all overhead power lines known to be 50 kV or less and 35 feet from all others.) ▪ Re-locate work so it is not close to power lines ▪ Avoid storing materials under overhead power lines	**M**
	3F) Underground Utilities	▪ All utilities will be marked prior to excavation activities ▪ See Underground utility location AHA	**M**
	3G) Cold Stress	▪ Dress in layers with wicking garments (those that carry moisture away from the body – e.g., synthetics) and a weatherproof slicker. A breathable water resistant outer garment is recommended. ▪ Take layers off as you heat up; put them on as you cool down. ▪ Wear head protection that provides adequate insulation and protects the ears. ▪ Maintain your energy level. Avoid exhaustion and over-exertion which causes sweating, dampens clothing, and accelerates loss of body heat and increases the potential for hypothermia. ▪ Acclimate to the cold climate to minimize discomfort. ▪ Maintain adequate water/fluid intake to avoid dehydration. ▪ Be aware of signs of hypothermia, its prevention, detection and treatment. ▪ Have extra protection available, in case of an emergency such as blankets and heating devices. ▪ Don't work under extremely adverse weather conditions ▪ Stay in tune to current weather and extended forecasts.	**L**

	3H) Heat Stress	▪ Remain constantly aware of the four basic factors that determine the degree of heat stress (air temperature, humidity, air movement, and heat radiation) relative to the surrounding work environmental heat load. ▪ Know the signs and symptoms of heat exhaustion, heat cramps, and heat stroke. Heat stroke is a true medical emergency requiring immediate emergency response action. ▪ Maintain adequate water intake by drinking water periodically in small amounts throughout the day (flavoring water with citrus flavors or extracts enhances palatability). ▪ Lessen work load and/or duration of physical exertion the first days of heat exposure to allow gradual acclimatization. ▪ Alternate work and rest periods. More severe conditions may require longer rest periods and electrolyte fluid replacement.	**L**
	3I) Lightning and Thunder	▪ Monitor weather channels to determine if electrical storms are forecasted. ▪ Plan ahead and identify safe locations to be in the event of a storm. (e.g., sturdy building, vehicle, etc.) ▪ Suspend all field work at the first sound of thunder. You should be in a safe place when the time between the lightning and thunder is less than 30 seconds.	**L**
	3J) Severe Weather	▪ Watch for clouds and incoming weather. ▪ Monitor weather forecasts. ▪ Train workers about weather and appropriate precautions. ▪ Identify a shelter and a safe place in event of tornado etc	**L**
	3K) Sun	▪ Keep body protected ▪ Wear sunscreen, wide brimmed hat or hardhat. ▪ Schedule work for cool part of day. ▪ Take breaks in the shade.	**L**
	3L) High Crime Areas	▪ Do not enter areas where threats are present. ▪ Contract security where applicable. Use the buddy system. ▪ Maintain contact with support such as radio or cell phone ▪ Do not work after dark.	**L**
4. Walk around the Site	4A) Poisonous plants	▪ Wear long sleeves, long pants and boots. ▪ Ensure all field workers can identify the plants. Mark identified poisonous plants with high visibility spray paint if working at a fixed location. ▪ Do not touch any plant part to any part of your body/clothing. ▪ Use commercially available products such as Ivy Block or Ivy Wash as appropriate.	**M**

	4B) Vermin, leaches, animal borne disease	▪ Survey the area for dens, nests, etc. ▪ Identify areas where biological hazards may be present. ▪ Be aware of your surroundings. ▪ Wear long sleeve shirt and full length pants ▪ Wear appropriate footwear (snake boots, etc.) ▪ Avoid high grass areas if possible ▪ Do not put hand/arm into/under an area that you cannot see into/under clearly ▪ Perform routine inspections for ticks, leaches, etc. of yourself and co-workers.	L
	4C) Chemical Hazards	▪ See HASP for appropriate level of PPE ▪ Wear chemical resistant PPE as identified in the HASP ▪ Use monitoring equipment, as outlined in HASP, to monitor breathing zone ▪ Read SDSs for all chemicals brought to the site ▪ Be familiar with hazards associated with site contaminants. ▪ Ensure that all containers are properly labeled	L
	4D) Slips/Trips/Falls	▪ Wear slip resistant footwear ▪ Pay attention to where you place your feet ▪ Slow down and use extra caution around logs, rocks, and animal holes. ▪ Extremely steep slopes (>50%) can be hazardous under wet or dry conditions; consider an alternate route. ▪ Site SHSO will inspect the entire work area to identify and mark hazards. ▪ Clear area of trip hazards; mark or barricade those that cannot be moved; ▪ Use caution when walking around excavated areas ▪ Use caution when walking on or around loose soil.	M
5. Inspections during construction operations	5A) Heavy Equipment/ Vehicles	▪ Spotters will be used when backing up trucks and heavy equipment and when moving equipment. ▪ Ground personnel in the vicinity of vehicles or heavy equipment operations will be within the view of the operator at all times. ▪ Ground personnel will be aware of the swing radius and maintain an adequate buffer zone. ▪ Ground personnel will not stand directly behind heavy equipment when it is in operation. ▪ Personnel are prohibited from riding on the buckets, or elsewhere on the equipment except for designated seats with proper seat belts or lifts specifically designed to carry workers. Ground personnel will stay clear of all suspended loads. ▪ Ground personnel will wear high visibility vests ▪ Eye contact with operators will be made before approaching equipment.	M
	5B) Eye Injury	▪ Wear appropriate safety glasses (tinted for sun). ▪ Watch where you walk, especially around trees and brush with protruding limbs.	L

	5C) Foot Injury	▪ Wear steel toed boots when working around heavy equipment, materials, and tools ▪ Wear insulated boots during winter ▪ Ensure shoes/boots have good traction ▪ Pay attention to where you place your feet, especially when walking on uneven terrain	L
	5D) Head Injury	▪ Wear hardhat ▪ Do not walk or work under scaffolding or other elevated work unless there are guardrails and toeboards in place ▪ Flag or mark protruding objects at head level	L
	5E) Chemical Hazards	▪ Wear chemical resistant PPE as identified in the HASP ▪ Use monitoring equipment, as outlined in HASP, to monitor breathing zone ▪ Read SDSs for all chemicals brought to the site ▪ Be familiar with hazards associated with site contaminants. ▪ Ensure that all containers are properly labeled ▪ Wash hands and face prior to consumption of food, beverage or tobacco.	M
	5F) Dust - particulates (respiratory)	▪ Use dust suppression methods ▪ Stand upwind of point of dust generation	L
	5G) Overhead Power Lines	▪ Maintain clearances depending on voltage - All equipment will stay a minimum of 10 feet from overhead energized electrical lines (50 kV or less). This distance will increase by 4 inches for each 10 kV above 50 kV. Rule of Thumb: Stay 10 feet away from all overhead power lines known to be 50 kV or less and 35 feet from all others.)	M
	5H) Standing/Static Posture	▪ Change posture on a frequent basis ▪ Stretch prior to any physical activity	L
	5I) Slips/`Trips/Falls	▪ Pay attention to where you place your feet ▪ Slow down and use extra caution around logs, rocks, and animal holes. ▪ Extremely steep slopes (>50%) can be hazardous under wet or dry conditions; consider an alternate route. ▪ Wear laced boots with a minimum 8" high upper and non-skid soles for ankle support and traction. ▪ Clear area of trip hazards; mark or barricade those that cannot be moved. ▪ Use caution when walking around excavated areas ▪ Stay back at least 5 feet from excavated areas ▪ Use caution when walking on or around loose soil. ▪ Be aware of surroundings. Avoid muddy areas if possible.	L

	5J) Excavation Hazards	▪ For excavations over 4 feet in depth, a competent person must inspect the trench daily or as hazardous conditions change. ▪ Trenches over 4 feet in depth must be adequately sloped, benched or shored with protective systems. ▪ Store all materials and soil at least 2 feet away from the side of the trench. ▪ Adequately support utilities crossing a trench. ▪ Wear appropriate PPE and fall protection/rescue equipment.	**M**
6. Return to office/ home	6A)See Mobilization/ Demobilization and Site Preparation JHA	**See Mobilization/ Demobilization and Site Preparation AHA**	**L**

AHA – Construction Inspection

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
PPE (Hard Hat, safety glasses, gloves, steel toe work boots, high visibility safety vest, hearing protection)	**Competent / Qualified Personnel:** Name – Position/Employer – See HASP **Training requirements:** List specific certification (as applicable) Site Specific HASP Orientation Toolbox safety meeting Task kick-off meeting	Inspect all PPE prior to use

AHA – Roof Work
Working at Heights and Roof Access by Lift

Activity/Work Task:	Working at Heights and Roof Access by Lift		
Project Location:	Lake Success, NY		
Contract Number:	3617207521		
Date Prepared:	**12/6/2018**	**Date Accepted:**	**12/7/2018**
Prepared by (Name/Title):	Ryan Belcher/Technical Lead		
Reviewed by (Name/Title):	Glen Gordon / Site Safety Officer		

Notes: (Field Notes, Review Comments, etc.)

This AHA involves the following:

- Establishing site specific measures
- Working with Subcontractor

This AHA is not an exhaustive summary of all hazards associated with the Site. Refer to the site HASP for additional requirements. Contractor to follow general site safety controls for Slips Trips and Falls, Biological hazards, cuts lacerations and pinch points, and emergency procedures.

Overall Risk Assessment Code (RAC) (Use highest code): **M**

Risk Assessment Code (RAC) Matrix

Severity	Probability				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart
E = Extremely High Risk
H = High Risk
M = Moderate Risk
L = Low Risk

Job Steps	Hazards	Controls	RAC
1. Mobilization/ Driving of Lift	Collision with Vehicular/ Pedestrian Traffic; Buildings and Other Infrastructure	Use of Spotter; Operation only be qualified personnel; use of cones and other barricades	(S= Catastrophic; P= Unlikely) **M**
2. Access Lift at ground level	Slips/Trips; Improper Ergonomics	Use of Proper footwear; proper body mechanics	(S= Marginal; P= Unlikely) **L**

AHA – Roof Work
Working at Heights and Roof Access by Lift

Job Steps	Hazards	Controls	RAC
3. Ride Lift up to roof	Fall from lift; Contact with objects/buildings	Maintain both feet on lift floor and two hands on railings; use of spotter; use of safety harness	(S= Catastrophic; P= Unlikely) **M**
4. Exit Lift onto Roof	Fall from lift/roof; Contact with objects/buildings; Improper Ergonomics	Maintain three points of contact; use of spotter; avoid roof work during wet or icy conditions.	(S= Catastrophic; P= Unlikely) **M**
5. Roof Work	Fall from roof	Maintain 10-foot setback from roof edge; use spotter/buddy system; avoid roof work during wet or icy conditions.	(S= Catastrophic; P= Unlikely) **M**
6. Access Lift from rooftop	Fall from lift/roof; Contact with objects/buildings; Improper Ergonomics	Maintain three points of contact; use of spotter	(S= Catastrophic; P= Unlikely) **M**
7. Ride Lift down from roof	Fall from lift; Contact with objects/buildings	Maintain both feet on lift floor and two hands on railings; use of spotter; use of safety harness	(S= Catastrophic; P= Unlikely) **M**
8. Exit Lift at ground surface	Slips/Trips; Improper Ergonomics	Use of Proper footwear; proper body mechanics	(S= Marginal; P= Unlikely) **L**

AHA – Roof Work
Working at Heights and Roof Access by Lift

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
Lift (to be operated by GWTT)	**Competent / Qualified Personnel:** GWTT **Training requirements:** Equipment specific training (Documented)	Inspect lift prior to entering/usage. Ensure safety checks by owner completed and current.

AHA – Soil Sampling

Activity/Work Task:	Soil Sampling		
Project Location:	Lake Success, NY		
Contract Number:	3617207521		
Date Prepared:	**3-8-13**	**Date Accepted:**	
Prepared by (Name/Title):	Kendra Bavor, CSP		
Reviewed by (Name/Title):			

Notes: (Field Notes, Review Comments, etc.)

This AHA involves the following:

- Establishing site specific measures

This AHA is not an exhaustive summary of all hazards associated with the Site. Refer to the site HASP for additional requirements. Contractor to follow general site safety controls for Slips Trips and Falls, Biological hazards, cuts lacerations and pinch points, and emergency procedures.

Overall Risk Assessment Code (RAC) (Use highest code)	**M**

Risk Assessment Code (RAC) Matrix

Severity	**Probability**				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	**E**	**E**	**H**	**H**	**M**
Critical	**E**	**H**	**H**	**M**	**L**
Marginal	**H**	**M**	**M**	**L**	**L**
Negligible	**M**	**L**	**L**	**L**	**L**

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

AHA – Soil Sampling

Job Steps	Hazards	Controls	RAC
1. Prepare for sampling event	1A) Chemical exposure	1A) Chemical Exposure ▪ Read HASP and determine air monitoring and PPE needs.	L
2. Mobilization	2A) See JHA Mobilization/Demobilization/ Site Preparation	▪ See JHA Mobilization/Demobilization/Site Preparation	M
3. General Site Hazards	3A) See JHA Field Work - General	▪ See JHA Field Work - General	L
4. Carrying equipment to site location	9A) Back or muscle strain	11A) Back or muscle strain ▪ Use proper lifting techniques when lifting pumps or generators ▪ Use mechanical aids if available ▪ Use 2 person lift for heavy items	M
5. Calibrate monitoring equipment	12A) Exposure to calibration gases	12A) Exposure to calibration gases ▪ Review equipment manuals ▪ Calibrate in a clean, well ventilated area	L
6. Preparing sampling location	6A) Contact with poisonous plants or the oil from poisonous plants	13A) Contact with poisonous plants or the oil from those plants: ▪ Look for signs of poisonous plants and avoid. ▪ Wear PPE as described in the HASP. ▪ Do not touch anything part of your body/clothing. ▪ Always wash gloves before removing them. ▪ Discard PPE in accordance with the HASP.	L
	6B) Contact with biting insects (i.e., spiders, bees, etc.)	13B) Contact with stinging/biting insects ▪ Discuss the types of insects expected at the Site and be able to identify them. ▪ Look for signs of insects in and around the well. ▪ Wear Level of PPE as described in the HASP. At a minimum, follow guidelines in the JHA “Insects Stings and Bites.” ▪ If necessary, wear protective netting over your head/face. ▪ Avoid contact with the insects if possible. ▪ Inform your supervisor and the Site Health and Safety Supervisor if you have any allergies to insects and insect bites. Make sure you have identification of your allergies with you at all times and appropriate response kits if applicable. ▪ Get medical help immediately if you are bitten by a black widow or brown recluse, or if you have a severe reaction to any spider bite or bee sting.	L
	6C) Exposure to hazardous substances. Inhalation and contact with hazardous substances (VOC contaminated soil); flammable atmospheres.	13C) Exposure to hazardous substances ▪ Wear PPE as identified in HASP. ▪ Review hazardous properties of site contaminants with workers before sampling operations begin ▪ Monitor breathing zone air in accordance with HASP to determine levels of contaminants present. ▪ When decontaminating equipment wear additional eye/face protection over the safety glasses such as a face shield.	L

AHA – Soil Sampling

	6D) Back strain due to lifting or moving equipment to sampling locations	13D) Back strain ▪ Use mechanical aids when possible, if mechanical aids are not available, use two person lifts for heavy items. ▪ Use proper lifting techniques	**M**
	6E) Foot injuries from dropped equipment	13E) Foot Injuries ▪ Be aware when moving objects, ensure you have a good grip when lifting and carrying objects. ▪ Do not carry more than you can handle safely ▪ Wear steel toed boots	**L**
7. Collecting soil samples	7A) Working around drill rigs	7A) See JHA - Drilling	**L**
	7B) Encountering underground or overhead utilities	7B) Have all utilities located.	**L**
	7C) Fire/Explosion/Contamination hazard from refueling generators	7C) Fire/Explosion/Contamination hazard from refueling generators ▪ Turn the generator off and let it cool down before refueling ▪ Segregate fuel and other hydrocarbons from samples to minimize contamination potential ▪ Transport fuels in approved safety containers. The use of containers other than those specifically designed to carry fuel is prohibited ▪ See JHA for Gasoline use	**L**
	7D) Electrocution	7D) Electrocution ▪ A ground fault circuit interrupter (GFCI) device must protect all AC electrical circuits. ▪ Use only correctly grounded equipment. Never use three-pronged cords which have had the third prong broken off. ▪ Make sure that the electrical cords from generators and power tools are not allowed to be in contact with water ▪ Do not stand in wet areas while operating power equipment ▪ Always make sure all electrically-powered sampling equipment is in good repair. Report any problems so the equipment can be repaired or replaced. ▪ When unplugging a cord, pull on the plug rather than the cord. ▪ Never do repairs on electrical equipment unless you are both authorized and qualified to do so.	**L**
8. Prepare for sampling event	8A) Chemical exposure	8A) Chemical Exposure ▪ Read HASP and determine air monitoring and PPE needs.	**L**
9. Mobilization	9A) See JHA Mobilization/Demobilization/ Site Preparation	9A) See JHA Mobilization/Demobilization/Site Preparation	**M**
10. General Site Hazards	10A) See JHA Field Work - General	10A) See JHA Field Work - General	**M**
11. Carrying equipment to site location	11A) Back or muscle strain	11B) Back or muscle strain ▪ Use proper lifting techniques when lifting pumps or generators ▪ Use mechanical aids if available ▪ Use 2 person lift for heavy items	**M**

AHA – Soil Sampling

12. Calibrate monitoring equipment	12A) Exposure to calibration gases	12B) Exposure to calibration gases ▪ Review equipment manuals ▪ Calibrate in a clean, well ventilated area	**L**
13. Preparing sampling location	13A) Contact with poisonous plants or the oil from poisonous plants	13A) Contact with poisonous plants or the oil from those plants: ▪ Look for signs of poisonous plants and avoid. ▪ Wear PPE as described in the HASP. ▪ Do not touch anything part of your body/clothing. ▪ Always wash gloves before removing them. ▪ Discard PPE in accordance with the HASP.	**L**
	13B) Contact with biting insects (i.e., spiders, bees, etc.)	13B) Contact with stinging/biting insects ▪ Discuss the types of insects expected at the Site and be able to identify them. ▪ Look for signs of insects in and around the well. ▪ Wear Level of PPE as described in the HASP. At a minimum, follow guidelines in the JHA "Insects Stings and Bites." ▪ If necessary, wear protective netting over your head/face. ▪ Avoid contact with the insects if possible. ▪ Inform your supervisor and the Site Health and Safety Supervisor if you have any allergies to insects and insect bites. Make sure you have identification of your allergies with you at all times and appropriate response kits if applicable. ▪ Get medical help immediately if you are bitten by a black widow or brown recluse, or if you have a severe reaction to any spider bite or bee sting.	**L**
	13C) Exposure to hazardous substances. Inhalation and contact with hazardous substances (VOC contaminated soil); flammable atmospheres.	13C) Exposure to hazardous substances ▪ Wear PPE as identified in HASP. ▪ Review hazardous properties of site contaminants with workers before sampling operations begin ▪ Monitor breathing zone air in accordance with HASP to determine levels of contaminants present. ▪ When decontaminating equipment wear additional eye/face protection over the safety glasses such as a face shield.	**L**
	13D) Back strain due to lifting or moving equipment to sampling locations	13D) Back strain ▪ Use mechanical aids when possible, if mechanical aids are not available, use two person lifts for heavy items. ▪ Use proper lifting techniques	**M**
	13E) Foot injuries from dropped equipment	13E) Foot Injuries ▪ Be aware when moving objects, ensure you have a good grip when lifting and carrying objects. ▪ Do not carry more than you can handle safely ▪ Wear steel toed boots	**L**
14. Collecting soil samples	14A) Working around drill rigs	14A) See JHA - Drilling	**L**
	14B) Encountering underground or overhead utilities	14B) Have all utilities located.	**L**

AHA – Soil Sampling

	14C) Fire/Explosion/Contamination hazard from refueling generators	14C) Fire/Explosion/Contamination hazard from refueling generators ▪ Turn the generator off and let it cool down before refueling ▪ Segregate fuel and other hydrocarbons from samples to minimize contamination potential ▪ Transport fuels in approved safety containers. The use of containers other than those specifically designed to carry fuel is prohibited ▪ See JHA for Gasoline use	**M**
	14D) Electrocution	14D) Electrocution ▪ A ground fault circuit interrupter (GFCI) device must protect all AC electrical circuits. ▪ Use only correctly grounded equipment. Never use three-pronged cords which have had the third prong broken off. ▪ Make sure that the electrical cords from generators and power tools are not allowed to be in contact with water ▪ Do not stand in wet areas while operating power equipment ▪ Always make sure all electrically-powered sampling equipment is in good repair. Report any problems so the equipment can be repaired or replaced. ▪ When unplugging a cord, pull on the plug rather than the cord. ▪ Never do repairs on electrical equipment unless you are both authorized and qualified to do so.	**L**
15. Prepare for sampling event	15A) Chemical exposure	15A) Chemical Exposure ▪ Read HASP and determine air monitoring and PPE needs.	**L**
16. Mobilization	16A) See JHA Mobilization/Demobilization/ Site Preparation	16A) See JHA Mobilization/Demobilization/Site Preparation	**M**
17. General Site Hazards	17A) See JHA Field Work - General	17A) See JHA Field Work - General	
18. Carrying equipment to site location	18A) Back or muscle strain	18A) Back or muscle strain ▪ Use proper lifting techniques when lifting pumps or generators ▪ Use mechanical aids if available ▪ Use 2 person lift for heavy items	**L**
19. Calibrate monitoring equipment	19A) Exposure to calibration gases	19A) Exposure to calibration gases ▪ Review equipment manuals ▪ Calibrate in a clean, well ventilated area	**L**
20. Preparing sampling location	20A) Contact with poisonous plants or the oil from poisonous plants	20A) Contact with poisonous plants or the oil from those plants: ▪ Look for signs of poisonous plants and avoid. ▪ Wear PPE as described in the HASP. ▪ Do not touch anything part of your body/clothing. ▪ Always wash gloves before removing them. ▪ Discard PPE in accordance with the HASP.	**M**

AHA – Soil Sampling

	20B) Contact with biting insects (i.e., spiders, bees, etc.)	20B) Contact with stinging/biting insects ▪ Discuss the types of insects expected at the Site and be able to identify them. ▪ Look for signs of insects in and around the well. ▪ Wear Level of PPE as described in the HASP. At a minimum, follow guidelines in the JHA "Insects Stings and Bites." ▪ If necessary, wear protective netting over your head/face. ▪ Avoid contact with the insects if possible. ▪ Inform your supervisor and the Site Health and Safety Supervisor if you have any allergies to insects and insect bites. Make sure you have identification of your allergies with you at all times and appropriate response kits if applicable. ▪ Get medical help immediately if you are bitten by a black widow or brown recluse, or if you have a severe reaction to any spider bite or bee sting.	**M**
	20C) Exposure to hazardous substances. Inhalation and contact with hazardous substances (VOC contaminated soil); flammable atmospheres.	20C) Exposure to hazardous substances ▪ Wear PPE as identified in HASP. ▪ Review hazardous properties of site contaminants with workers before sampling operations begin ▪ Monitor breathing zone air in accordance with HASP to determine levels of contaminants present. ▪ When decontaminating equipment wear additional eye/face protection over the safety glasses such as a face shield.	**L**
	20D) Back strain due to lifting or moving equipment to sampling locations	20D) Back strain ▪ Use mechanical aids when possible, if mechanical aids are not available, use two person lifts for heavy items. ▪ Use proper lifting techniques	**M**
	20E) Foot injuries from dropped equipment	20E) Foot Injuries ▪ Be aware when moving objects, ensure you have a good grip when lifting and carrying objects. ▪ Do not carry more than you can handle safely ▪ Wear steel toed boots	**L**
21. Collecting soil samples	21A) Working around drill rigs	21A) See JHA - Drilling	
	21B) Encountering underground or overhead utilities	21B) Have all utilities located.	**L**
	21C) Fire/Explosion/Contamination hazard from refueling generators	21C) Fire/Explosion/Contamination hazard from refueling generators ▪ Turn the generator off and let it cool down before refueling ▪ Segregate fuel and other hydrocarbons from samples to minimize contamination potential ▪ Transport fuels in approved safety containers. The use of containers other than those specifically designed to carry fuel is prohibited ▪ See JHA for Gasoline use	**L**

	21D) Electrocution	21D) Electrocution ▪ A ground fault circuit interrupter (GFCI) device must protect all AC electrical circuits. ▪ Use only correctly grounded equipment. Never use three-pronged cords which have had the third prong broken off. ▪ Make sure that the electrical cords from generators and power tools are not allowed to be in contact with water ▪ Do not stand in wet areas while operating power equipment ▪ Always make sure all electrically-powered sampling equipment is in good repair. Report any problems so the equipment can be repaired or replaced. ▪ When unplugging a cord, pull on the plug rather than the cord. ▪ Never do repairs on electrical equipment unless you are both authorized and qualified to do so.	**L**

AHA – Soil Sampling

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
PPE (1/2 face respirator with P-100 cartridge, Hard Hat, safety glasses, gloves, steel toe work boots, high visibility safety vest, hearing protection)	**Competent / Qualified Personnel:** Name – Position/Employer – See HASP **Training requirements:** List specific certification (as applicable) Site Specific HASP Orientation Toolbox safety meeting Task kick-off meeting	Daily inspection of equipment per manufacturer's instructions. Tag tools that are defective and remove from service. Inspect power cord sets prior to use. Inspect all PPE prior to use

AHA – Working w/ Power Tools - Electrical

Activity/Work Task:	Working w/ Power Tools - Electrical		
Project Location:	**Former Unisys Facility – Great Neck**		
Contract Number:	3617207521		
Date Prepared:	**12/07/2012**	**Date Accepted:**	**4/30/2019**
Prepared by (Name/Title):	Kendra Bavor		
Reviewed by (Name/Title):	Glen Gordon, CSP		

Notes: (Field Notes, Review Comments, etc.)

This AHA involves the following:

- Establishing site specific measures

This AHA is not an exhaustive summary of all hazards associated with the Site. Refer to the site HASP for additional requirements. Contractor to follow general site safety controls for Slips Trips and Falls, Biological hazards, cuts lacerations and pinch points, and emergency procedures.

Overall Risk Assessment Code (RAC) (Use highest code)	**M**

Risk Assessment Code (RAC) Matrix

Severity	**Probability**				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	**E**	**E**	**H**	**H**	**M**
Critical	**E**	**H**	**H**	**M**	**L**
Marginal	**H**	**M**	**M**	**L**	**L**
Negligible	**M**	**L**	**L**	**L**	**L**

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

AHA – Working w/ Power Tools - Electrical

Job Steps	Hazards	Controls	RAC
1.Carrying tool to jobsite	1A. Back or muscle strain	1A) Back or muscle strain ▪ Use proper lifting techniques when tools or generators ▪ Use mechanical aids if available ▪ Use 2 person lift for heavy items	**M**
2. Setting up Work Area	2A. Injury due to encountering branches or debris	2A) Injury due to encountering branches or debris ▪ Inspect work area and clear away any loose wire, rope, branches or other items that may become entangled in tool or cutting head. ▪ Tool should be equipped with trigger style release switch.	**L**
	2B. Injury due to defective tool	2B) Injury due to defective tool ▪ Inspect tool prior to use to ensure it is safe to use. ▪ If found to be defective or if questionable condition, do not use the tool until serviced. Tag tool out of service	**M**
3. Using tool	3A. Inexperience	3A) Inexperience ▪ Train all hand tool users in their proper use. ▪ Never allow workers to work alone until they have demonstrated an ability to handle the tool safely.	**H**
	3B. Electrical shock	3B) Electrical shock ▪ Make sure that tool is in good condition, cord is not frayed or pulling away from the plug or connection. ▪ Do not remove grounding plug or use a tool where the grounding plug has been removed ▪ Avoid working in wet areas. ▪ Ground tools when using generators. ▪ Use a GFCI ▪ Keep tools unplugged when not in use.	**H**
	3C. Cuts	3C) Cuts ▪ All electric power tools should be unplugged when changing bits, making adjustments, or changing blades. ▪ Guards must remain in place and not "pinned" back. ▪ Push sticks should be used when using jointer or ripping with table saw. ▪ Keep fingers away from cutting blades. ▪ Clamp small stock when using router, drill, saw, or sander. ▪ Check blades regularly and keep in good condition. ▪ Use blade recommended for material being cut. ▪ Never jam saw into work. ▪ Cut green, treated or wet material slowly and with caution	**M**
	3D. Ear injury	3D) Ear injury ▪ Wear ear protection if required.	**M**

AHA – Working w/ Power Tools - Electrical

	3E. Eye injury	3E) Eye injury ▪ Safety goggles (or protective glasses) should be worn at all times. ▪ Look for nails or hard knots before cutting. ▪ Face shield when particles are produced with use of the tool.	**M**
	3.F Entanglement (clothing or cords)	3F) Entanglement (clothing or cords) ▪ Secure all loose clothing and long hair. ▪ Be aware of cord locations and keep away from drill, saw, or sander. ▪ Keep chuck key clear of drill or saw before plugging in. ▪ Electrical hand saws, drills, and corers must have quick release trigger.	**L**
	3.G Electrical grinders	3G) Electrical grinders ▪ Check grinding wheels often. ▪ Do not grind soft material. ▪ Hold small objects with clamp or vise grip.	**L**
	3H. Electrical saws (dust)	3H) Electrical saws (dust) ▪ Operators exposed to dust, as when cutting concrete, tile, treated wood or stone, shall wear approved respirator (mask).	**L**
	3I. Electrical drills	3I) Electrical drills ▪ Inspect drill bits regularly and use the recommended bit for material being drilled.	**M**
	3J. Electrical sanders	3J) Electrical sanders ▪ Inspect sanding surface for nails. ▪ Check sandpaper often. Keep belt centered on belt sander. ▪ Do not sand wet material.	**L**

AHA – Working w/ Power Tools - Electrical

	3K. Electric Mobile Concrete Coring Machine	3K) Electric Mobile Concrete Coring Machine ▪ Read and understand the Safety and Operating Instructions prior to use. ▪ Inspect tool upon obtaining for proper functionality. ▪ Underground utilities identified and marked. Ensure location(s) is in cleared area. ▪ Ensure generator is and tool is grounded with a GFCI. Keep power cords out of water. Use equipment specified voltage. ▪ Use two person lifting or mechanical means to minimize back injury moving. (unit should have dolly wheels to move once on ground) ▪ Clear path to move equipment. ▪ Keep bystanders well clear of the work area. ▪ Do not apply power until machine is set up and ready to drill ▪ Securely anchor the tool. ▪ Check alignment by lowering drill until about ½ inch from surface with power off. ▪ Do not adjust settings (speed selector when in operation) ▪ Ensure emergency shut offs are readily available and functioning. ▪ Ensure water flow for frictions and dust minimization. Monitor water pressure. ▪ Provide collection and plan for a path of water to avoid ponding, puddles and slips. ▪ Wear safety glasses with side shields, face shield, steel toed safety boots, hearing protection, and wear leather gloves when handling the bit. ▪ Secure laces. Be aware of body parts and tie back loose clothing or long hair. ▪ Allow the bit to cool prior to handling after drilling. ▪ Observe pressure gauges when drilling as an indication of adverse conditions, if available.	**M**

AHA – Working w/ Power Tools - Electrical

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
	Competent / Qualified Personnel: Name – Position/Employer **Training requirements:** List specific certification (as applicable) Site Specific HASP Orientation Toolbox safety meeting Task kick-off meeting	Daily inspection of equipment per manufacturer's instructions. Tag tools that are defective and remove from service. Inspect power cord sets prior to use. Inspect all PPE prior to use

Former Unisys Facility Remediation Site	
Document Title	**Activity Hazard Analysis (AHA)** **Site Activities during Covid-19 Pandemic**

Activity/Work Task:	**Site Activities during Covid-19 Pandemic**			HSE-GDS-110002 Trigger Level where you're coming from	**2**	HSE-GDS-110002 Trigger Level where you're going to	**2**	Overall RAC	**L**
Project Location:	Lake Success, NY	Home Location:	Various (local)						
Project Number:	3617207521								
Date Prepared:	June 9, 2020	Date Reviewed:	June 10, 2020						
Prepared by / for (Name/Title):	Ryan Belcher/Senior Engineer								
Reviewed by (Name/Title):	Stuart Pearson/Principal Engineer, PM								

Risk Assessment Code (RAC) Matrix

Severity	**Probability**				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	**H**	**H**	**S**	**S**	**M**
Critical	**H**	**S**	**S**	**M**	**L**
Marginal	**S**	**M**	**M**	**L**	**L**
Negligible	**M**	**L**	**L**	**L**	**L**

Notes: (Field Notes, Review Comments, etc.)
This AHA involves the following activity:
Precautions to be taken for prevention of Covid-19 exposure at home, travelling to and from the Project and working on the Project Site.

This AHA is not an exhaustive summary of all hazards associated with the Project or activity. Refer to the site SHASP for additional requirements. Workers are to follow general site safety controls for; Slips, Trips and Falls; biological hazards; cuts lacerations and pinch points; and emergency response procedures.

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **H = High Risk**
- **S = Substantial Risk**
- **M = Moderate Risk**
- **L = Low Risk**

MANAGEMENT OF CHANGE: If there is a change or deviation from the planned activity, you must stop the job and re-evaluate the risk assessment and the precautions taken. Any changes to work described in this AHA shall require review by a Qualified Person.

Former Unisys Facility Remediation Site		
Document Title	**Activity Hazard Analysis (AHA)** **Site Activities during Covid-19 Pandemic**	

Equipment to be Used	Training Requirements / Contact Information	Inspection Requirements
PPE as required by Site HASP. Additional PPE as required by risk assessment, such as use of a mask or respirator in non-ventilated spaces (i.e. pump houses) or when social distancing cannot be achieved. Cellphone. Handwashing soap and/or hand sanitizer. Disinfecting wipes and disinfectant cleaners.	**Competent / Qualified Personnel:** Field Lead: Dave Kahn (PES) 631-813-9932 Project Manager: Stuart Pearson 207-776-4251 Client Contact: Glenda Clark 817-901-9933 North Atlantic HSE Lead: Jeff Tweeddale 860-670-5908 HSE Manager: Cindy Sundquist 207-650-7593 WorkCare: 888-449-7787 Emergency services: 911 See Emergency Contact List posted in the HASP for additional contacts if needed. **Training requirements:** • Site-specific HASP orientation • Review of applicable AHAs • Toolbox safety meeting • Task kickoff meeting • Wood Guide to Covid-19 presentation. • Any other trainings required by the site-specific HASP	Inspection of vehicle/equipment prior to operation. Note needed repairs and schedule service as soon as feasible. Inform supervisor if issues identified that will affect safe operation. Inspect all PPE prior to use. Perform an assessment to identify all areas and equipment with shared surfaces. Verify all areas and equipment identified with shared surfaces are disinfected with antimicrobial wipes prior to use. Check in regularly with yourself and other field staff to ensure hands are washed frequently and/or sanitized. Stay home if: • Feeling sick even if symptoms do not align with COVID-19; or • You have been in contact with someone believed to have the coronavirus or traveled to a foreign country

Job Steps	Hazards	RAC Inherent	Controls	RAC Residual
1. Pre-Work Preparation • Communicate hazards and controls to all employees and subcontractors involved in the Project - Tailgate - Unscheduled meeting - Town Hall • Manage Change	Failure to identify a hazard and subsequent potential for injuries, illness, damage, environmental impact, economic loss or business impact. Failure to prepare. Evaluate potential high-risk issues: Shared workspaces; Work tasks	**M**	• Ensure workers understand scope of work, emergency response procedures and location of emergency response equipment on the Project. • Workers and supervisory staff involved with the work to be involved in the AHA generation process through pre-job safety discussion. • Assign trained, competent workers. Provide mentoring/coaching as needed for supplier trained personnel and trained Site workers. • Inform Site Superintendent/Field Lead and/or SSHO if high risk situation cannot be controlled or mitigated.	**L**

• Be prepared	involving close contact of workers; etc. Workers unfamiliar with site safety requirements. Unfamiliar with current global/local events and Wood/Government directives.		• Superintendents/Field Leads to have contact list for all workers (text, email, phone) to be able to quickly update workers with any significant changes outside of work hours. • Individuals to stay up to date with current directives/procedures issued by civil authority. • Wood Project Management Team to stay up to date with current Wood directives/procedures through **Wood Occupational Health website** and emailed communications. • Keep workforce briefed on situation daily through tailgates and unscheduled H&S meetings, if needed. Postings in trailers to maintain awareness. • Utilize daily go/no go decision making specific to proposed tasks through use of Wood Daily Field Level Readiness Review (attached to tailgate daily). • Use of the Wood Declaration Form daily attached to tailgate. • All should be prepared for unexpected/sudden work shutdowns/civil restrictions i.e. have a plan and emergency kits/supplies available.	
2. Habits Outside Work • Social gathering • Shopping • Other high-risk activity for exposure	**Close Contact with others** • Compliance • High risk individuals • Non-compliance to physical distance directives • Hygiene • Visiting friends/relatives • Visiting people that have recently travelled	**M**	• Although it is a difficult transition, all must "**Manage Change**" and adjust to the current situation and follow the directives issued by various Medical Officer of Health (local, Provincial, Federal). • Understand the implications of non-compliance – you could be responsible for the death of another person. • Stay away from those individuals and establishments that are considered high risk (underlying health issues, old age homes etc.). • Do not go out and visit friends and relatives unless necessary. Curtail social habits. • Encourage those that are not "**Following the Rules**" to do so – "**Intervene**". • Practice social distancing (2 metres/6 feet from each other). • Make use of the numerous businesses now offering non-contact and free delivery of items. No need to actually go into a store for supplies. • Practice good hygiene, such as frequent hand washing. Use "**Correct PPE"** if needed (i.e. gloves) • Be familiar with the signs and symptoms of Covid-19. If at any time they develop, know what to do: self-assessment tool online	**L**

			(https://www.ontario.ca/page/2019-novel-coronavirus), call, follow directions.	
	SARS-CoV-2 exposure in community	**M**	• Avoid public spaces and going out to eat by bringing your own lunch to the Project site. Ensure all personnel wash and/or sanitize their hands properly prior to eating. • While staying in a hotel, the following is recommended: - Eat all food in your hotel room after disinfecting surfaces. Do not eat in public spaces or restaurants. - Wash hands with soap and warm water for a minimum of 20 seconds or disinfect using hand sanitizer prior to eating - If the hotel has a restaurant or café, order food to be picked up or delivered to your room. Minimizing time in public spaces. - If there is no food available at the hotel, order groceries or food for delivery to the hotel. Call local restaurants to order food for delivery (call the hotel lobby for recommendations) or use food ordering applications. Some of these applications have options for contactless delivery • Prior to leaving the site: - Disinfect work areas (hard surfaces) and shared equipment you came into contact with during the work day. - Wash your hands thoroughly for a minimum of 20 seconds with soap warm water or disinfect using hand sanitizer prior to leaving the site. • When you arrive home: - Disinfect your cell phone with an approved antimicrobial wipe.	**L**
3. Mental Health • Stress • Fear • Anxiety	**Unexpected Reactions** • Anger • Violence • Breakdown	**M**	• Understand that all people are individuals and we all react differently to situations of high stress and change to normal routine in our lives. • Watch out for each other's wellbeing. • Don't be a downer affecting morale - keep a good attitude and stay positive. A good attitude will help maintain a positive atmosphere at home and work. • Think before you say – don't spread false news or gossip. • If you are feeling stress/anxiety that overwhelms you, seek out assistance. • Be prepared for an unexpected reaction to a comment or interaction.	**L**

Travel To/From Site • Staffing level. • Arrival protocols.	**Work Assignment** • Priority of task • Staffing	**M**	• Evaluate if it is necessary to go to Project or if you can effectively work remotely from home and be on call. • Superintendents/Field Leads to minimize to the extent possible the number of people on the Project based on the work to be performed and other considerations such as site conditions, weather. If staff will not be needed have them stay home on call. Subcontractors to be managed in the same way.	**L**
	Arrival at Site • Security protocols • Interactions with others	**M**	• Use your own pen for sign ins or have one person sign everyone in to avoid needless sharing of pen etc. • Screen all workers/visitors etc. attempting to enter the site based on the Wood Visitor Declaration Form. • Anyone with an issue identified through use of screening to be prevented from entering and the Superintendent to be notified to provide instruction. • Do not arrive for work too early unless justified. • When parking on-site, stay in vehicle until time for tailgate meeting. If getting out practice social/physical separation from others. • Do not gather with others in close groups.	**L**

	SARS-CoV-2 exposure • Illness. • Exposure to others.	**M**	• Do not travel if you are not feeling well. • Do not travel if someone you've had close contact with in the last 14-days has experienced fever, chills, or other virus related symptoms. • Do not travel with other individuals who are not feeling well or have been in close contact with individuals in the last 14-days who have experienced COVID-19 symptoms. • Do not travel if you have been in close contact with individuals who are healthcare professionals treating confirmed or suspected COVID-19 patients. • Travel to project site should limit the number of personnel per vehicle. Do not carpool is preferred. • Avoid touching high-contact surfaces within vehicles if operated by others. • Wash hands after exiting vehicle and avoid touching face/eyes/mouth while inside vehicle if its not yours. • Keep ventilation systems running (i.e. drawing in outside air) when inside vehicle or crack the window open for additional fresh air.	**L**
Work at Site • Performing assigned work tasks with others. • Breaks. • Equipment use. • Shared facilities. • Tailgate meetings. • Business continuity.	**Shared Facilities/Equipment** • Lunch/Meeting Trailers • Admin Trailers • Washrooms • Equipment (dozer, excavator etc.) • Workspaces.	**M**	• Minimize to the extent possible the number of people in indoor facilities at any one time. Tailgates and meetings to be limited such that social distancing can be accomplished and performed outdoors if practical. • If necessary, have multiple tailgate meetings, possibly by employer. • Investigate possibility/feasibility of phone in/Skype meetings and maximize use of alternative communications to mitigate face to face interactions and proximity of people. • Increase frequency of cleaning of facilities. Ensure good supply of cleaning supplies are on-hand/available. Assign workers to clean frequently used surfaces twice daily and if necessary, retain a contractor to supply this service. • Encourage all to understand that everyone needs to chip in and assist in keeping work areas clean. If in doubt, grab a cleaning cloth and wipe down surfaces. • Plan meals (i.e. lunch) so that microwave is not used to minimize contact between workers using a common piece of equipment. • To the extent possible limit equipment use to one operator. If required to share equipment, equipment to be wiped down between workers.	**L**

			• At the end of day, operators are to clean/wipe down control surfaces in the unit so it is ready for the next days work in case another operator is assigned. • If a second operator is assigned to a specific unit in a day, first operator performs a wipe down, opens window and leaves unit running for ventilation. New operator to wait 5 minutes before getting in and operating. • Where two people work in the same office, one to move out to another space or evaluate if remote work from Project is possible. • Shared offices need to be cleaned after use before another person uses that space. • Stagger breaks so that not everyone is using facilities at the same time depending on the number of staff on-site. Social distancing needs to be maintained. •	
	Personal Hygiene • Washing. • Personal habits.	**M**	• Avoid touching face, especially nose, eyes. • Wash hands frequently. Before and after eating; after you have been in a public place; after using the washroom; after coughing and sneezing; after touching surfaces that other people also touch • Use a tissue if experiencing runny nose and dispose. Alternatively cough and/or sneeze into the crook of arm. • Where there is common, frequent contact of rails, door knobs etc., consider use of nitrile gloves for work outside of the controlled zones to control direct contact with common surfaces. • Increase frequency of glove change out in all Zones.	**L**
	Performance of Work Tasks • Work involving close contact between workers.	**M**	• Perform risk assessment prior to task to mitigate hazard of close contact. Consider type of work, duration involving close contact (incidental or long term). For long term work (hours) it should be postponed, or another way found to complete the task. • If necessary, use mask or half or full-face respirator as a mitigation if workers cannot practice physical distancing requirements (i.e. labor work). If the task requires long term (hours) continuous work in close proximity to a coworker consider postponing such tasks. • If unsure how to mitigate, involve supervisor and/or PHSO.	**L**

			• Ventilation systems to be always operated in the cabs of heavy equipment to ensure good fresh air exchange.	
	Communication • Lack of awareness.	**M**	• Promote awareness by posting Wood HSSEA supplied materials. • Hand washing posters. • Hold unscheduled H&S meetings to communicate new information.	**L**
	Business Continuity	**M**	• Those workers with a laptop should be taking it home at night. • Test internet connections at home to identify issues to be rectified. • All with the ability should be prepared to work from home if the situation arises where the civil authority issues shut down controls.	**L**
Emergency Response • Illness at work • Performing first aid. • CPR.	**Becoming ill at work** • Experiencing any symptoms of illness. • Observing someone ill.	**M**	• Immediately notify supervisor and isolate yourself from all others. Wait for instruction. • If you become aware of an individual who does not appear to feel well and has not indicated so, **"Intervene".**	**L**
	Providing First Response in advance of responding agency • Close contact	**M**	• As with all first aid situations, any individual has a choice as to provide first aid or not. • If you are asked to be a Site first aider for the day as noted on tailgate say no if you are not comfortable doing so. • If CPR is required only do chest compressions. If AR is required in addition to CPR use a rescue breather mask. • Use a face shield if risk assessment determines one is needed.	**L**

AHA REVIEW ACKNOWLEDGEMENT		
Reviewed by (PM):	Signature:	Date:
Plan Concurrence by (other):	Signature:	Date:
The undersigned acknowledge they have read, understood and shall comply with all components of the AHA. This AHA is a living document and should be reviewed and revised during regular meetings with the Wood team.		
Name (print):	Signature:	Date:
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AHA –

Activity/Work Task:		Overall Risk Assessment Code (RAC) (Use highest code)	
Project Location:	Lake Success, NY		
Contract Number:	3617207521		
Date Prepared:	**Date Accepted:**		
Prepared by (Name/Title):			
Reviewed by (Name/Title):			

Risk Assessment Code (RAC) Matrix

Severity	Probability				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Notes: (Field Notes, Review Comments, etc.)

This AHA involves the following:

-

This AHA is not an exhaustive summary of all hazards associated with the Site. Refer to the site HASP for additional requirements. Contractor to follow general site safety controls for Slips Trips and Falls, Biological hazards, cuts lacerations and pinch points, and emergency procedures.

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

Job Steps	Hazards	Controls	RAC

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
PPE	**Competent / Qualified Personnel:** **Training requirements:**	

Attachments

Covid-19 Daily Declaration Form

Community Air Monitoring Program

Gamma Screening SOPs

HASP Addendum

GWTT HASP

Declaration Form (Covid-19)

Prior to entering this facility/site, or mobilizing to visit an office/site, review the questions below and make a declaration if your response to the questions all are 'No.'

If your response to any of the questions is 'YES' then we regret to inform you that you are not to come to work or visit any Wood office/site at this time.

1. Have you, or anyone whom you share a residence with, been in contact with any person suffering or suspected to be suffering from Covid-19 in the last 14 days?
2. Do you have any fever or respiratory symptoms (e.g. cough, sore throat or breathing difficulty)?
3. Have you travelled outside the United States in the last 14 days (travel to certain countries may not trigger a work exclusion, review with regional health and safety coordinator for specifics)

By signing below, it is your declaration that your responses to the questions above is NO, and that this declaration is true and accurate to the best of your knowledge.

Use your own pen (if possible) and/or disinfect regularly shared tools/equipment; and, practice good hand hygiene using soap/water, or hand sanitizer.

Name	Company	Signature	Date

COMMUNITY AIR MONITORING PROGRAM

A Community Air Monitoring Plan (CAMP) is required due to the Site's history of subsurface contamination. The CAMP requires real-time monitoring for VOCs and particulates (i.e., dust) at the downwind perimeter of each work area when certain intrusive activities (boring advancement, soil handling, and back filling) are in progress, on a periodic or continuous (15- minute) basis. The purpose of CAMP is to protect any downwind communities, including residences and businesses, from potential airborne contaminant releases and nuisance dust.

VOC and dust emission readings will be recorded by an AMEC employee on site. Summary CAMP monitoring reports will be submitted to NYSDEC and NYSDOH.

Baseline Indoor Air Sampling

Because work will be conducted within 20 feet of an occupied structure, a baseline sample of indoor air will be collected from the two tenant areas adjacent to the work. These samples will be analyzed for VOCs by USEPA method TO-15 and will be used for comparison if the need for future indoor air samples are triggered during the work. Any unusual background readings will be discussed with the NYSDEC and NYSDOH prior to commencement of the work.

VOC Monitoring

Wind direction will be assessed with a weather station and the location of upwind and downwind monitoring locations will be recorded on a map daily. VOCs will be monitored at both the upwind and downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis during invasive activity and soil excavation/handling. A third monitoring unit will be located adjacent to the occupied building and consider potential air intake vent locations in proximity to the work. The monitoring work will be performed using equipment appropriate to measure the contaminants known or suspected to be present (MultiRAE PLUS with a PID with a 10.6 eV lamp or equivalent model). The equipment will be calibrated on a daily basis prior to start of the field work. The equipment will be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

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 (upwind) for the 15-minute average, work activities will be temporarily halted and monitoring will continue. When the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background (upwind), work activities can resume with continued monitoring. If total organic vapor opposite the walls of occupied structures or next to intake vents exceed 1 ppm above background, indoor air samples will be initiated within the occupied structure.

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 (upwind) but less than 25 ppm, work activities will 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 at the downwind perimeter of the work area or exclusion zone is below 5 ppm over background (upwind) for the 15-minute average. After these steps, work activities will 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.

If the organic vapor level is above 25 ppm at the perimeter of the work area, activities will be shut down until the problem is evaluated and resolved.

Particulate Monitoring

Air monitoring for particulates (i.e., dust) will be performed continuously during intrusive and soil excavation/handling activities. The particulate monitoring will 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. Particulates will be measured using DustTrack II or equivalent model. The particulate monitoring equipment will be calibrated at the start of each day as necessary. Depending upon daily wind direction, upwind (background) and downwind dust monitors will be set up at approximately 4 to 5 feet above ground surface (i.e., breathing zone). A third monitoring unit will be located in the direction of the nearest residence and will also be setup at approximately 4 to 5 feet above ground surface. The equipment will be equipped with an audible

alarm to indicate exceedance of the action level. In addition, fugitive dust migration will be visually assessed during all work activities.

If the downwind PM-10 particulate level is 100 micrograms per cubic meter (ug/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 will be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 ug/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

If after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 μg/m^3 above the upwind level, or above 150 μg/m^3 opposite walls of occupied structures or next to intake vents, work will be stopped and a re-evaluation of activities initiated. Work will resume when dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 μg/m^3 of the upwind level and in preventing visible dust migration.

CAMP Reporting

A CAMP Summary Data Report will be provided electronically immediately following excavation events to the NYSDEC and the NYSDOH Project Managers. The CAMP Report will include the following: a figure depicting CAMP monitoring station locations and wind direction, a daily summary of work activities, and a summary of downloaded CAMP data. In addition, the NYSDEC and the NYSDOH will be notified of any CAMP exceedances and corrective actions taken within one business day.

SOP Owner:	**AMEC E&E, PC**
SOP No.:	**RAD-02**
Revision No.:	**0**
Revision Date:	**Aug 2021**
Revision By:	
Approved By:	

Lockheed Martin Corporation
SOP-RAD-02 – Portable Radiation Instrument Quality Control

Description

The purpose of this procedure is to provide instruction to establish the instrument specific response check limits, and complete operational checks.

Abbreviations

cpm	counts per minute
RAD	Radiation Safety Procedure
SOP	Standard Operating Procedure

Required Tools/Equipment

- Portable radiation survey instruments
- Radioactive artifacts, sources and source jigs

Definitions

1. **Portable Radiological Survey Instrument** - Portable radiation instruments are battery powered instruments that are carried to a specific facility or location for use. They generally come in two forms: 1. An instrument and detector combined into the same housing 2. A separate instrument and external detector connected by a cable.

2. **Smart Portable Survey Instruments** – Some portable radiation survey instruments and detectors are designed to be "smart" systems. This allows for a variety of calibrated "smart" type detectors to be interchanged with a separately calibrated instrument without invalidating the calibration.

3. **Ratemeter** –An instrument which reads a rate of detected radiation events per unit time (i.e., counts per minute) is known as a ratemeter. Some portable survey instruments operate exclusively as ratemeters and are commonly used for scanning.

4. **Scaler** – A radiation survey instrument which totalizes the events detected over a time period is known as a scaler. Totalizing detected radiation events over a specific period of time reduces measurement uncertainty and subjectivity associated with the human machine interface.

5. **Radioactive artifact or Check Source**-An object that produces a consistent radiation emission.

6. **Jig** – A device that may be used to ensure the check source or artifact and its position in relation to the detector can be replicated.

Safety Considerations

- Handle stable radioactive artifacts & check sources following standard radiation safety practices.
- Secure artifacts and sources when not in use.

Associated Forms

- SOP-RAD-02-01 Establish Response Check Range
- SOP-RAD-02-02 Operational Response Checks

Prerequisites

- Portable instruments must have been calibrated within the last 12 months.
- For "smart" instruments, confirm the calibration date for both the detector and instrument, and ensure that both the instrument and detector are in calibration.
- For traditional instruments, verify that the instrument and detector were calibrated together and that they are in calibration.

Precautions and Limitations

- Direct contact of the detector with a radioactive check source surface may damage the check source.
- Unexplainable or out of character changes in background count or dose rates may be the result of a damaged or contaminated detector or unidentified radiation interference.
- Counting systems vary in their design and capability. Some are 'single channel' instruments, while others may have two (or more) channels (e.g., alpha & beta). This procedure does not assume that a '2-channel' counting system instrument is in use. Consequently, it may be necessary to repeat procedures described for instruments with more than one channel if more than one channel of data is required.

Lockheed Martin Corporation
SOP-RAD-02 – Portable Radiation Instrument Quality Control

Establish the Acceptable Response Check Range

- Document the following using Form SOP-RAD-02-01 Response Check Acceptable Range
- Complete the project specific information including the name of the person completing the form and the date.
- Record the instrument specific information:
    a. Instrument & detector model No. (s),
    b. Instrument & detector serial No.(s),
    c. Instrument & detector calibration due date(s),
    d. Test Location.
- Verify that the portable radiation survey instrument is operationally ready to perform a source response check:
    a. Check the physical condition of the instrument for signs of damage.
    b. Turn the instrument "ON" and verify that the instrument is operating as expected.
    c. IF the counting system is operating on battery power,
        THEN verify that the battery power is acceptable.
    d. IF the counting system has a high voltage (HV) indicator,
        THEN verify that the HV is appropriately set.
- Verify that no radioactive materials are present in the vicinity of the portable radiation survey instrument before proceeding with the background determination.
- For all scaler Instruments, use a 1 minute measurement time.
- For all ratemeter instruments, observe the display for a period of time for the measurement to equilibrate/ stabilize. The meter should be on slow response.
- Select the appropriate radioactive response check source and source jig.
- Record the response check-specific information:
    a. Indicate if a jig will be used and record the jig ID.
    b. Channel (alpha, beta, gamma) being evaluated
    c. Source ID No.,
    d. Source Isotope(s).
- Measure the instrument's response to ambient background radiation.
    a. Record the background count rate, R_b.
- Place the detector in position in proximity to the check source.
- Measure the instrument's response to the radiation emitted from the check source.
- Record the source response check test-specific information:
    a. Count time, T_s
    b. Counts observed, N_g
- Calculate the source response gross count rate, R_g (in cpm), by dividing the observed counts, N_g, by the source response check count time, Ts in minutes).

$$R_g = \frac{N_g}{T_s}$$

    a. Record the source response gross count rate R_g.
- Calculate the net count rate, R_n, (in cpm)
    a. Subtract the background count rate from the gross count rate.

$$R_n = R_g - R_b$$

    b. Record the net count rate.
- Calculate the ±20% Acceptable Range
    a. Multiply the net count rate, Rn, by 80% (0.8).
    b. Record the -20% source response range boundary.
    c. Multiply the net count rate, Rn, by 120% (1.2).
    d. Record the +20% source response range boundary.
- Remove the response check source from the source jig.
- Place the response check source in its designated packaging.
- If more than one source is required to be used for an instrument, repeat step above for each source used.
- Return source(s) to their proper storage location.
- Repeat this process for additional channels or sources.
- Submit the completed form for review.

Preform Operational Response Checks

- Operational checks will be performed prior to use, or daily, and will include a start of day and end of day check.
- Document Response Checks using Form SOP-RAD-02-02 Operational Response Checks
- When starting a new form, complete the following information from SOP-RAD-02-02.
    - Instrument Specific Information.

- Response Check Source Specific Information.
- Response Check Data & Calculations.

- For all scaler Instruments, use a 1-minute measurement time.
- For all ratemeter instruments, observe the display for a period of time for the measurement to equilibrate/ stabilize. The meter should be on slow response.
- Record the operation response check information:
  a. Measurement date,
  b. Measurement time,
- Verify that the portable radiation survey instrument is operationally ready to perform a source response check, and record the results as P for pass or F for fail:
  a. Check the physical condition of the instrument for signs of damage.
  b. Turn the instrument "ON" and verify that the instrument is operating as expected.
  c. IF the counting system is operating on battery power,
     THEN verify that the battery power is acceptable.
  d. IF the counting system has a high voltage (HV) indicator,
     THEN verify that the HV is appropriately set.
- Verify that no radioactive materials are present in the vicinity of the portable radiation survey instrument before proceeding with the background determination.
- Measure the instrument's response to ambient background radiation.
  a. Record the background count rate, R_b.
- Measure the instrument's response to the radiation emitted from the check source.
- Select the appropriate radioactive response check source and source jig.
- Place the source in the source jig.
- Place the detector in position in proximity to the check source.
- Record the source response check test-specific information:
  c. Count time, T_s
  d. Counts observed, N_g
- Calculate the source response gross count rate, R_g (in cpm), by dividing the observed counts, N_g, by the source response check count time, T_s in minutes).

$$R_g = \frac{N_g}{T_s}$$

  b. Record the source response gross count rate, R_g.
- Calculate the net count rate, R_n, (in cpm)
  c. Subtract the background count rate from the gross count rate.

$$R_n = R_g - R_b$$

  d. Record the net count rate
- Verify that the source count rates are within the ±20% "Acceptable Source Response Range" limit.
  a. IF the net rate, R_n, is within the ±20% "Acceptable Source Response Range,
     THEN record pass in the results column"
  - Remove the response check source from the source jig.
  - Place the response check source in its designated packaging.
  b. IF the source count rate, R_n, is outside the ±20% "Acceptable Source Response Range,
     THEN record fail in the results column,
     AND investigate and correct, if appropriate. Use the remarks section to identify issues. Common issues are low batteries, improper source position, improper cable connection, etc.
  - Repeat the entire operational check.
  c. IF the source count rate is within the ±20% "Acceptable Source Response Range,
     THEN indicate on the source response check datasheet that the test is "PASS."
  d. IF the source count rate again falls outside the ±20% "Acceptable Source Response Range",
     THEN remove the instrument from use.

Instrument Failure

- IF a portable radiation survey instrument fails to pass an operational check, is damaged during use or appears to be functioning improperly, THEN
  a. Stop using the instrument,
  b. Remove the instrument from service,
  c. Notify the health physicist, and project manager of the need for a replacement instrument.

SOP-RAD-02-01 Portable Instrument Response Check Acceptable Range

Task Number: _____

Task Name: _____

Instrument Specific Information
Person Performing: _____ Date: _____
Instrument Model: _____ Serial No.: _____ Smart Probe: ☐ Yes ☐ No
Detector Model: _____ Serial No.: _____ Cal Due Date: _____
Location:

Response Check Source Specific Information	
NOTES:	*An appropriate artifact for setting up the counting system to perform response checks will produce a count rate when measured that is on the order of 10x higher (or more) than the instrument's response to background radiation in the channel under test.* *In some instances, it may be helpful to use a source jig when setting up the response check acceptable range and performing later periodic response checks. This will ensure that measurement geometry variances are controlled.*
Is a source jig used in the measurement to establish the response check acceptable range? ☐ YES ☐ NO If YES, record the source jig ID Number:	

Response Check Acceptable Range Determination Data & Calculations

Instrument Channel: _____ Measurement Units: _____

Source ID No.: Source Isotope(s):

T_s	N_g	R_g	R_b	R_n	±20% R_n	R_n – 20%	R_n + 20%
Count Time (min)	*Counts*	*Gross Count Rate (cpm)*	*Background Count Rate (cpm)*	*Net Count Rate (cpm)*	*Interval (cpm)*	*Acceptable Range (cpm)*	
						Lower Boundary	*Upper Boundary*

Response Check Acceptable Range Determination Data & Calculations

Instrument Channel: _____ Instrument Units: _____

Source ID No.: Source Isotope(s):

T_s	N_g	R_g	R_b	R_n	±20% R_n	R_n – 20%	R_n + 20%
Count Time (min)	*Counts*	*Gross Count Rate (cpm)*	*Background Count Rate (cpm)*	*Net Count Rate (cpm)*	*Interval (cpm)*	*Acceptable Range (cpm)*	
						Lower Boundary	*Upper Boundary*

Performed by: _____ Date: _____
Print Name / Signature

Reviewed by: _____ Date: _____
Print Name / Signature

Operational Response Checks

Task No.:_____ Task Name: _____

Instrument Specific Information			
Instrument Model: _____	Serial No.: _____	Test Location: _____	Instrument Channel: _____
Detector Model:	Serial No.:	Cal Due Date:	Smart Detector: ☐ Yes ☐ No
Response Check Source Specific Information			
NOTE: *The radioactive artifact used to perform the Instrument Response Check must be the same as was used for establishing the source response check acceptable range for the instrument channel under test. If a source jig was used when determining the response check acceptable range, the same source jig must be used when performing source response checks.*			
Source ID No.:	Isotope(s):	Source Jig used: YES ☐	NO ☐ Source Jig ID No.:
Response Check Data & Calculations			
Response Check Units:	±20% Acceptable Response Check Range		-to-

Date (dd-Mmm -yyyy)	*Time* (24:00)	Physical (P/F)	Battery (P/F)	HV (P/F)	T_s *Count Time* *(min)*	N_g *Source Response* units ( )	R_g *Gross Rate* units	R_b *Background Rate* units ( )	R_n *Net Rate* units ( )	*RESULT* *(Pass/Fail)*	*Analyst Name*	*Remarks*

Operational Response Check
(Continued)

Task No.:_____ Task Name: _____

Date (dd-Mmm -yyyy)	*Time* (24:00)	(P/F)	(P/F)	(P/F)	T_s *Count Time (min)*	N_g *Source Response* units (_____)	R_g *Gross Rate* units (_____)	R_b *Background Rate* units (_____)	R_n *Net Rate* units (_____)	*RESULT (Pass/Fail)*	*Analyst Name*	*Remarks*

SOP Owner:	**AMEC E&E, PC**
SOP No.:	**RAD-03**
Revision No.:	**0**
Revision Date:	**Aug 2021**
Revision By:	
Approved By:	

Lockheed Martin Corporation SOP-RAD-03 –Radiation Surveys

Description

The purpose of this procedure is to provide instruction for the performance of radiological surveys performed before, during and after radiological work. These surveys include both radiation and contamination surveys methods. This procedure also describes the methodology used to document the results of radiological surveys.

Abbreviations

cpm	counts per minute
RAD	Radiation Procedure
SOP	Standard Operating Procedure
AL	Action Level

Required Tools/Equipment

Portable radiological survey instruments

Safety Considerations

- Comply with all applicable project H&S requirements, including confined space requirements as applicable.
- Wear all required PPE and follow all associated procedures as outlined in the Health and Safety Plan.
- Surveys shall be performed following standard contamination control and ALARA Practices.
- Notify the Health Physicist if unexpected radiological conditions are encountered.

Associated SOPs

SOP- RAD-02 Portable Radiation Instrument Quality Control.

Associated Forms

SOP-RAD-02-01 Establish Response Check Range

SOP-RAD-02-02 Operational Response Checks

SOP- RAD-03-1 Radiation Survey Map.

SOP- RAD-03-2 Alpha Beta-Gamma Survey

SOP- RAD-03-3 Radiation Survey Notes

Precautions and Limitations

- Ensure that instruments and equipment used are calibrated and quality control checks have been performed using SOP-RAD-02 Portable Radiation Instrument Quality Control.
- Surfaces containing significant amounts of dirt, dust or moisture may result in erroneous survey results. Alpha emitting isotopes present under dirty or painted surfaces will not be detected using standard surveying techniques

Radiological Survey Documentation

- Radiation surveys may be documented on a single form or a series of forms as appropriate.
    - If multiple pages are used ensure the survey number, date total number of pages is recorded on all pages.
- Assign a unique survey number
  XXX-FYYY--XXX, where:
    - LMC- = Project ID
    - YYYY = 4 digit year
    - XXX= Sequential survey number (i.e., 01, 02, 03, etc.).
- Document all radiological surveys with sufficient information and clarity to provide a clear understanding of the scope, contents, and results of the survey.
- Required information includes the following:
    - General Information
        - Task Name and Number.
        - Survey Number.
        - Date and time.
        - Surveyor name/signature.
    - Instrument information
        - Meter Model & SN
        - Detector Model & SN
        - Calibration Due date
        - Units
    - Survey Details
        - purpose of the survey.
        - Description of area, item (s) or object(s) surveyed. Be as specific as possible, Truck or equipment numbers if available.
        - Measurement units
        - Applicable Background measurement & Action Level
        - Field measurement data (e,g, alpha, beta-gamma, etc)

        - Record survey results in the instrument reported units.
    - Survey Maps (SOP-RAD-03-01), -
        - If available an existing site map/ image etc. should be used to record data instead of a hand drawn sketch.
        - Document the locations at which radiological measurements/samples are collected.
        - If symbols are used, add a legend to the form.
        - The map should provide orientation and referenceable landmarks, (i.e. permanent site features) so it clearly communicates the location of measurement.

General Radiological Survey Techniques

- Select the appropriate portable instrument for the survey, whenever possible, select an instrument with an audible response.
- Allow sufficient time for the instrument to respond while conducting radiological surveys. See the instrument's operating manual or operating procedure for response wait times.
- Perform on-contact radiation surveys with the instrument's detector held as close as possible to the item being surveyed, without touching the instrument or detector to the item or surface.
- When performing radiation surveys, do not make corrections or subtractions for background radiation levels.
- A radiation survey may include collection of multiple types of measurements.

Background/ Ambient Measurements

- Background measurements should be collected in an area not impacted with radiological material
- Material specific backgrounds should be use if possible.
- Collect measurement using the same geometry.
- Collect a representative number of measurements.
- Calculated the Action Level as specific in the Site-Specific Radiation Safety Plan Section 5.2.

Exposure Rate Measurements

- General Area Radiation Measurements are primarily collected to provide data to evaluate potential worker exposures.
- The measurement should be collected with the detector at 1 meter (waist level).
- Measurement locations should include locations where workers are likely to be present.
- On contact radiation measurements may be collected but should clearly indicate it is a contact measurement.

Surface Scanning (alpha, beta, gamma)

- Select an appropriate survey instrument, ensure the audible response is on.
- For alpha and beta surveys ensure the area to be scanned is dry and free of dirt, debris.
- When scanning equipment or personnel, ensure you focus on areas with a higher potential for contamination. (e.g, tires, hands, feet),
- Scan the surface
    - Scan the item/area at a consistent rate (approximately 1 - 2 inches per second)
    - The detector should be approximately ¼ inch from the surface being measured.
    - Avoid direct contact with the item.
    - Observe the count rate
- Document the count rate range.
- IF an increased count rate is observed,

  THEN

  [1] Pause over the suspect area,

  [2] IF increased count rate is still observed

  THEN

  [a] Scan slowly in the area and

  [b] Identify the extent of elevated measurement, and

  [c] the location of the highest measurement.

  [3] IF increased count rate is not observed

  THEN conclude it was a false positive
- Document the count rate range.

Static Surface Measurement (alpha, beta, gamma)

- The Radiation technician may choose to collect static measurements, to evaluate the total activity present on a surface.
- Measurements shall be collected at locations with scan measurements above the AL.
- Static measurement count times shall be 1 minute, unless directed otherwise by the HP
- Record the measurement location
- Initiate a measurement
    - Place the detector ¼ of an inch above the measurement location.
    - Record the measurement-specific information:
        a. Count time, T_s
        b. Counts observed, N_g
    - Calculate the gross count rate (Rg) in cpm:

$$R_g = \frac{N_g}{T_s}$$

- Record the response gross count rate, R_g (in cpm).

Swipe Measurements

- To evaluate removable contamination, collect a swipe sample.
- Swipe samples may be collected from randomly selected locations or from static measurement locations.
- If a static measurement is required, ensure it is collected prior to collecting the swipe.
- Wipe the surface
    - Apply moderate pressure
    - Wipe an area of 100 cm^2.
    - Label the wipe
- Record the measurement location
- Count the swipe sample, in the same manner as a static measurement.
- Document the measurement result.

Large Area Wipe

- Large area Wipe (LAW) may be used to screen equipment for the presence of removable contamination.
- Wipe the surface with an LAW.
- Scan the LAW using the surface scan method.
- If increased count rates are confirmed the item should be held for further evaluation.

Survey Reviews

- Radiation Technician: complete survey documentation:
    - Ensure the survey documentation is complete
    - Number all pages in sequential order
    - Print name and sign the Form in the spaces provided
    - Transmit completed records to the Health Physicist.
- Health Physicist (or designee), completes a technical review of the survey,
    - Confirm documentation is complete
    - Review any calculations
    - Consult with technician to address any review comments.
    - Print name and sign the Form in the spaces provided
    - File documents.

Special Surveys

Job Coverage

- Job coverage generally has the following purposes:
    1. To ensure worker's radiation exposures are maintained ALARA and within limits/guidelines.
    2. To minimize the creation and spread of surface contamination.
    3. Ensure equipment and materials leaving the site are not contaminated.
- Periodic radiation surveys should be performed during conduct of the work to monitor radiological conditions or changes to those conditions.

Release Surveys

- Release surveys identify contamination on vehicles, equipment and material that is leaving an area of radioactive contamination (or potential radioactive contamination).

- Release surveys are typically surface scan surveys as described above.
- The surveys should focus on areas where contamination is most likely to be present. Examples are:
    - Vehicle tires.
    - Equipment in direct contact with soil.
    - Any cracks or crevices on items where contamination may accumulate.
- Equipment can be released if measurements do not exceed the AL.
- If contamination is identified above the Action Limit, the item should undergo decontamination.
- Waste generated during decontamination shall be segregated for waste characterization.
- If contamination cannot readily be removed, contact the Health Physicist (or designee) for advice. Do not allow the contaminated equipment to leave the site.

Annual Survey

- An annual survey of the site shall be performed and documented.
- The following locations shall be included:
    - The Sub-Slab Depressurization System (SSDS)
    - OU1 Groundwater Treatment System (GWTS) Soil Vapor Extraction System (SVE)
    - OU2 GWTS
    - Extraction points (EP)
- The survey shall include collection of data to evaluate current site radiological conditions, with a focus on measurements to evaluate worker exposures.
- Previously completed annual surveys should be consulted in guiding the planning, performance and documentation of an annual survey.

Radiological Survey Map

Task Number	Task Name

Site Name:_____ Location:_____ Date:_____ Time:_____

Purpose:_____Survey #_____ __ _____

Instrument #1 – Model:_____ Serial #_____Probe Model:_____ Serial#_____ Cal Due:_____

Instrument #2 – Model:_____ Serial #_____Probe Model:_____ Serial#_____ Cal Due:_____

Remarks: _____

Surveyor Name (Print):_____ Surveyor Signature:_____ Reviewed By:_____

O indicates smear location * indicates contact radiation reading LAW indicates large area wipe All radiation readings are gamma in µR/h unless noted.

Alpha Beta Gamma Survey Form

Survey Number: _____

Task Number	Task Name		
Location		Date	Time
Purpose			

Instrument and Probe Type and Serial Number		Surveyor(s) Printed Name	Surveyor(s) Signature

#	Item Description /Measurement Location	BETA-GAMMA SURVEY		ALPHA SURVEY		Gamma Survey		EXPOSURE SURVEY	
		Min cpm	Max cpm,	Min cpm	Max cpm,	Min	Max	Reading/Units	Distance
	Background								

Remarks	
Reviewed by	Date

Radiation Survey Notes

Task Number: _____ Task Name _____

Survey Description: _____ Date _____

Notes:

Technician Name _____

SOP Owner:	**AMEC E&E, PC**
SOP No.:	**RAD-06**
Revision No.:	**0**
Revision Date:	**Aug 2021**
Revision By:	
Approved By:	

Lockheed Martin Corporation
SOP-RAD-06 Excavation Gamma Screening

Description

This SOP provides instructions for performing radiation screening of excavation using gamma scintillation detectors and ratemeters.

Abbreviations

AL	Action Level
cpm	counts per minute
NaI	Sodium Iodide
SOP	Standard Operating Procedure
RAM	Radioactive Materials

Required Tools and Equipment

Ludlum Model 2221 Ratemeter (or equivalent)
Ludlum Model 44-10 2-inch by 2-inch NaI gamma scintillation detector (or equivalent).

Safety Considerations

- Comply with all applicable project H&S requirements, including excavation access requirements.
- Wear all required PPE and follow all associated procedures as outlined in the Health and Safety Plan.
- Radiological surveys shall be performed in accordance with governing work documents. and contamination control practices.
- Surveys shall be performed following standard contamination control and ALARA Practices.
- Notify the Health Physicist if unexpected radiological conditions are encountered.

Associated SOPs

SOP-RAD-02 Portable Radiation Instruments Quality Control
SOP-RAD-03 Radiation Survey

Associated Forms

SOP-RAD-02-01 Establish Response Check Range
SOP-RAD-02-02 Operational Response Checks
SOP-RAD-06-01 Excavation Background
SOP-RAD-03-01 Radiation Survey Map

Precautions and Limitations

- Ensure that instruments and equipment used are calibrated and quality control checks have been performed using SOP-RAD-02 Portable Radiation Instrument Quality Control.
- Use of an instrument other than specified must be approved by the Health Physicist.
- Any excavation of radioactive contaminated soil (or potentially contaminated soil) will have a radiation safety professional on site to provide guidance to the field team in performing the survey.
- Background count rate's and AL's shall be established for each Instrument/Detector to be used for excavation screening. Because the detector efficiency and responsiveness to gamma sources varies from detector to detector.

Background Survey

- Identify the area to be used for background measurements
    - unimpacted by manufacturing operations, approximately 1,600 ft^2 (i.e. northeast of the OU-1 GWTS location)
    - cleared of surface debris and large cobbles.
- Conduct a gamma survey either by GPS paired walk over survey or a static grid survey
- Static Grid Survey
    - Divided the area into 10'X10' grids
    - Identify 8 Grid nodes
    - Hold the detector 4 inches from the ground surface
    - Collect 10 1-minute measurements at each node
    - Record the data on SOP-RAD-06-01 Excavation Background
    - Calculate the action level as following:
        - The AL assumes a normal background data distribution and is the 95% Upper Tolerance limit (UTL) with 95% coverage. The preferred calculation method is using EPA's ProUCL software, however other statistical software and methods may be used subject to HP approval. Documentation of the

calculation shall be retained as a survey record.
    - For personnel frisking surveys, the AL is any measurement above the ambient background level.
- GPS paired walkover survey
    - Complete a walk over survey of the entire area
    - Maintain a detector height of approximately 4 inches (10 centimeters) from ground surface
    - Using a scan rate of 0.5 meters per second (m/s).

SOP Owner:	**AMEC E&E, PC**
SOP No.:	**RAD-06**
Revision No.:	**0**
Revision Date:	**Aug 2021**
Revision By:	
Approved By:	

Lockheed Martin Corporation
SOP-RAD-06 Excavation Gamma Screening

Screening Excavations & Stockpiles

- Document all radiation surveys following SOP-RAD-03 Radiation Surveys, and endure data is recorded for each scanned lift or stockpile.
- Prior to excavation, conduct a gamma scan of the ground surface of the following
    - Proposed excavation area
    - Work areas where excavated soil may be handled
    - Spoils stockpile area,
    - Record the gamma scan range
    - Identify any measurements above the AL
- Screening excavation
    - Conduct a gamma scan for each 6-inch to 12-inch lift.
    - Use professional judgment to evaluate scan measurements. Pay particular attention to upward trends in count rates in areas due to the depth of excavation, changes in natural material types, and detector geometry effects.
    - Investigate areas where measurements are trending higher.
    - Stop excavation if levels exceed the AL.
- Screening stockpiles
    - Screening the stockpiled soil may be used instead of screening the excavation bottom when the excavation is unsafe to access.
    - Conduct a gamma scan for each 6-inch to 12-inch lift.
    - Work with the excavator operator to place spoils in a manner to facilitate scanning.
    - Use professional judgment to evaluate scan measurements.
    - Investigate areas where measurements are trending higher.
    - Stop excavation if levels exceed the AL.
- Investigate any area that exceeded the AL
    - Collect a 1-minute timed count
    - Identify the extent of the area that exceeds the AL.
    - Notify the Task Manager who will notify Lockheed Martin Corporation and NYSDEC.
- Material that exhibits readings above the ALs should be segregated from other excavated material
- Further excavation of soil that exceeds ALs should follow NYSDEC guidance.
- Upon completion of the excavation, backfilling can proceed with soil that has been pre-approved by NYSDEC.

Waste Management

- Soil and waste generated during this work will be placed into drums for later characterization and disposal.
- Soil and waste identified as potentially radioactive, (average above the AL) will be segregated. Segregated waste materials shall be stored in a sturdy container and clearly labeled.

1. Introduction to Wood Health, Safety, Security and Environment (HSSE) Management Systems

1.1 Wood HSSE Management System "Blue Book"

The Wood HSSE management system is defined by the HSSE Management System Standard -the Blue Book. It consists of fifteen elements that set mandatory minimum standards for the management of HSSE across Wood. These minimum standards define how Wood leads, plans and organizes itself to ensure HSSE risks are controlled and to deliver continuous improvement in HSSE performance. The Blue Book is supported by Wood HSSE standards, procedures, guidelines and tools which provide further direction and advice on how to comply with the Blue Book's requirements.

Wood's core ***Vision*** is to:

Inspire with ingenuity, partner with agility, create new possibilities...

The Wood ***Values*** are:

- ***Care*** -Working safely, with integrity, respecting and valuing each other and our communities
- ***Commitment*** - Consistently delivering to all our stakeholders
- ***Courage*** - Pushing the boundaries to create smarter, more sustainable solutions

The Wood HSSE management system helps translate our Vision and Values into action by:

- Providing structure and consistency in the way we manage HSSE
- Focusing our attention on risk management, ensuring compliance and undertaking assurance activities
- Supporting the development of a positive HSSE culture which in turn supports the management system
- Providing a framework for continuous improvement

Refer to the Wood "Blue Book" for additional information (LINK).

1.2 Wood E&I HSSE Management System Manual and California Injury and Illness Prevention Plan (IIPP)

The Wood E&I Health, Safety, Security and Environment (HSSE) Management System Manual and California Injury and Illness Prevention Plan (IIPP) describes the HSSE system and tools developed & implemented at Wood E&I. The manual addresses HSSE requirements for offices, laboratories and projects, including those of various duration, scale, location, and jurisdiction.

Wood E&I's Safety philosophy as it pertains to all work conducted whether in the office, laboratory or in the field is:

- All incidents and injuries can be prevented.

- Management and staff are responsible for preventing injuries and occupational illnesses.
- Occupational safety and health are part of every employee's total job performance.
- Working safely is a condition of employment.
- All workplace hazards can be safeguarded.
- Training employees to work safely is essential and is the responsibility of management/supervision.
- Prevention of personal injuries and incidents and protection of environment is good business.

These principles tie into the Wood plc Health, Safety, Security and Environment (HSSE) Policy Statement:

Figure 1-1 HSSE Policy

A copy of the Wood HSSE policy can be found in Appendix I and should be posted at the site. Modify if no site trailer or site office.

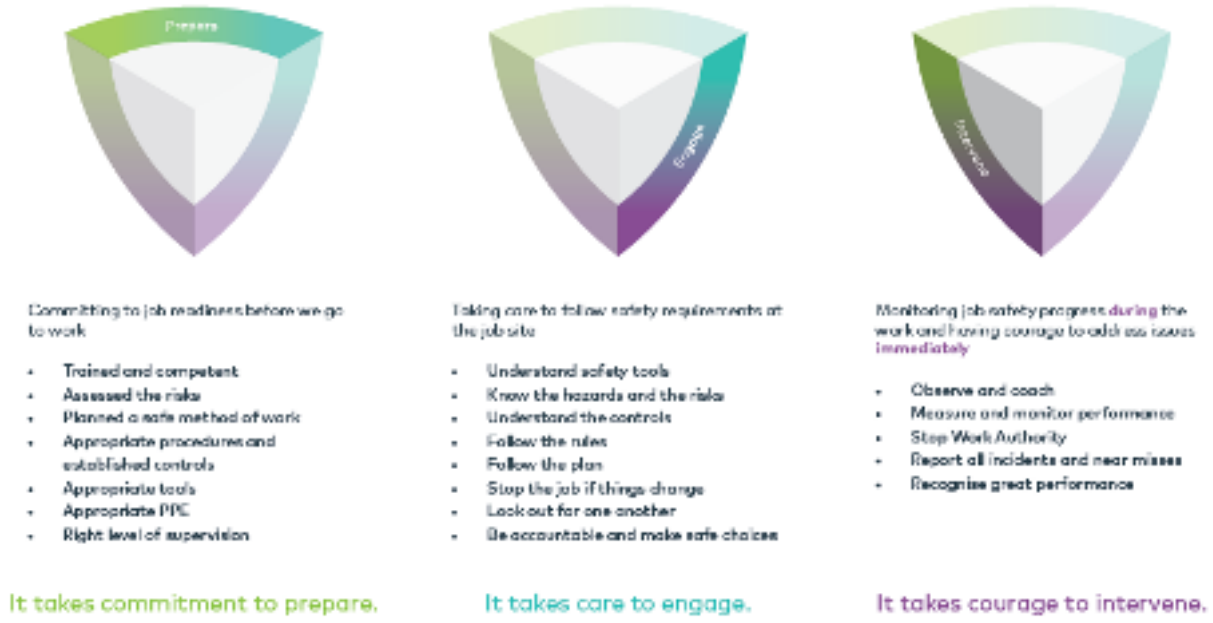
1.3 Wood Safety Shield

A metaphor for protection. Safety Shield pulls together our HSSE processes and procedures to drive a simplistic and consistent message to our workforce around HSSE.

Aligned with our values, the three elements of the shield are:

- **Prepare:** It takes commitment to prepare.
- **Engage:** It takes care to engage.
- **Intervene:** It takes courage to intervene.

The Safety Shield seeks to educate, inform, monitor, improve and recognize our employees.



1.4 Stop Work Authority

All workers have Stop Work Authority. If work assigned or observed is deemed to be unsafe, they should stop work and notify their supervisor. Follow the Work Refusal Procedure found in Section 4.5 of the Wood E&I HSSE Integrated Manual.

Figure 1-2 Stop Work Authority

1.5 Just and Fair Safety Culture

Wood's Vision is that everyone coming to work goes home again, safe and healthy. The Wood Just and Fair Culture is designed to ensure this happens and to address the following issues:

- Promote an understanding in why people do the things they do
- Recognize people do make mistakes
- The premise that reckless behaviors are never tolerated

It is unacceptable for those who are risk takers to:

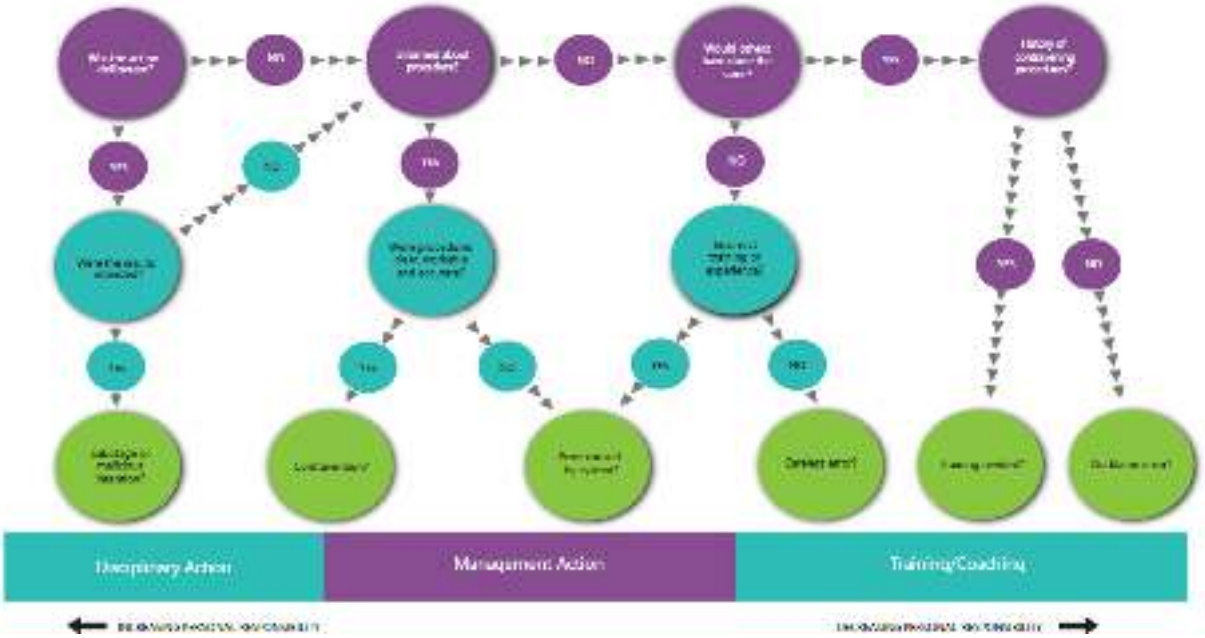
- Take chances with their safety or the safety of colleagues and others
- Fail to understand the impact an incident involving them may have on their family,
- friends and work colleagues

The Just and Fair culture process is generally undertaken after an initiating event – this could be an incident, findings from an audit or similar.

Just and Fair culture must be a transparent process, implemented uniformly and should be used sensitively and in the full knowledge of those involved. Just and Fair culture identifies the necessary action to be taken by those responsible for issues and/or improvements. When workers do not comply with all the safety systems that have been put in place, they need to understand that there is a consequence for that behavior.

Everyone involved in the process must have an opportunity to input into what went wrong and why, and that they understand the importance of intervention to prevent incidents from re-occurring.

Figure 1-3 Just and Fair Culture Model



1.6 Six Safety Essentials

The Six Safety Essentials are designed to support the safe execution of work in all our operating locations with the development of a "common set of behaviors" that we can all share. Wood, in our goal to be recognized as a world-class leader in HSSE safety must strive to ensure our daily overall consistency of HSSE standards, leadership and performance.

When performing work at the site, the Wood Six Safety Essentials will be followed:

- Always Take Care
- Follow the Rules
- Do a Risk Assessment
- You Must Intervene
- Manage Any Change
- Wear the Correct PPE

Figure 1-4 Six Safety Essential Icons

1.7 Wood Nine Life Saving Rules

The Life Saving Rules are Wood's minimum standard - it is an expectation that everyone must comply with the rules. Everyone needs to understand that:

- You must comply with the Life Saving Rules because non-compliance could result in serious injury or fatality to you or your colleagues
- If you breach a Life Saving Rule you may be subject to disciplinary action.

Supervisors and Managers must understand that:

- Breaking the Life Saving Rules will not be tolerated - no matter how urgent or important a task is.
- You have a duty to ensure that people undertaking a task have the right instruction, equipment and training to comply with the Life Saving Rules.

Bypassing Safety Controls – Obtain authorization before overriding or disabling safety controls. I understand and use safety critical equipment and procedures which apply to my task. I obtain authorization before:

- Disabling or overriding safety equipment
- Deviating from procedure
- Crossing a barrier

Confined Space – Obtain authorization before entering a confined space. I confirm energy sources are isolated. I confirm the atmosphere has been tested and is monitored. I check and use my breathing apparatus when required. I confirm there is an attendant standing by. I confirm a rescue plan is in place. I obtain authorization to enter.

Driving – Follow safe driving rules. I always wear a seatbelt. I do not exceed the speed limit and reduce my speed for road conditions. I do not use phone or operate devices while driving. I am fit, rested and fully alert while driving. I follow journey management requirements.

Energy Isolation – Verify isolation and zero energy before work begins. I have identified all energy sources. I confirm that hazardous energy sources have been isolated, locked and tagged. I have checked there is zero energy and tested for residual or stored energy.

Hot Work – Control flammable and ignition sources. I identify and control ignition sources. Before starting any hot work:

- I confirm flammable material has been removed or isolated.
- I obtain authorization

Before starting any hot work in a hazardous area, I confirm:

- A gas test has been completed
- Gas will be monitored continually.

Line of Fire – *Keep yourself and others out the line of fire.*
I position myself to avoid:

- Moving objects
- Vehicles
- Pressure releases
- Dropped objects

I establish and obey barriers and exclusion zones. I take action to secure loose objects and report potential dropped objects.

Safe Mechanical Lifting – Plan lifting operations and control the area. I confirm that the equipment and load have been inspected and are fit for purpose. I only operated equipment that I am qualified to use. I establish and obey barriers and exclusion zones. I never walk under a suspended load.

Work Authorization – Work with a valid permit when required. I have confirmed if a permit is required. I am authorized to perform the work. I understand the permit. I have confirmed that hazards are controlled, and I is safe to start. I stop and reassess if conditions change.

Working at Height – Protect yourself against a fall when working at height.
I inspect my fall protection equipment before use. I secure tools and work materials to prevent dropped objects. I tie off 100% to approved anchor points while outside a protected area. Wood's definition of working at height as work at or above 1.8m/6ft, unless local legislation requires a lower height.

1.8 Stand Up for Safety

Wood's Stand up for Safety initiative focuses on four hazards that were identified by analyzing Wood's HSSE incidents and High Potential events. These are four are areas of primary concern

and are hazards that Wood employees face collectively as a global business. These four hazardous areas are:

- Dropped objects
- Driving
- Working at Height
- Energy Isolation

Extra attention will be paid to these four key areas if applicable when working on the project site.

1.9 HEART (Harm Elimination and Recognition Tracking)

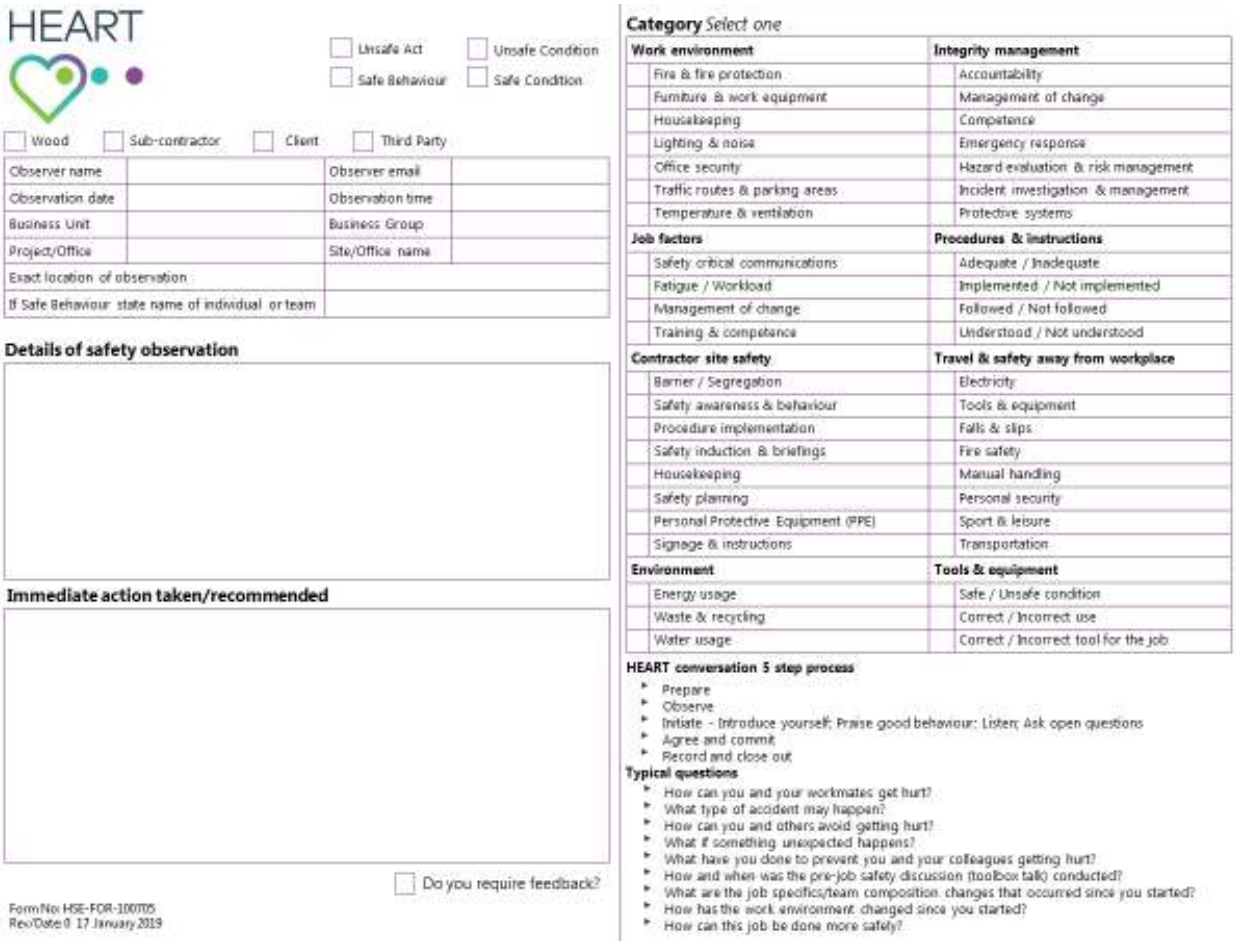
HEART is the corporate observation reporting system that all Wood employees are to use to report safety or environmental observations.

To enter a HEART observation, use the following link: https://cfapps.amecfw.com/HEART/

HEART is also accessible from mobile devices. Click here for instructions on how to access HEART from a mobile device.

A manual HEART observation form can be accessed from here.

Figure 1-5 HEART Form



HEART

☐ Unsafe Act ☐ Unsafe Condition
☐ Safe Behaviour ☐ Safe Condition

☐ Wood ☐ Sub-contractor ☐ Client ☐ Third Party

Observer name		Observer email	
Observation date		Observation time	
Business Unit		Business Group	
Project/Office		Site/Office name	
Exact location of observation			
If Safe Behaviour state name of individual or team			

Details of safety observation

Immediate action taken/recommended

☐ Do you require feedback?

Form/No: HSE-FOR-100705
Rev/Date: 0 17 January 2019

Category *Select one*

Work environment	**Integrity management**
☐ Fire & fire protection	☐ Accountability
☐ Furniture & work equipment	☐ Management of change
☐ Housekeeping	☐ Competence
☐ Lighting & noise	☐ Emergency response
☐ Office security	☐ Hazard evaluation & risk management
☐ Traffic routes & parking areas	☐ Incident investigation & management
☐ Temperature & ventilation	☐ Protective systems
Job factors	**Procedures & instructions**
☐ Safety critical communications	☐ Adequate / Inadequate
☐ Fatigue / Workload	☐ Implemented / Not implemented
☐ Management of change	☐ Followed / Not followed
☐ Training & competence	☐ Understood / Not understood
Contractor site safety	**Travel & safety away from workplace**
☐ Barrier / Segregation	☐ Electricity
☐ Safety awareness & behaviour	☐ Tools & equipment
☐ Procedure implementation	☐ Falls & slips
☐ Safety induction & briefings	☐ Fire safety
☐ Housekeeping	☐ Manual handling
☐ Safety planning	☐ Personal security
☐ Personal Protective Equipment (PPE)	☐ Sport & leisure
☐ Signage & instructions	☐ Transportation
Environment	**Tools & equipment**
☐ Energy usage	☐ Safe / Unsafe condition
☐ Waste & recycling	☐ Correct / Incorrect use
☐ Water usage	☐ Correct / Incorrect tool for the job

HEART conversation 5 step process

- Prepare
- Observe
- Initiate - Introduce yourself; Praise good behaviour; Listen; Ask open questions
- Agree and commit
- Record and close out

Typical questions

- How can you and your workmates get hurt?
- What type of accident may happen?
- How can you and others avoid getting hurt?
- What if something unexpected happens?
- What have you done to prevent you and your colleagues getting hurt?
- How and when was the pre-job safety discussion (toolbox talk) conducted?
- What are the job specifics/team composition changes that occurred since you started?
- How has the work environment changed since you started?
- How can this job be done more safely?

APPENDIX I HSSE Postings

For posting in trailer or at the jobsite. If no trailer or office at the site, keep in HASP for reference.

Our HSSE Policy

wood.

At Wood, we care for our people and the environment. We ensure that our people have a safe, healthy and secure workplace; this is a fundamental right. This policy explains how we provide this.

We will:

- Care for our people.
- Identify and manage hazards to eliminate or mitigate resultant risks.
- Prevent injury, ill-health, pollution and loss resulting from our activities.
- Be responsible in our approach to protecting the environment and minimising our impacts.
- Deliver continual improvement in our health, safety, security and environmental performance.

Name Robin Watson
Position **Chief Executive**
Date **01 January 2020**

We do this by:

- Ensuring we have exemplary HSSE leadership and management.
- Having effective, efficient and applied HSSE management systems.
- Understanding and complying with all legal, industry and other external requirements.
- Establishing and attaining clear HSSE objectives.
- Learning lessons from our incidents and preventing reoccurrence.
- Engaging with our people on HSSE issues.
- Working with our customers, regulators and others to promote continuous improvement.
- Training our people to be competent and safe in undertaking their roles.
- Helping our supply chain and partners to meet our own policy obligations.
- Promoting a positive HSSE culture that drives HSSEA improvement.
- Encouraging anyone to stop a job if they perceive any HSSE shortfall.

We commit ourselves to this Policy.

We will review annually, or where significant changes impact our business.

wood.

Stand Up For Safety

We've analysed our HSE Incidents and High Potential events and we are focusing on common key safety challenges we collectively face as a global business: dropped objects, driving, working at height and energy isolation.

Wood's Stand up for Safety campaign brings us together as a team with one, shared goal – to keep safety at the heart of every conversation we have.

The Six Safety Essentials provide a common set of shared behaviors that complement out Life Saving Rules

The Live Saving Rules provide workers with the information on critical risk areas and describe the actions to take to protect themselves and their colleagues.

International Association of Oil & Gas Producers

LIFE-SAVING RULES

Bypassing Safety Controls

Obtain authorisation before overriding or disabling safety controls

- I understand and use safety critical equipment and procedures which apply to my task
- I obtain authorisation before:
  - disabling or overriding safety equipment
  - deviating from procedures
  - crossing a barrier

Confined Space

Obtain authorisation before entering a confined space

- I confirm energy sources are isolated
- I confirm the atmosphere has been tested and is monitored
- I check and use my breathing apparatus when required
- I confirm there is an attendant standing by
- I confirm rescue plan is in place
- I obtain authorisation to enter

Driving

Follow safe driving rules

- I always wear a seatbelt
- I do not exceed the speed limit, and reduce my speed for road conditions
- I do not use phones or operate devices while driving
- I am rested and fully alert while driving
- I follow journey management requirements

Energy Isolation

Verify isolation and zero energy before work begins

- I have identified all energy sources
- I confirm that hazardous energy sources have been isolated, locked and tagged
- I have checked there is zero energy and tested for residual or stored energy

Hot Work

Control flammables and ignition sources

- I identify and control ignition sources
- Before starting any hot work:
  - I confirm flammable material has been removed or isolated
  - I obtain authorisation
- Before starting hot work in a hazardous area I confirm:
  - a gas test has been completed
  - gas will be monitored continuously

Line of Fire

Keep yourself and others out of the line of fire

- I position myself to avoid:
  - moving objects
  - vehicles
  - pressure releases
  - dropped objects
- I establish and obey barriers and exclusion zones
- I take action to secure loose objects and report potential dropped objects

Safe Mechanical Lifting

Plan lifting operations and control the area

- I confirm that the equipment and load have been inspected and are fit for purpose
- I only operate equipment that I am qualified to use
- I establish and obey barriers and exclusion zones
- I never walk under a suspended load

Work Authorisation

Work with a valid permit when required

- I have confirmed if a permit is required
- I am authorised to perform the work
- I understand the permit
- I have confirmed the hazards are controlled and it is safe to start
- I stop and reassess if conditions change

Working at Height

Protect yourself against a fall when working at height

- I inspect my fall protection equipment before use
- I secure tools and work materials to prevent dropped objects
- I tie off 100% to approved anchor points while outside protected areas

Safety Essentials

The Safety Essentials are designed to give us a common set of shared behaviours that complement our Life Saving Rules. They will apply to all that we do, whether you are based in an office or on site.

Our behaviours directly influence the way we work, the way we do things and the way we follow processes. It is only through your behaviour and commitment that the Safety Essentials will be embedded into our operations.

SITE SPECIFIC HEALTH AND SAFETY PLAN
SUB-SLAB DEPRESSURIZATION BOOSTER SYSTEM PROJECT

LOCKHEED MARTIN CORPORATION
FORMER UNISYS FACILITY, GREAT NECK
LAKE SUCCESS, NEW YORK
NYSDEC Site ID #130045

August 2021
Revision 1

GWTT
Ground / Water Treatment & Technology

627 Mount Hope Rd
Wharton, NJ 07885

SAFETY POLICY FOR GROUND/WATER TREATMENT & TECHNOLOGY

The purpose of this policy is to develop a high standard of safety throughout all operations of Ground/Water Treatment & Technology and to ensure that no employee is required to work under any conditions, which are hazardous or unsanitary.

We believe that each employee has the right to derive personal satisfaction from his/her job, and the prevention of occupational injury or illness is of such consequence to this belief that it will be given top priority at all times.

It is our intention here at Ground/Water Treatment & Technology to initiate and maintain complete accident prevention and safety training programs. Everyone from top management to the working person is responsible for the safety and health of those persons in their charge and coworkers around them. By accepting mutual responsibility to operate safely, we will all contribute to the wellbeing of our employees.

CONTRACTOR APPROVALS

By their signature, the undersigned hereby certify that this Site-Specific Health and Safety Plan (SSHASP) has been reviewed, modified for site-specific hazards, and approved for use at the Former Unisys Facility located at 1111 Marcus Avenue, Great Neck, New York.

GWTT Project Manager — Date: 9-1-2021

GWTT Health and Safety Director — Date: 9-1-2021

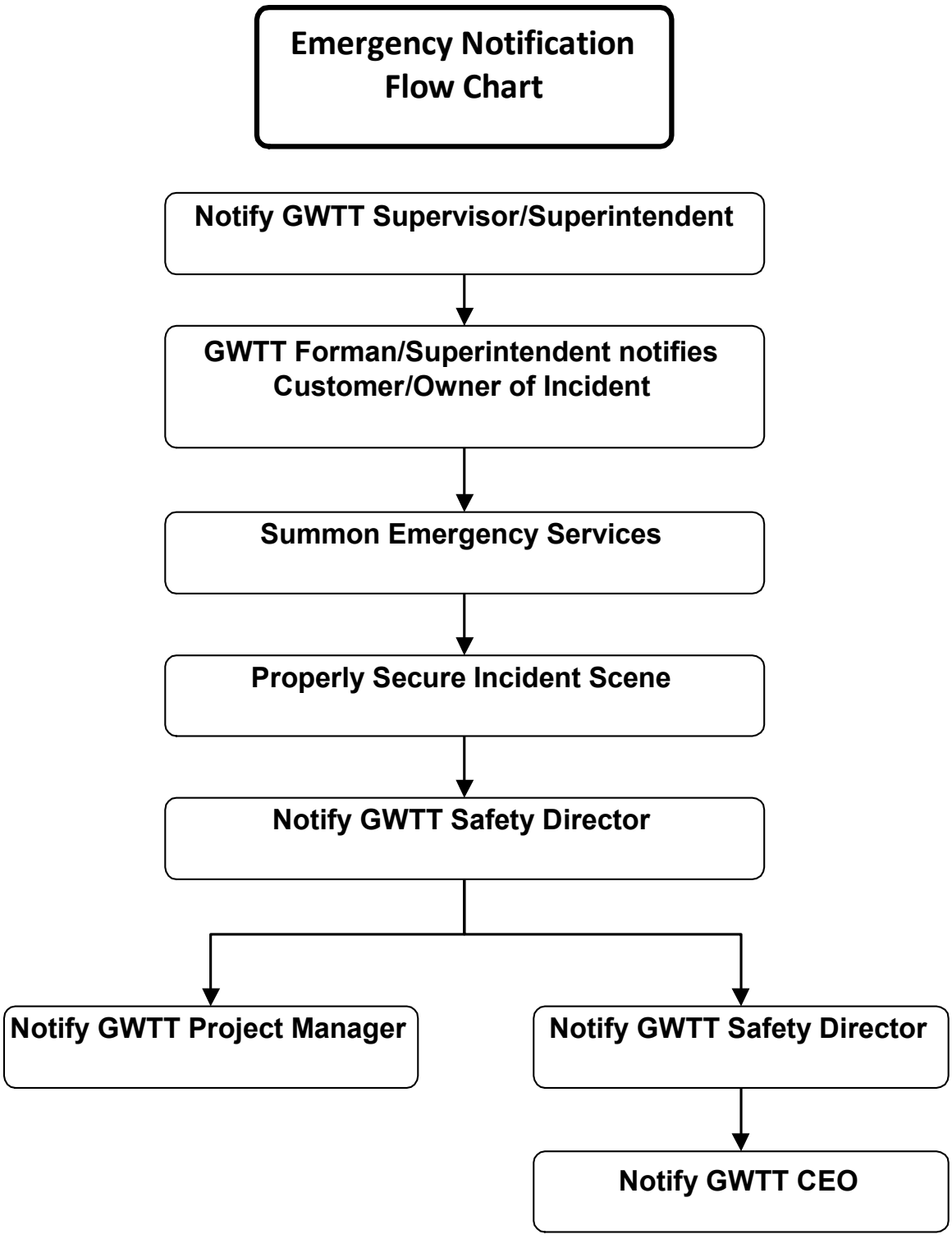
Table of Contents

1. Critical Project Information

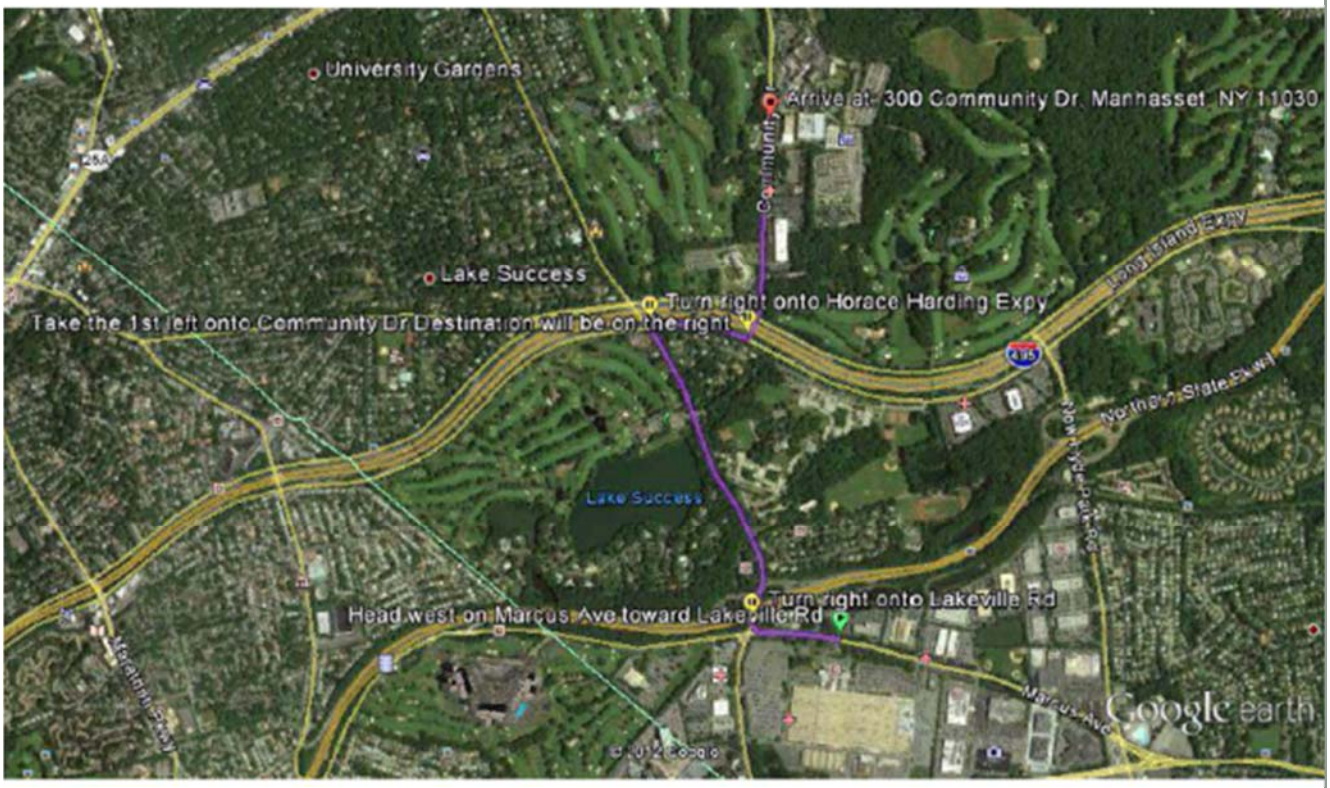
Site & Customer/Owner Information	
Site Location	1111 Marcus Avenue, Great Neck, NY
Customer Project Manager/Engineer of Record Stuart Pearson	Office: 207-828-3426 Cell: 207-776-4251
Customer Offsite Support/Construction QC William Whitacre	Office: 609-689-6771 Cell: 646-831-5662
Customer Primary Contact Eduard Chenette	Office: 207-828-3282 Cell: 207-710-4602
Customer Safety Officer/Construction QC Jack Feng	Office: NA Cell: 646-392-5252
Customer Safety Manager Jeff Tweeddale	Office: 860-529-7191 Cell: 860-670-5908

GWTT Personnel Contact Information	
GWTT Project Manager (PM) Kevin Marchut	Office: 973-983-0903 Cell: 973-513-58122
GWTT Safety Director (GSD) Roger Huth	Office: 973-983-0903 Cell: 201-274-3041
GWTT Site Superintendent (SS) Mike VanVliet	Office: 973-983-0903 Cell: 973-903-2945

Emergency Information	
Emergency Services (Ambulance, Fire, Police)	**CALL 911**
Hospital Name	North Shore Community Hospital
Hospital Address	300 Community Dr, Manhasset, NY
Hospital Phone Number	516-562-4125 (ER)
GWTT Safety Director (GSD) Roger Huth	Office: 973-983-0903 Cell: 201-274-3041


Emergency Notification Flow Chart
Notify GWTT Supervisor/Superintendent
GWTT Forman/Superintendent notifies Customer/Owner of Incident
Summon Emergency Services
Properly Secure Incident Scene
Notify GWTT Safety Director
Notify GWTT Project Manager
Notify GWTT Safety Director
Notify GWTT CEO

Hospital Map and Directions



Directions to the Hospital:

From Site located at: 1111 Marcus Ave, Great Neck, NY

1. Head west on Marcus Ave toward Lakeville Rd	0.2mi
2. Turn right onto Lakeville Rd	0.7mi
3. Turn right onto Horace Harding Expy	0.2mi
4. Take the 1st left onto Community Dr Destination will be on the right	0.5mi

Address of the Hospital:

300 Community Dr
Manhasset, NY

EMERGENCY FIRST AID PROCEDURES

THE RESPONDER SHOULD HAVE APPROPRIATE TRAINING TO ADMINISTER FIRST AID OR CPR.

1. Survey the situation. Do not endanger your own life. **DO NOT ENTER A CONFINED SPACE TO RESCUE SOMEONE WHO HAS BEEN OVERCOME. FOLLOW PROTOCOLS INCLUDING THAT A STANDBY PERSON IS PRESENT.** IF APPLICABLE, REVIEW SDSs TO EVALUATE RESPONSE ACTIONS FOR CHEMICAL EXPOSURES.
2. Call On-Site Security (see above numbers) **IMMEDIATELY**. Explain the physical injury, chemical exposure, fire, or release.
3. Decontaminate the victim if it can be done without delaying life-saving procedures or causing further injury to the victim.
4. If the victim's condition appears to be non-critical, but seems to be more severe than minor cuts, he/she should be transported to the nearest hospital by the SS or designated personnel.

STOP BLEEDING AND CPR GUIDELINES	
To Stop Bleeding	CPR
1. Give medical statement indicating that you are trained in First Aid. 2. Assure: airway, breathing and circulation. 3. Use DIRECT PRESSURE over the wound with clean dressing or your hand (use non-permeable gloves). Direct pressure will control most bleeding. 4. Bleeding from an artery or several injury sites may require DIRECT PRESSURE on a PRESSURE POINT. Use pressure on pressure points for 30 to 60 seconds to help control severe bleeding. 5. Continue primary care and seek medical aid as needed.	1. Give medical statement indicating that you are trained in CPR. 2. Check for responsiveness: Tap shoulders and shout, “Are you OK?” If unresponsive and not breathing: 3. Send someone to call **911** and to obtain an AED and first aid kit (or, if you are alone, complete these actions yourself). It is very important to call for emergency assistance prior to initiating CPR. 4. Open the airway with the person lying on his or her back, tilt head back slightly to lift chin. Check for breathing for no more than 10 seconds. If there is no breathing: 5. Immediately begin CPR, starting with compressions: COMPRESSIONS: - at least 2 inches deep - rate of 100 to 120 compressions per minute RESCUE BREATHS: - Open airway: tilt head past neutral position and lift chin. - Pinch nose and form seal over mouth. 6. Continue CPR steps performing compressions and rescue breaths until breathing resumes or emergency services arrive. 7. When AED is available, use it in accordance with the AED instructions. If breathing resumes, maintain an open airway and monitor for any changes in condition.

2. Scope of Work

1. Mobilization / Pre-construction Activities
2. Installation of Sub-Slab Depressurization Booster Points (two locations)
3. Booster Point Work Area Restoration
4. Roof and Interior Piping Installation and Connections
5. Electrical Connections
6. Heat Trace and Insulation
7. SSDS Startup and Testing

2.1 Mobilization / Pre-Construction Activities

Upon mobilization of all labor, materials, and equipment to site the following activities will take place:

- Site Specific Health & Safety orientation and training
- Establishment of work zones and staging areas
- Set up Privacy Fencing around work areas
- LMC dig permit and checklist
- Notify one-call of activity and obtain utility clearance prior to groundbreaking
- Private utility markout / survey using GPR and precision utility locator by qualified geophysical contractor.
- Take pre-construction photos and submit portfolio
- Installation of soil erosion and sediment controls

2.2 General Requirements On-site Activities

- Daily safety tailgate meetings (at least 1 per shift)
- Daily progress reporting
- Attend coordination meetings as required including:
  - Internal GWTT
  - Project Team
  - Building Manager and Tenants
  - Weekly schedule update

2.3 Construction Activities

2.3.1 Installation of Sub-Slab Depressurization Extraction Point (two points)

- Set up SESC measures and safety / privacy fencing
- Clear grass and segregate, if possible, for later reuse
- Begin continuous monitoring of workspace air with calibrated four / five gas meter
- Remove soils to 2-ft below grade around the work area, and deeper as necessary to facilitate core drilling of one (1) or two (2) 6-inch diameter hole(s) through 12-inch thick foundation wall.
- Stage spoil pile at least 2-feet away from shallow pit – keep pit less than 4-ft below grade and sloped. Manage spoil pile by surrounding workspace with 3-ft silt fence and plastic cover.
- Excavate soils on opposite side of foundation wall by applying vacuum.

- Install 4-in dia Sch 40 PVC pipe with link seal between cored foundation wall and OD of pipe
- Plug and grout secondary hole if applicable
- Measure off location of point relative to nearest building corner

2.3.2 Booster Point Work Area Restoration

- Seal buried connections with bentonite chips
- Backfill around exterior piping with a 12-inch pipe bedding box and use clean imported fill to backfill installation pit. Restore in 12-inch compacted lifts.
- Install buried utility identification tape.
- Restore original cover (mulch) over in pit area and in track access to pit from road.
- Maintain SESC measures
- Transport and handle soil spoils onsite into 55-gallon drum containers for sampling and disposal.
-

2.3.3 Vertical EP Piping to Roof

- Route 4-inch dia. sch. 10 galvanized steel pipe from Sch 80 PVC stub up and valve connection to building wall. Extend piping vertically to roof and secure to brick wall as per drawings.
- Secure stack to building using masonry fasteners Unistrut and pipe clamps every 10-ft and before and after lower spool piece.

2.3.4 Roof and Interior Piping Installation and Connections

This task includes the installation of horizontal roof piping and connections to existing piping network.

- The specifications and approved shop drawings will be followed including rooftop protection pads, floating pipe supports with pipe hangers, use of rigid and flexible couplings, and expansion loops.
- Piping on north and south shall be sloped from high points of run back to booster point and interior tie in.
- The interior connections shall be made in coordination with the Engineer's representative to ensure that system downtime is minimized.
- Instrument spools shall be constructed and mounted in place with isolation valves prior to tie in.
- Tie in shall consist of shutting down the system, removing existing piping and modifying the existing spool piece to allow for the new EP connection.
- GWTT shall utilize a rack truck or box truck to relocate equipment and materials from the SSDS plant staging area to the nearest available entrance to the work site and begin by providing protective cover along the flooring. This will include a combination of paper, plastic and matting or plywood as required.
- Electric manlifts, material carts and ladders will be brought into the work area and the tie in locations will be evaluated to ensure all parts are on hand to complete the work.

- GWTT will have temporary caps, flanges, and valves available for use should they be needed to stop work and resume at a later date.
- The SSDS will be shut down by Wood operational staff.
- From the newly installed tee, piping will be routed and supported with Unistrut style supports to the glass block wall for penetration onto the roof. This work must be done in dry conditions and requires removal of several glass blocks. The glass block will be fitted with a pipe boot on the interior and exterior to seal the penetration.

2.3.5 Electrical and Controls

All programming, live troubleshooting and work related to communication network shall be completed by others.

GWTT shall manage the Electrical subcontractor, LEB Electric. LEB's scope is as follows:

- North and south sides supply and install galvanized conduit with conductors (200' each) with all expansion fittings from instrument tie into RP panel in respective fan house. These runs shall be to power and control devices at the extraction point instrument spools.
- Include local disconnect switch at each valve.
- Terminate wires inside existing panels at Wood direction.
- Conduit routed on pipe stands where allowed transition to wooden blocks on rooftop back to existing catwalk. Conduits to run below catwalk and drop off for routing to fan house at each location.
- Penetrations in fan houses shall be sealed with non-shrink grout.
- Tie in with new breaker at existing distribution panels inside the fan-houses for each heat trace runs.
- Install meter to monitor power usage at each location.
- Run conduit and wire from fan house to heat trace circuits as needed.

2.3.6 Heat Trace & Insulation

- See above 2.3 for Heat Trace Power Installation
- Install heat trace along bottom of EP piping and secure with proper tape
- Insulate all EP piping and fittings in both north and south bays from glass block wall penetrations and down to grade on west side of facility.

2.3.7 Startup and Testing Activities

This task includes coordination with the main OMM contractor to facilitate the start-up and shake-down of newly installed booster system components. This may include:

- Calibration of instrumentation and control devices,
- Perform regular inspections and testing – collection of field parameters
- Confirm connectivity and communication of newly integrated equipment
- Troubleshoot issues

2.4 Demobilization Activities

Demobilization activities includes the following:

- Remove and properly manage materials and equipment that are not part of the permanent installation

- Take post-work photographs and submit portfolio
- Prepare final red-lines and record documents, including Operation and Maintenance Manual for equipment and devices.
- Perform any final site restoration including temporary fence removal, SESC measures removal, final clean up and re-seeding with hay.

3. Project Organization and Responsibilities

This section specifies GWTT project organization and responsibilities. All GWTT personnel, including its subcontractors, will be responsible for adherence to the safety procedures during the performance of this project. Deviations from this SSHASP will not be allowed without express consent of the GWTT Safety Director (GSD). Project management and field supervisors for subcontractors are responsible for ensuring that their personnel will follow the procedures of this SSHASP. Violations of this SSHASP will result disciplinary action up to dismissal from site operations.

3.1 Project Manager (PM) – Kevin Marchut

The GWTT PM responsibilities include the following:

- Ensures implementation of the SSHASP;
- Participates in incident investigations;
- Ensures the SSHASP has all the required approvals before any site work is conducted; and
- Ensures the PS, SS, and GSD are informed of project changes which require modifications of the site safety plan.

3.2 GWTT Safety Director (GSD) – Roger Huth

The GSD responsibilities include the following:

- Assists in the development and approval of the SSHASP;
- Approves revised or new safety protocols for field operations;
- Approves individuals who are assigned Health and Safety responsibilities;
- Coordinates revisions of this SSHASP with field personnel;
- Assists in Coordinating upgrades or downgrades of personal protective equipment with the PS and the site SS;
- Assists with safety walkthroughs and safety inspections;
- Assists with the implementation of the SSHASP;
- Assists in the investigation of all accidents/incidents; and
- GSD or GWTT Corporate Safety Manager will perform quarterly corporate safety audits.

3.3 Safety Supervisor (SS) – (responsibilities will be handled by site management)

The site Safety Supervisor responsibilities include the following:

- Ensures that all health and safety activities identified in this SSHASP are conducted and/or implemented;
- Determines upgrades or downgrades of personal protective equipment (PPE) based on site conditions and/or real-time monitoring and personnel sampling results;

- Identifies operational changes which require modifications to health and safety procedures and site safety plans, and ensures that the procedure modifications are implemented and documented through changes to the SSHASP, with GSD approval;
- Directs and coordinates health and safety monitoring activities;
- Ensures proper personal protective equipment is utilized by field teams;
- Conducts weekly safety inspections of work areas;
- Monitors compliance with this SSHASP;
- Serves as the primary contact to review health and safety matters that may arise;
- Approves revised or new safety protocols for field operations;
- Approves individuals who are assigned health and safety responsibilities;
- Coordinates revisions of this SSHASP with field personnel;
- Assists in the investigation of accidents/incidents;
- Performs real-time monitoring and personnel sampling and reporting/recordkeeping;
- Coordinates health and safety monitoring activities with PS/PM; and
- Has overall project responsibility for Project Health and Safety.

3.4 Project Superintendent (PS) – Mike VanVliet

The Project Superintendent's responsibilities include the following:

- Ensures that the SSHASP is implemented in conjunction with the GSD and SS;
- Ensures that work is scheduled with adequate personnel and equipment resources to complete the job safely;
- Ensures that adequate communication between field crews and emergency response personnel is maintained;
- Ensures that site personnel are adequately trained and qualified to work at the site;
- Enforces site health and safety rules;
- Conducts and documents daily safety briefings;
- Conducts periodic inspections;
- Stops work if necessary;
- Notifies GSD and SS of accidents/incidents;
- Reports to the GSD and SS to provide summaries of field operations and progress; and
- Acts as the primary point of contact with the owner (or its agents) for site related activities and coordination with project related site operations.

3.5 Site Personnel

The Site Personnel responsibilities include the following:

- Perform work tasks according to the GWTT Code of Safe Work Practices;
- Report any unsafe or potentially hazardous conditions to the PS and SS;
- Maintain knowledge of the information, instructions and emergency response actions contained in the SSHASP;
- Comply with rules, regulations and procedures as set forth in this SSHASP and any revisions;
- Prevent admittance to work sites by unauthorized personnel;
- Inspect all tools and equipment, including PPE, prior to use each day; and
- All site personnel have the authority to stop work if they deem the task unsafe.

3.6 Subcontractors

At a minimum, GWTT subcontractors will comply with this SSHASP. GWTT subcontractors will also maintain an independent SSHASP that complies with their specific site related tasks. If necessary, the applicable sections of the subcontractor SSHASP will be added to this SSHASP to cover additional hazards. GWTT will evaluate the safety performance of its on-site subcontractors in the same manner that it evaluates its own performance.

GWTT subcontractors will submit a addendums to this SSHASP that include:

- A written description of required safety needed for the job;
- Applicable safety training documentation as well as licenses and certifications; and
- The name and telephone number of the site safety coordinator responsible for safety on site.
- Job Activity Hazard Analyses
- Subcontractors will be required to participate in all safety meetings and discussions and adhere to the GWTT SSHASP and Client Safety Requirements.

4. Location and Site Description

The former Unisys Site is located at 1111 Marcus Avenue, Great Neck in the Village of Lake Success and the Town of North Hempstead, Nassau County, New York. The site is bounded by Marcus Avenue to the north, Union Turnpike to the south, Lakeville Road to the west, and the Triad Office Park to the east. The site is approximately 90.5 acres in size. The property is fully developed consisting primarily of the former main manufacturing building, various smaller support buildings, three recharge basins, and parking lots. The site has been redeveloped for commercial use and presently houses multiple tenants. The proposed northwestern SSD booster system is in the Village of Lake Success, an incorporated Village in the Town of North Hempstead. The proposed southwestern SSD booster system is located solely in the Town of North Hempstead.

5. Control of Work / Permits

5.1 Safety Orientation

All GWTT employees and sub-contractors who participate in fieldwork at this project will attend safety orientation training; it will be administered to all employees prior to the initial work assignment.

The orientation will consist of all required training programs as well as job and site-specific safety and health information. All GWTT personnel and management will adhere to the SSHASP along with any local OSHA or site safety requirements.

5.2 Daily Job Safety Analysis/STARRT forms

Each day before work commences and when there is a change to procedures all employees shall complete a GWTT STARRT form. At the end of their shift the STARRT form shall be turned in to their supervisor, scanned and saved to the job file, then forwarded to the appropriate department for filing. GWTT will incorporate Customer and/or forms for daily safety briefings as requested.

5.3 Safety Meetings

GWTT employees will follow the procedure of communicating the possible hazards any time they are on site. Weekly safety talks will be communicated and be either site specific or issued by corporate. Employees will be given safety briefings by their respective supervisors on a daily basis. STARRT communication will also be given immediately:

- Each morning prior to work beginning.
- When tasks change or environment changes during the day.
- When an injury occurs during the task.
- When manufacturers provide safety-related information pertaining to defects, use, etc. for equipment used by this company.

5.4 Job Activity Hazard Analysis (JAHA)

The Control of Work process requires that field personnel prior to initiating work conduct a Job Activity Hazard Analysis (JAHA), also known as Job Safety Analysis (JSA) and Job Hazard Analysis (JHA). A JAHA is a written review of the work activities to be completed in a sequential manner where each step is evaluated for anticipated hazards with applicable controls developed. If needed, the SS can assist with the development of the JAHA with an example form included as **Appendix A**; however, subcontractors are encouraged to utilize their own template. **Appendix B** includes a list of potential hazards and associated control measures.

Once the JAHA has been developed it should be submitted to the SS, or other designee, for review and confirmation that work does not conflict with other activities being performed in that immediate area. If necessary, the SS will identify and initiate coordination with additional parties on-Site before allowing activities to occur. Additionally, the SS or other designated IA would issue work permits for high-risk activities such as ground disturbance, hot work, confined space entry, working near live overhead utilities, lifting operations, working at heights and energy isolation as part of their JAHA review. If a Work Permits is deemed necessary to complete activities outlined on the JAHA, then that step of the task should not proceed until the appropriate permit has been issued by the SS or designated personnel.

5.5 Hot Work Permit

A Hot Work Permit is required before conducting any activity that uses or creates a heat source, spark, or open flame (i.e. welding, cutting, brazing, etc.). The work area must be evaluated for flammable or combustible hazards as well as a potential hazardous atmosphere. A copy of the Hot Work Permit form is included in **Appendix C**. Additional information regarding hazards associated with the use of hand and power tools, welding and cutting along with potential explosions is included Section 2 as applicable to the project scope of work.

5.6 Confined Space Entry

Entry into confined spaces will be conducted in strict accordance with 29 CFR 1910.146 and 29 CFR 1926 Subpart AA 1200-1213. Confined spaces will be evaluated prior to entry to determine if hazards are present that could pose a risk to entrants. Before workers may enter a permit-required confined space, an entry permit must be issued. The SS or PS will only issue the permit if all requirements for entry are met. Refer to **Appendix C** for the Confined Space Entry Permit. A copy of the Confined Space Entry Permit form is included in **Appendix C**. Note that as part of permit issuance, the development of a rescue plan is also required. If a permit required confined space entry is needed, a rescue plan must be developed and approved prior to the start of work.

5.7 Working Near Overhead Utilities

A Work Near Overhead Utilities Permit is required before conducting any activity that is in proximity from overhead utilities (i.e. power lines, communication lines, guy wires, etc.). Any work ≤10 feet from any overhead utility or any work where a power line is rated as ≥50kV requires the issuance of actual voltage for distance to be determined. Work that could reach within minimum approach distance near energized power line must have a permit for work prior to start of work.

Table 1: Minimum Safe Working Distances*

Line Voltage	Required Minimum Safe Working Clearance Distances
0-50kV	10' (3.05m)
51-100kV	12' (3.66m)
101-200kV	15' (4.57m)
201-300kV	20' (6.1m)
301-500kV	25' (7.62m)
501-750kV	35' (10.67m)
751-1000kV	45' (13.72m)

*For those locations where utility companies specify more stringent safe distances, those distances shall be observed.

5.8 Energy Isolation / Lock Out Tag Out (LOTO)

An Isolation Control Register/Permit also known as a Lockout/Tagout (LOTO) Permit is required before conducting any activity that requires work on any potential energy sources (i.e. electrical, mechanical, hydraulic, thermal or piping systems - liquid or gas, etc.) Documentation of the energy sources and isolation methods must be done. Utilize Lock-out/Tag-out procedures to render equipment inoperable and/or systems de-energized during the work process. Tags indicating ownership of the lockout device and the equipment/system that has been de-energized. All Lock-out/Tag-out activities require coordination with the SSO prior to commencing work.

5.9 Lifting Operations

Lifting operations includes the use of cranes, hoists, slings or other lifting equipment to lift and move heavy loads. Lifts can be subdivided into 'critical' and 'non-critical' depending on the weight of the load and the rating of the lifting equipment. When utilizing a forklift in hoisting operations "below the forks – free rigging" is prohibited unless approved by the manufacturer and an approved boom attachment is utilized with the weight capacity clearly marked on both

sides of the attachment with supporting documentation presented to the SS. All forklifts or Lulls will have hydraulic adjustable forks. Only trained and authorized persons can participate in critical lifts. A Lifting Operations Pre-Lift Form must be issued for all critical and non-critical lifts with a copy of this form included in **Appendix C**. All crane lifts require a lifting permit from Southern Company. Any lifting over 500lbs by a piece of equipment other than a crane also requires a permit. All cranes brought on site will require verification of annual crane inspection. Crane operators must be NCCCO certified for the model of crane they are operating.

5.10 Vehicle and Equipment Safety

All vehicles and equipment shall not exceed 10 mph speed limit unless posted otherwise. All GWTT vehicles shall be equipped with first aid kits and 10-pound ABC dry chemical fire extinguishers. All GWTT equipment shall be equipped with a 10- pound ABC dry chemical fire extinguisher. All equipment used requires make/model specific training including written and fundamental tests, including gators or buggies, etc. Trucks and equipment will be visually inspected daily and any defects shall be reported to the site supervisor/superintendent, if the defect poses a hazard or potential hazard the equipment shall be immediately removed from service until repaired by a qualified mechanic.

7. Hazard Analysis

This section presents an assessment of the chemical, biological, and physical hazards that may be encountered during the tasks specified under Section 2. This section is intended to serve as a general overall hazard assessment and safe work practices for the entire project. In performance of the work, all project team members shall comply with all applicable health and safety requirements, including:

- Federal, state, and local statutes, regulations, and ordinances
- Customer H&S requirements
- GWTT SSHASP requirements
- Subcontractor H&S requirements

7.1 Biological Hazards

During the project, there is a potential for workers to come into contact with biological hazards such as animals, insects and plants. Workers will be instructed in hazard recognition, health hazards, and control measures during site-specific training.

7.1.1 Animals

During the conduct of site operations, wild animals such as stray dogs or cats, raccoons, rats, birds, and mice may be encountered. Workers shall use discretion and avoid all contact with wild animals. If these animals present a problem, efforts will be made to remove these animals from the site by contacting a licensed animal control technician.

7.1.2 Insects

Insects, including bees, wasps, hornets, mosquitoes, ticks, and spiders, may be present at the Site making the chance of a bite possible. Some individuals may have a severe allergic reaction to an insect bite or sting that can result in a life-threatening condition; any individuals who have been bitten or stung by an insect should notify a supervisor immediately. The following is a list of preventive measures:

- Apply insect repellent prior to performing any field work and as often as needed throughout the work shift.
- Wear proper protective clothing (work boots, socks and light-colored pants).
- When walking in wooded areas, avoid contact with bushes, tall grass, or brush as much as possible.
- Field personnel who may have insect allergies shall have bee sting allergy medication on site and should provide this information to the PS and SS prior to commencing work.
- It is recommended that personnel check themselves when in areas that could harbor insects, wear light color clothing, and visually check themselves and their buddy when coming from wooded or vegetated areas.

7.1.3 Plants

The potential for contact with poisonous plants exists when performing fieldwork in undeveloped and wooded areas. During clearing and grubbing of the site, poison ivy, sumac, and oak may be encountered. Poison ivy can be found as vines on tree trunks or as upright bushes. Poison ivy consists of three leaflets with notched edges. Two leaflets form a pair on opposite sides of the stalk, and the third leaflet stands by itself at the tip. Poison ivy is red in

the early spring and turns shiny green later in the spring. Poison sumac can be present in the form of a flat-topped shrub or tree. It has fern-like leaves, which are velvety dark green on top and pale underneath. The branches of immature trees have a velvety "down." Poison sumac has white, "hairy" berry clusters. Poison oak can be present as a sparingly branched shrub. Poison oak is like poison ivy in that it has the same leaflet configuration; however, the leaves have slightly deeper notches. Prophylactic application of Tecnu may prevent the occurrence of exposure symptoms. Post exposure over the counter products are available and should be identified at the local pharmacist. Susceptible individuals should notify the PS or SS.

Contact with poison ivy, sumac, or oak may lead to a skin rash, characterized by reddened, itchy, blistering skin which needs first aid treatment. If you believe you have contacted one of these plants, immediately wash skin thoroughly with soap and water, taking care not to touch your face or other body parts.

7.3 Physical Hazards

A variety of physical hazards may be present during Site activities. The most common hazards are struck-by/against hazards; slips, trips, and falls; equipment hazards and temperature extreme (cold and heat) stress. Other physical hazards are due to the use of hand and power tools and material handling. Additional specific safety requirements may be covered during safety briefings at the Site. The following physical hazards, as marked below, have been identified and may be encountered during scheduled field activities:

☒ **Driving/Vehicle Operation**	☒ **Work on or Near Roadways**	☒ **Slips, Trips and Falls**
☒ **Housekeeping**	☒ **Noise**	☒ **Materials and Equipment Handling/Lifting**
☐ **Overhead Utilities**	☒ **Underground Utilities**	☒ **Elevated Platforms/Working Surfaces**
☒ **Stairway or Ladder Use**	☒ **Portable Hand and Power Tools**	☒ **Removing/Replacing Manhole Covers**
☒ **Electrical Hazards**	☒ **Energy/System Isolation**	☐ **Personal Safety - Crime Prone Areas**
☒ **Arc Flash**	☒ **Equipment Refueling**	☐ **Personal Safety - Forested Areas**
☐ **Confined Spaces**	☒ **Excavations**	☐ **Personal Safety - Hunting Areas**
☒ **Heavy/Mobile Equipment**	☐ **Fire/Explosion**	☐ **Personal Safety - Shooting Ranges**
☐ **Drilling**	☐ **High-Pressure Hazards**	☐ **Preserved Laboratory Sample Kits**
☐ **ATV or UTV Use**	☐ **Working on or Near Water**	☐ **Groundwater Sampling**
☐ **Building Collapse**	☒ **Fatigue**	☒ **Working at Night**
☒ **Drum Handling**	☐ **Mobile Data Collection**	☒ **Welding and Cutting (Hot Work)**
☒ **Aerial Boom/Scissor Lift**	☐ **Troxler Nuclear Density Gauge**	☒ **Hoisting and Rigging (Cranes)**
☐ **Demolition**	☒ **Other:** Radon, VOCs, other air pollutants	☒ **Other:** Heavy Vehicle Traffic

Actions to be taken to protect against the hazards identified are provided in the sections below. During all activities, personnel shall strictly adhere to the following:

- The buddy system or line of sight will be used during intrusive work; and
- If field personnel perceive an unsafe condition or situation, the SS will be notified immediately.

7.3.2 Housekeeping

Personnel shall maintain a clean and orderly work environment. Keep aisles and passageways clear and in good repair to provide free and safe movement of employees and material-handling equipment. Make sure that all materials stored in tiers are stacked, racked, blocked, interlocked, or secured to prevent sliding, falling, collapse or overturning. Do not allow materials to accumulate to a degree that it creates a safety or fire hazard.

During construction activities, scrap and form lumber with protruding nails and other items shall be kept clear from work areas, passageways and stairs. Combustible scrap and debris shall be removed at regular intervals. Safe means must be provided to facilitate removal of debris. Containers must be provided for collecting and separating waste, used rags and other debris. Containers used for garbage and other oily flammable or hazardous waste such as caustics, acids, harmless dusts, etc., must be separated and equipped with covers. Garbage and other waste shall be disposed of at frequent and regular intervals.

7.3.3 Stairway or Ladder Use

Stairway and ladders should be maintained in good condition, dry and free from debris or other tripping hazards. On constructions sites, except where more stringent requirements may exist, all stairways and ladders shall be constructed and used in accordance with OSHA 29 CFR 1926 Subpart X. If work performed from a stairway or ladder is >4 feet above ground or lower level, then 100% fall protection is required (i.e. guardrail, fall arrest system, fall restraint system, etc.). Where 100% fall protection is not typically required or not feasible (i.e. accessing or working from a portable/permanent ladder, trailer, scaffold, excavation, etc.) then the use of a Permit may need to be utilized and the project SS or PM should be consulted. If and area does not allow for 100% fall protection, a deviation would be required.

Ladders

- Ladders are to be visually inspected for possible signs of damage or defects daily before each use. Defective ladders should be removed from service and “tagged”.
- All ladders must be 1A or greater on site.
- All ladder inspections shall be identified with the appropriate color code for the period as established by the project.
- Where possible, portable straight rung ladders shall be set up so that the horizontal distance from the top support to the foot of the ladder is ¼ of the working length of the ladder. The ladder shall be secured by tying it off to a firm point or held in place by another worker while in use. If the ladder is used to gain access to a roof or platform, the side rails shall extend at least 3 feet beyond the point of support at the edge of the roof or platform.
- Step ladders shall always be set up properly so that they are in the “A” frame position, level and with all four feet on firm ground and fully opened with the spreaders locked in place. Personnel are forbidden to stand on the top cap or on the last step of a stepladder, or to stand on the hinged back of a stepladder. A stepladder shall never be used at a straight ladder.
- Ladders are rated by the total amount of weight (i.e., person’s weight, clothing and PPE weight, weight of tools and supplies that will be carried and stored on ladder) they can safely support.

Type IAA (Extra Heavy Duty)	375 pounds
Type IA (Extra Heavy Duty)	300 pounds

To prevent falls from ladders, make sure the following controls are in-place:

- Use only ladders designed to handle the job that needs to be done.
- Be sure step ladders are fully open and locked before climbing them.
- Place ladder on a hard, flat, and secure surface.
- Place ladder on non-movable base.
- Lean ladder against a secure surface, not boxes or barrels that could collapse.
- Do not place ladder in front of a door.
- Check shoes to ensure they are free of grease or mud prior to ascending or descending.
- Mount the ladder from the center, not from the side.
- Face ladder when ascending or descending and hold on with both hands.
- Carry tools in pockets, in a bag attached to a belt or raised and lowered by rope.
- Do not climb higher than the third rung from the top.
- Work facing the ladder.
- Do not overreach, always keep your torso between the ladder rails.
- Avoid outdoor ladder use on windy days.
- No aluminum ladders allowed on site.

Stairways

- Stairways must be between 30 and 50 degrees from the horizontal with no more than ¼ inch variation in riser height or stair tread width.
- Handrails and top rails must withstand a force of at least 200 pounds applied within 2 inches of the top edge, without failure.
- Temporary handrails shall have a minimum of 3 inches of clearance between the handrail and walls or other objects.
- When ascending or descending stairs, personnel should always use the handrail.
- Personnel should avoid using both hands to carry objects while on stairways; if unavoidable, use extra precautions.

7.3.4 Cold Stress

At certain times of the year, workers may be exposed to the hazards of working in cold environments. Potential hazards in cold environments include frostbite, trench foot or immersion foot, hypothermia as well as slippery surfaces, brittle equipment, poor judgment, and unauthorized procedural changes.

7.3.5 Heat Stress

Heat stress is a significant potential hazard, which is greatly exacerbated with the use of PPE in hot environments. The potential hazards of working in hot environments include dehydration, cramps, heat rash, heat exhaustion, and heat stroke. A heat stress prevention program will be implemented when ambient temperatures exceed 70ºF for personnel wearing impermeable clothing.

7.3.6 Noise

Noise is a potential hazard associated with the operation of heavy equipment, power tools, pumps and generators. Site workers who will perform suspected high noise tasks and operations for short durations (less than 1-hour) would be provided with hearing protection devices. If deemed necessary, the PS and SS will be consulted on the need for additional hearing protection and the need to monitor sound levels for site activities. GWTT corporate hearing conservation program can be found in GWTT Corporate HASP.

7.3.7 Hand and Power Tools

To complete the various tasks for the project, personnel will utilize hand and power tools. The use of hand and power tools can present a variety of hazards, including physical harm from being struck by flying objects, being cut or struck by the tool, fire, and electrocution. Work gloves, safety glasses, and hard hats will always be worn by the operating personnel when utilizing hand and power tools and GFI-equipped circuits will be used for all power tools. Tool inspections will be conducted prior to each work shift. Damaged tools will be tagged out of service and repaired.

7.3.8 Slips, Trips, and Falls

Working in and around the site will pose slip, trip and fall hazards due to slippery surfaces that may be oil covered, or from surfaces that are wet from rain or ice. Excavation at the sites will cause uneven footing in the trenches and around the spoil piles. Daily housekeeping inspections of the work areas will be conducted to identify, eliminate, and control slip trip and fall hazards.

7.3.9 Fire and Explosion

When conducting excavating activities, the opportunity of encountering fire and explosion hazards exists from contamination in the soil and the possibility of free product in the underground pipelines. This will be especially hazardous when pipelines are sawed or broken to grout the ends. Before an inactive utility line can be sawed or broken for capping purposed, a Line Break Permit is required to be duly executed by GWTT PS and reviewed by the SS.

Additionally, the use of a diesel engine on excavating equipment could present the possibility of encountering fire and explosion hazards. See GWTT Corporate HASP for further precautions and procedures in dealing with Fire and Explosions.

If a fire or explosion is serious enough to warrant evacuation or coordinated emergency response; all employees will be instructed to follow Emergency Response Plan.

7.3.11 Manual Lifting

Manual lifting of heavy objects such as sections of pipe may be required. Manual lifting max weight is 50lbs. Failure to follow proper lifting technique can result in back injuries and strains. Site workers will be instructed to use power equipment to lift heavy loads whenever possible and to evaluate loads before trying to lift them (i.e. they should be able to easily tip the load and then return it to its original position). Carrying heavy loads with a buddy and proper lifting techniques:

1) Make sure footing is solid.
2) Make back straight with no curving or slouching.
3) Center body over feet.
4) Grasp the object firmly and as close to your body as possible.
5) Lift with legs.
6) Turn with your feet, to avoid stress in the lower back.

Back injuries are a serious concern as they are the most common workplace injury, often resulting in lost or restricted work time, and long treatment and recovery periods. In addition, hand digging for pipes may present lifting/ergonomic hazards.

7.3.12 Heavy Equipment Operations

Equipment including earth-moving equipment, cranes, haul trucks, drill rigs or other heavy machinery designed to move dirt, material or equipment will be operated in compliance with the manufacturer's instructions, specifications and limitations, as well as any applicable regulations. The operator of equipment shall be appropriately training and qualified for role and is responsible for inspecting the equipment prior to use each work shift to verify that it is functioning properly and maintaining documentation of noted deficiencies and resolutions, as applicable. On active construction Sites, except where more stringent requirements may exist, all mobile equipment operations shall be in accordance with OSHA 29 CFR 1926 Subpart O. Operator should have make/model specific training, including written and functional test.

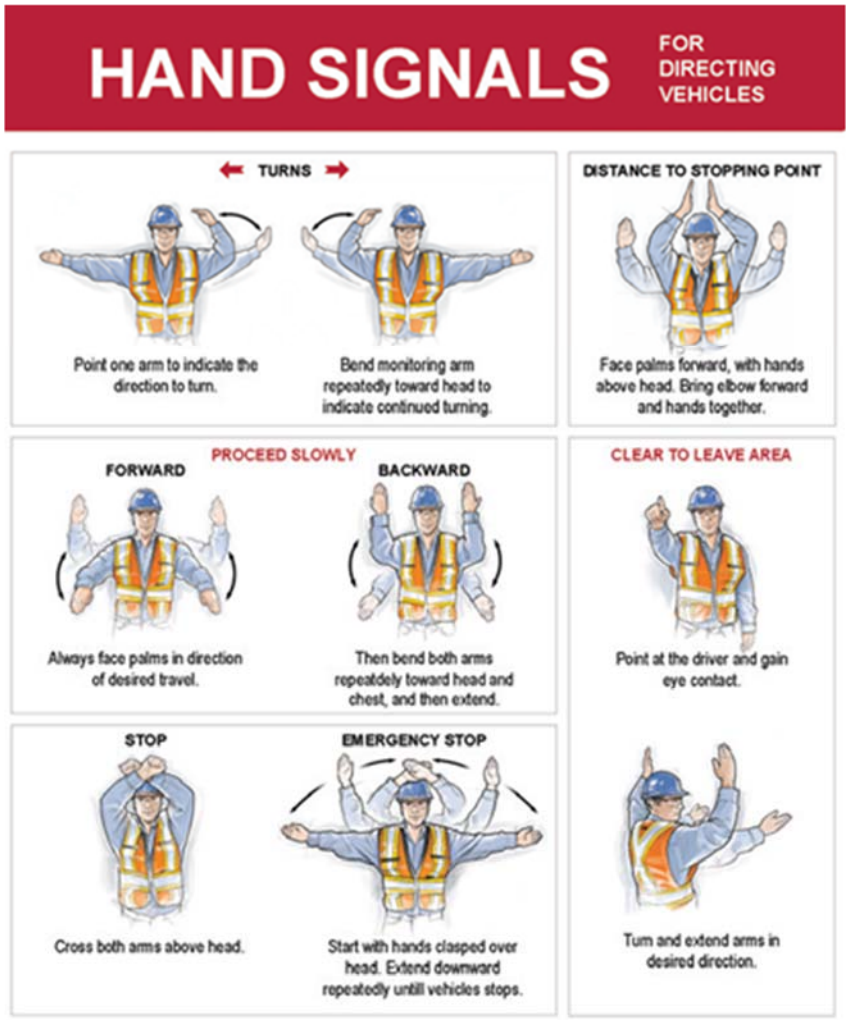
<u>Important</u>
Many types of mobile equipment have large blind spots and inhibit the operator's ability to clearly see all around the equipment as well as a huge swing radius. Because of this, personnel must always be aware of the location and operations of mobile equipment and never assume that the operator sees them. Personnel should not walk directly in the swing radius or in front, back or sides of mobile equipment without first making eye contact with the operator and obtaining approval. The use of high visibility safety vest is required.

The following precautions should be observed whenever heavy/mobile equipment is in use:

- PPE should include steel-toed boots, foam backed safety glasses, high visibility vests and hard hats, cut 4 level gloves with impact protection at a minimum.
- Personnel must be aware of the location and operation of heavy equipment and take precautions to avoid getting in the way of its operation. Workers must never assume that the equipment operator sees them; eye contact and hand signals should be used to inform the operator of the worker's intent.
- Personnel should not walk directly behind, or to the side of, heavy equipment without the operator's knowledge. Workers should avoid entering the swing radius of

equipment and be aware of potential pinch points.
- Nonessential personnel will be kept out of the work area.

The following are common hand signals used to communicate with mobile equipment operators. It should be noted that hand signals do occasionally vary by region and should be confirmed with the operator prior to starting work with the contractor.



Cooperation and clear, consistent communication between operators and spotters can minimize the potential for harm or damage. A spotter is a person designated to assist the operator in the safe movement of their equipment to make sure the heavy equipment doesn't inadvertently damage people, property and/or equipment/vehicles. Generally, spotters are required when:

- The operator's view of the intended path of travel or any part of its travel is obstructed (e.g. reversing, restricted side clearances)
- Operating equipment is in a location in which a person may be endangered by its intended path of travel

- Equipment is passing beneath or near overhead hazards (e.g. overhead power lines, communication lines, pipe racks)
- The above-mentioned list is not all inclusive; the operator may identify other situations in which the use of a spotter will help prevent an incident. Spotters should be appropriately trained and qualified to perform task.

The following are general expectations for use of mobile equipment on GWTT project Sites:

- Use of personal electronic devices including, but not limited to, cellular phones, tablets and smartwatches are prohibited while operating mobile equipment.
- Always use safe operating practices including observing the posted speed limit.
- Where required, the use of seat belts is always required while the equipment is energized.
- All vehicles and equipment with one ton or above weight must have the emergency brake set and wheels must be chocked if the vehicle is parked on a grade.
- When parking equipment, any forks, buckets, booms, etc. shall be lowered to the ground, controls neutralized, power shut-off, and the brakes set.
- All cab glass shall be safety glass or equivalent that introduces no visible distortion.
- All mobile equipment shall be equipped with a functioning back-up alarm audible above the surrounding noise level.
- Personnel are not permitted under any equipment suspended loads.
- Loads should be stable and only elevated as high as necessary for safe travel.
- Engines shall be shut off during fueling or maintenance operations and when left unattended.
- Trip handles for tailgates of dump trucks and heavy equipment shall be arranged so that, in dumping, the operator will be clear.
- No personnel shall get on or off moving vehicles or equipment or be permitted to ride in the bed of a truck unless seats, seatbelts, and roll-over protection are provided.
- Rollover protection (ROPS) as specified by federal, regional, local is required for all applicable equipment operated on the project.
- No vehicle or equipment shall cross over the top of power cables or pipes except at designated crossings where it has been protected from damage.

7.3.13 Lockout/Tagout

Lockout/tagout (LOTO) procedures in accordance with 29 CFR 1910.147 will be performed before activities begin on or near energized or mechanical equipment that may pose a hazard to Site personnel. The purpose of the LOTO system is to safeguard exposure from machinery, energized electrical circuits, piping under pressure or any type of energy source from unexpected energization or start-up that could cause harm to an individual. Workers conducting the operation will positively isolate the piece of equipment, lock/tag the energy source, and verify effectiveness of the isolation. Only employees who perform the lockout/tagout procedure may remove their own tags/locks.

Whenever multiple personnel (or multiple employers are working on the same Site) are to be engaged in activities requiring LOTO, employees/employers shall inform each other of their activities and coordinate their respective LOTO procedures. When applicable, GWTT shall request an owner's representative to initiate the LOTO procedure and apply the first lock. When initiated by others, GWTT will remove their locks prior to leaving a facility. Whenever a

group lockout/tagout procedure must be performed, they shall utilize a procedure that affords the same level of protection as that provided by the implementation of a personal lockout or tagout device. Group LOTO devices shall meet the requirements of 29 CFR 1910.145(f)(3). GWTT will be trained on and adhere to Customer/Owner policy and procedures when required.

Portable Equipment

Portable electrical equipment such as hand drills, computers, and power saws that use plug type connectors must be unplugged prior to any task that may expose the employee to energized portions of the equipment. Removal of the plug from the power source, such as the generator or wall socket, may be combined with a tagout system, particularly if the plug is at a distance from the equipment being repaired.

7.3.14 Confined Space Entry

Tanks, vessels on site will be considered potential permit required confined spaces. Prior to entry, each will be monitored for oxygen content, combustible gases, and toxic gases and vapors. A GWTT Confined Space Assessment will be conducted. When atmospheric conditions are below action levels, normal entry will be permitted, and monitoring will be continued. If action levels are exceeded, the tank will be immediately vacated, and the area will then be re- classified as a Permit Required Confined Space.

7.3.15 Fall Protection

GWTT has a 6-foot maximum fall height requirement above a lower level requiring 100 percent tie off on this site. GWTT will observe Customer/Owner fall protection requirements. During the construction, there is a potential for injuries caused by falls from unprotected leading edges. GWTT shall take precautions to ensure that all leading edges are protected in accordance with OSHA 29 CFR 1926. If during installation, a worker is required to assist the process in an aerial lift, they shall be protected from falls by an appropriate harness and latching system as described in OSHA CFR 1926. All aerial work platforms will have secondary guarding to avoid entrapment.

- Full body harness is the only acceptable means of fall arrest for personnel working over surfaces greater than 4 feet in height. A Fall Arrest System consisting of safety harness and anchor lanyard must be worn by anyone working on elevated surfaces that lack “general” fall protection such as railings, etc.
- Lanyards must be tied off at a point above the worker’s head and to a firm structure or a portion thereof designed to hold a weight of 5,000 lbs. Only hooks with locking snaps that operate in “as new” condition will be used. These hooks are also referred to as “double action lanyard hooks”. Lanyards used on site must be small, double locking type hook. Large lanyard hooks will not be allowed unless personnel are working on scaffold erection and have been approved Southern Safety Representatives. No pelican hooks allowed unless personnel are building scaffolds.
- When other possible means of fall protection (railings, etc.) are not available, individuals working at heights of less than 6 feet must tie-off if there is danger of impalement, especially if the impalement hazard cannot be mitigated in accordance with OSHA standards.
- All workers must perform routine inspection of harnesses and lanyards prior to their use. The employer shall conduct regular inspections (every three months) of all fall protection

equipment. In addition, there shall be an inspection of all workers' personal tools and equipment prior to the employees using them on the job. GWTT will adhere to monthly inspection color codes that are issued as site specific.
- Lanyards are to be used for tie-off purposes only. Harnesses and lanyards that are damaged or where involved in a fall arrest must be retired and discarded.

Protection from Falling Objects

- Personnel exposed to falling objects should wear hard hats.
- Objects on elevated surfaces must be positioned far enough away from the surface's edge to prevent those objects from falling over the edge if accidentally displaced.
- In addition to hard hats and object positioning, at least one of the following protective measures should be implemented to prevent falling objects:
- Erect toe boards, screens, or guardrail systems that prevent objects from falling to lower levels.
- Erect a canopy structure to contain falling objects.
- Barricade the area where objects could fall and prohibit entry into the barricaded area.
- Guardrail systems, when used as falling object protection, must have all openings small enough to prevent passage of potential falling objects.
- Canopies, when used as falling-object protection, must be strong enough to prevent collapse, and prevent penetration by any objects that may fall onto the canopy.

7.3.16 Working at Night

Working at night presents multiple hazards to field personnel from increased slips, trips and falls from reduced visibility to high vehicle incidents due to combine less traffic and higher speeds to alcohol impaired or drowsy drivers.

When working at night, field staff will be required to illuminate their personal workspace with headlamps and/or flashlights. Depending on the situation, additional portable light stands may need to be acquired. PPE for activities should include, at a minimum, an ANSI Class 2 high visibility vest or outerwear. Any work that begins or ends during the dark should include check-in (work starts) and check-out (work ends) calls to the PM or other designated person. Additionally, field staff should plan to adjust their sleep schedule to make sure they are rested and alert when conducting work at night.

Working at night not only impacts visibility at the Site, but also makes it difficult to get enough sleep. Sleep after night work usually is shorter and less refreshing or satisfying than sleep during the normal nighttime hours. The combination of sleep loss and working at the body's low point can cause excessive fatigue and sleepiness, which makes it difficult to perform well increasing risk of accidents. Also, shiftwork can be stressful because of frequent switching from a day to night schedule. Personnel should take responsibility for getting enough sleep to feel rested and restored. When switching back to days after the night shift, it is best to get most of your sleep the following night. Sleep just a couple of hours shortly after night shift to shake off sleepiness. Then stay awake all day and go to sleep at your regular bedtime at night.

7.3.17 Welding and Cutting Safety

All employees performing welding and cutting on site must adhere to GWTT Welding and Cutting Safety Rules and must complete Customer/Owner Hot Work training. In addition, all employees must abide by GWTT's Hot Work Program. GWTT fire watch will remain 30 minutes after hot work is complete.

7.3.18 Electrocution

The use of power tools and extension cords may pose electrical hazards to workers. Additionally, electrical cords or tools are of potential concern during treatment system setup operations. Site specific precautions will be followed to maintain a safe working distance and to alert all workers to the electrical dangers. Potential adverse effects of electrical hazards include shocks, burns, and electrocution, which could result in death. GWTT will adhere to monthly inspection color codes that are issued as site specific.

Extension Cords

Extension cords may not be used as a permanent means of providing power and will be removed from service if they are worn, frayed, or if the grounding prong is missing. Portable GFCI's will be required on portable electrical tools and cord sets used in wet environments and not plugged into a permanent power source with GFCI's present.

Extension cord precautions include the following:

- Be aware of exposed or bare wires, especially on metal grating. Warning: Electrical contact with metal can cause fatal electrocution.
- Prior to use, inspect cords for exposed or bare wires, worn or frayed cords, and incorrect splices. Splices are permitted, but there must be insulation equal to the cable, including flexibility.
- Cables and extension cords in passageways, steps or any area where there may be foot traffic should be secured to not create a tripping hazard. Overhead cables and extension cords shall be rigged to a height greater than 7 feet.
- Shield extension cords that must run across driveways or areas where vehicle traffic is present.
- Do not run cords across doorways or windows where they can be frayed or cut by a closed door or window.
- Do not run wires through wet or puddled areas.
- Flexible cord sets that are used on construction Sites or in damp locations shall be of hard usage or extra hard usage type.

Temporary Grounding

For portable generators greater than 5 kilowatts (kW), refer to the operator's manual for grounding requirements. When temporary grounding is required, a ground rod or listed grounding wire cable clamp must be utilized. Minimum ground rod requirements are 5/8"x10', must be driven perpendicular to the surface, and should be considered disposable after installation (unlikely to be able to be removed).
Portable generator manufacturers have different operation requirements so it is prudent to review the owner's/operations manual prior to renting or transporting to a remote field location.

7.3.19 Arc Flash

An arc flash is a short circuit through the air when insulation or isolation between electrified conductors is breached or can no longer withstand the applied voltage. The temperature of an arc can reach more than 35,000 degrees Fahrenheit as it creates a brilliant flash of light and a loud noise. Concentrated energy explodes outward from the electrical equipment, spreading hot gases, molten metal, causing death or severe burns and creating pressure waves that can damage hearing or brain function and a flash that can damage eyesight. The fast-moving pressure wave also can send loose material such as pieces of equipment, metal tools and other objects flying, injuring anyone standing nearby.

An arc flash can be caused by common occurrences such as dropping tools, accidental contact with electrical systems and buildup of dirt or corrosion. For prevention of arc flash generation, the following are recommended proactive steps to be implemented:

- Keep equipment and tools a safe distance from energized equipment so that if they fell they would not contact or electrical panels.
- Routinely inspect and coordinate the cleaning of energized equipment or electrical panels to prevent the buildup of dirt or corrosion.

Regulations require the calculation of the “flash protection boundary” inside which qualified workers must be protected when working. This boundary is an imaginary sphere surrounding the potential arc point, “within which a person could receive a second-degree burn if an electrical arc flash were to occur,” according to the National Fire Protection Association (NFPA) 70E standard. GWTT’s Safety Supervisor (SS) should be consulted for assistance in determining the “flash protection boundary” for the project or scope if not previously established via a risk assessment.

Newly installed/serviced electrical equipment may contain an Arc Flash Label that will identify the energy, hazard category and PPE requirements associated with the equipment. For all other unlabeled equipment, where the specific flash protection boundary (energy, hazard category and applicable PPE) is not established or cannot be established first (prior to live electrical exposure), GWTT personnel must maintain a 4-foot minimum observation distance (10 feet is preferred) from the exposed (i.e. doors open, covers off) live electrical equipment rated 600V and below. In the event that the flash protection boundary must be crossed, only GWTT personnel deemed ”Qualified” will don PPE appropriate for Hazard/Risk Category 2. For equipment rated above 600V, personnel must maintain a 10-foot minimum observation distance and not enter the flash protection boundary unless qualified and approved to do so.

Personnel should treat electrical equipment and circuits as energized until:

- Lock-Out/Tag-Out (LOTO) procedures have been implemented (refer to the energy isolation hazard description for additional information regard LOTO procedure) and the equipment or circuit has been tested to verify “no voltage” present, by a trained and qualified electrical worker, or
- The equipment or circuit has been physically isolated from every power source, tested and clearly labeled.
- For personnel involved with energized electrical work (i.e. design verification, equipment checkout or start-up adjustments), the following ordered approach must be followed:

- A trained and qualified electrical worker shall perform all energized electrical hands-on work (i.e. switching, metering, testing, etc.) while GWTT employees remain outside the flash protection boundary, with the exception of those GWTT employees who have completed NFPA 70 E training and have appropriately planned, including appropriate PPE, for the task.
- GWTT employees that closely supervise work within the flash protection boundary shall develop, in writing, the possible electrical hazards, appropriate PPE and mitigation techniques to be implemented during the activities via a detailed work plan that will be attached to this plan. The project SS or SS's designee should be consulted during the development of this plan and must approve the work plan with identified shock or arc flash hazards as part of the overall plan approval. Additionally, a permit may be required to conduct the activities in the field and the SS or PM should be consulted.

DEFINITIONS

- Energized Electrical Work. Work performed on or near energized electrical systems or equipment with exposed components operating at 50 volts or greater. Electrical system testing, thought to be de energized, but not proven to be (for example, a LO/TO effectiveness check).
- Flash Protection Boundary. The distance from energized exposed electrical equipment at which an unprotected person will receive a curable burn: 2nd degree burn or blistering. Work performed inside this boundary requires that the person be a "qualified person" and the use of appropriate personal protective equipment (PPE) to protect against arc flash burns.
- Qualified Personnel. A person with the training and experience having knowledge of energized electrical equipment hazards from an operational standpoint and from the safety-training standpoint. Educational credentials alone do not make a person qualified. Determination of qualification must be established by the employee's supervisor or other designated knowledgeable management representative.

7.3.20 Severe Weather

Outdoor operations will cease in the event of severe weather conditions. All heavy equipment use will cease prior to the onset of a thunderstorm regardless of the stage of activity. Indoor / Outdoor evacuation areas will be identified after mobilization and site setup. GWTT will adhere to all site-specific evacuation regulations.

7.4 Chemical Hazards

Chemicals not identified in this SSHASP may be used during system setup activities. Prior to the initiation of these tasks, Safety Data Sheets (See SDS Binder) will be obtained for each of the chemicals to be used and all site workers and visitors who may potentially be exposed will be made aware of these hazards. A separate SDS binder will be maintained in the GWTT on-site trailer.

If the SS determines that monitoring will be required to determine if these chemicals are potentially migrating off-site, a monitoring program will be established that is consistent OSHA regulations for Hazard Communication.

8. Personal Protective Equipment (PPE)

A hierarchical approach that employs engineering and administrative controls including Personal Protective Equipment (PPE) will be utilized to mitigate hazards likely to be encountered during the performance of the project scope of work. Where possible, an attempt to mitigate identified hazards will be made using the following hierarchy:

1. Elimination
2. Substitution
3. Engineering
4. Administrative
5. Personal Protective Equipment

However, even with the implementation of good management practice, some form of PPE will generally always be required. The amount and type of PPE used will be based on the nature of the hazard encountered or anticipated.

All project personnel shall use the required PPE specified or identified to be required for certain tasks. Each work task will be reviewed as to the hazards present with appropriate mitigation implemented including providing necessary PPE. Note: Jewelry shall not be worn where moving parts or equipment is located, where chemicals are being used or when working on electrical equipment (live or de-energized).

Based on the hazards identified for this project, the following levels of PPE will be required and used. Changes to the specified levels of PPE will not be made without the approval of the SS after consultation with the PS.

8.1 Required PPE

In general, Site activities will commence in Level D PPE unless otherwise specified, or if the SS, GSD or PM determines on-site that a higher level of PPE is required. Level D PPE will be permitted as long as air monitoring data indicates that airborne concentrations of chemicals of concern are maintained below the Site-specific action levels defined in Section 5. Level A or B PPE is not anticipated and is therefore not addressed in this plan. If Level A or B PPE is necessary, this HASP will be revised to reflect changes as appropriate.

The following is the minimum PPE required to conduct activities at the Site:

- Work shirt (sleeved) and long pants
- ANSI- or ASTM-approved steel/safety-toed boots
- ANSI-approved safety glasses with side-shields with foam backing.
- ANSI-approved (Class 2 or 3) High-visibility traffic safety vest or outerwear.
- ANSI-approved hard hat.
- Work gloves that are cut level 2.

Additional PPE to be donned prior to entering the project construction zone includes the following:

- Hearing protection with a Noise Reduction Rating (NRR) of 28 or above when working around operating equipment, or other environment where excessive noise exposure is a potential.
- Flame/fire Resistant Clothing (FRC) for working within petrochemical manufacturing or

steel mills and during energized electrical assessment activities.

- Insulating gloves (e.g., rubber with leather protector) with appropriate voltage classification for task being performed.
- Full-body Harness with appropriate lanyard(s) and tie-off when performing confined space entry or working at heights.
- Chemical goggles, when in contact with chemical liquids, can be reasonably expected, or when handling corrosive chemicals. In addition, a face shield may be required to protect the face from splash hazards.
- Using the Rule of Thumb provided by the AIHA;
- Total airborne concentration of contaminants is anticipated to be less than 100 ppm;
- The humidity is expected to be less than 85%; and
- Desorption of the contaminants (including those with poor warning properties) after partial use of the chemical cartridge can occur after a short period (hours) without use (e.g., overnight) and result in a non-use exposure

8.1.1 Equipment Refueling

Care shall be exercised while refueling generators, pumps, vehicles and other equipment to prevent fire and spills. Personnel shall eliminate static electricity by grounding themselves (touching metal) prior to using refueling hoses and or containers of petroleum liquids. Items being refueled shall be grounded or be located on the ground and not on a trailer, workbench or inside a truck bed. Equipment that is hot must be allowed to cool prior to refueling. Spill response materials shall be available when conducting refueling operations. All equipment must be turned off for refueling.

10. Emergency Response Plan

On-site personnel will use the following standard emergency procedures. GWTT Superintendent shall be notified of any on site emergencies and be responsible for ensuring that the appropriate procedures are followed. Emergency procedures should be modified as required for the incident. All evacuation procedures and assembly points will follow current standard operating procedures.

10.1 Fire/Explosion:

In the event of a fire or explosion, procedures will include immediately evacuating the work area. Personnel will then immediately notify the GC and site safety. No personnel will fight a fire beyond the stage where it can be put out with a portable extinguisher (incipient stage). Adhering to the following precautions will prevent fires:

- Good housekeeping and storage of materials.
- Storage of flammable liquids and gases away from oxidizers.
- No smoking in the exclusion zone or any work area.
- No hot work without a properly executed hot work permit.
- Shutting off engines to refuel.
- Grounding and bonding metal containers during transfer of flammable liquids.
- Use of UL approved flammable storage cans.
- Fire extinguishers rated at least 10 pounds ABC
- Monthly inspections of all fire extinguishers.

11. Site Control Measures

The SS will conduct routine safety inspections of the Site to verify compliance with the requirements of the HASP. These routine inspections will occur weekly (at a minimum) and the initial day of returning to work following extended downtimes (i.e. holidays, temporary demobilizations, etc.). Recommended frequency of inspection includes following the addition of a new subcontractor on-Site or change in Site construction activities/conditions. The SS will document the completion of these inspections of the Site Safety Checklist Form **Appendix C** or other similar form. It will be the responsibility of the SS, or person completing inspection on the SS's behalf, to communicate observation of unsafe conditions or acts with field personnel and/or subcontractor, stopping work if necessary. The SS will also be responsible for working with said personnel or subcontractor to determine corrective action and to document completion of corrective action on the Site Safety Checklist Form and on the JHA and/or active permit for activity. Depending on type of corrective action, the action should be shared during the next morning safety brief/meeting if beneficial to all Site workers. Additionally, subcontractors are required to conduct a daily H&S review of the work area and encouraged to utilize their own form, but an example has been included in **Appendix C** for use if needed. Note that the completion of this daily review along with JHAs is a requirement to contain a permit. Site visitors should contact the SS prior to leaving the project support area.

13. Training Requirements

Field personnel, including subcontractors, conducting work in controlled areas of the site, must have completed the appropriate training as required by 29 CFR 1926. GWTT will coordinate Customer/Owner required training based on duties of employees onsite. These trainings will be required prior to employee arrival onsite. GWTT field personnel will have completed the OSHA 10-Hr Construction Safety Course. Field personnel, including subcontractors, performing specialty tasks such as equipment operators or serving as competent personnel will have additional complete appropriate training for task.

Further site-specific training for the field personnel, including subcontractors, will be the responsibility of GWTT. This site orientation training will include, but will not necessarily be limited to, emergency procedures, site control, personnel responsibilities, and the provisions of this HASP. Each employee will document that they have been briefed on the hazards identified at the Site and that they have read and understand the requirements of this HASP by signing the H&S Plan Acknowledgement Form attached as the last section prior to appendices. A daily morning briefing to cover safety procedures and contingency plans in the event of an emergency is to be included with a discussion of the day's activities. These daily meetings will be recorded on the GWTT STARRT form.

15. Contingency Procedures

Minimum emergency equipment maintained on Site will include a fully charged ABC dry chemical fire extinguisher, an adequately stocked first aid kit, and an emergency eyewash station (when corrosive chemicals are present).

In the event of an emergency, Site personnel will follow the GWTT emergency procedures identified in the site orientation. Communication signals, such as hand signals, must be established where communication equipment is not feasible or in areas of loud noise.

It is the SS's duty to evaluate the seriousness of the situation and to notify appropriate authorities. The first part of this plan contains emergency telephone numbers as well as directions to the hospital. Nearby telephone access must be identified and available to communicate with local authorities. If a nearby telephone is not available, a cellular telephone will be maintained on Site during work activities. The operation of the cellular phone will be verified to confirm that a signal can be achieved at the work location.

The SS, or designee, should follow Site emergency processes in the event of an emergency. After emergency services are notified, the PM and SP will be notified of the situation as soon as possible. If personal injury, property damage or equipment damage occurs, the PM and GWTT Safety Director will be contacted as soon as practicable. A Preliminary Incident Investigation Report form will be completed within 24 hours by the SS, supported by the PM. The final report to be completed within one week of the initial incident.

15.1 Injury or Illness

If an exposure or injury occurs, work will be temporarily halted until an assessment can be made to determine it is safe to continue work. The SS, in consultation with the PM, will make the decision regarding the safety of continuing work. The SS will conduct an investigation to determine the cause of the incident and steps to be taken to prevent recurrence.

In the event of an injury, the extent and nature of the victim's injuries will be assessed and first aid/CPR will be rendered as appropriate. Any injury on site will be first assessed by the on safety rep, he SS and the GSD. If necessary, emergency services will be contacted, or the individual may be transported to the nearby medical center. The mode of transportation and the eventual destination will be based on the nature and extent of the injury. A hospital route map is presented at the front of this HASP for injuries requiring emergent medical services or for injuries that are life threatening. The site job file has additional information for injuries that are not life threatening but may still require medical attention. The medical facility information and authorization forms for non-life threatening injuries are found there.

In the event of a life-threatening emergency, the injured person will be given immediate first aid and emergency medical services will be contacted by dialing the number listed in the Critical Project Information section at the beginning of this plan. The individual rendering first aid will follow directions given by emergency medical personnel via telephone.

15.2 Vehicle Collision or Property Damage

If a vehicle collision or property damage event occurs, the SS, SSO, PM or designee, will contact the Safety Director for appropriate action.

15.3 Fire

In the event of fire, personnel will ensure an ABC fire extinguisher is within reach of any tool, operation, or piece of equipment that may catch fire. Personnel will use the PASS method to extinguish fire. Only trained, experienced fire fighters should attempt to extinguish substantial fires at the Site. Site personnel should not attempt to fight fires, unless properly trained and equipped to do so. Site personnel should not attempt to fight a fire if it poses a risk to their personal safety. GWTT personnel will also adhere to any site-specific requirements that Southern has in place regarding fire protection.

Note that smoking is not permitted in areas near flammable or combustible materials, or in areas designated by the facility as non-smoking areas. Personnel will smoke in designated areas only.

15.4 Site Evacuation

The SS will meet with Customer/Owner site supervision to identify evacuation routes and refuge areas to be used in the event of a Site emergency. The SS, or designated representative, will count and identify site personnel to verify that all have been evacuated safely.

15.5 Spill of Hazardous Materials

If a hazardous material spill occurs, Site personnel should locate the source of the spill and determine the hazard to the H&S of Site workers and the public. Attempts to stop or reduce the flow should only be performed if it can be done without risk to personnel.

Isolate the spill area and do not allow entry by unauthorized personnel. De-energize sources of ignition within 100 feet of the spill, including vehicle engines. Should a spill be of the nature or extent that it cannot be safely contained or poses an imminent threat to human health or the environment, an emergency cleanup contractor will be called out as soon as possible. Spill containment measures listed below are examples of responses to spills.

- Right or rotate containers to stop the flow of liquids. This step may be accomplished as soon as the spill or leak occurs, providing it is safe to do so.
- Sorbent pads, booms, or adjacent soil may be used to dike or berm materials, subject to flow, and to solidify liquids.
- Sorbent pads, soil, or booms, if used, must be placed in appropriate containers after use, pending disposal.
- Contaminated tools and equipment shall be collected for subsequent cleaning or disposal.

17. Drug Testing

GWTT will follow the GWTT Drug Testing Policy and protocols for drug testing. Drug and Alcohol Testing will be done by a professional testing services facility. Alcohol testing is only required under suspicion, post-accident, or reasonable cause situations.

Authorization forms will be filled out by GWTT and given to the collector/clinic each time drug testing is performed. Proper completion of this form will ensure that all appropriate information is used for testing, billing, and reporting.

All donors are required to show valid photo identification to the collector before a test will be performed. All donors must provide their full Social Security Number to take a drug screen.

There is a 3-hour time limit for contract workers to provide a specimen. If a specimen is not provided in 3 hours, it will be considered a refusal to test, which may be treated as a positive. If there is a medical reason as to why the donor is not able to provide a specimen, the donor may contact GWTT HR and Safety Director for review.

17.1 Fitness for Duty (Non-Negative Prescriptions)

GWTT employees with non-negative drug tests as result of a prescription medication will be verified by the MRO. Additional information may be required for employees in safety sensitive positions prior to returning to site. If the MRO's review of the non-negative test, results in a positive confirmation, the worker will be removed from site. Documentation used to evaluate contract employee's ability to safely perform his/her duties while taking prescription medication shall be kept in accordance with GWTT HR Policies.

18. Site Access

GWTT employees and Sub-Contractors must present an unexpired, "official" state or federal identification credential, which includes the individual's picture whenever requested.

20. Site Specific Barricade Procedure

A barricade tag will be affixed to all non-rigid barricades in a prominent location. Multiple barricade tags will be used when necessary (for example, large barricades or multiple approach paths). Barricade tags will be predominately orange in color and, at a minimum, include the following:

- Name
- Name of the person responsible for the barricade for each shift where work is being performed and means of contact (for example, radio or phone number).
- Date barricade was erected.
- Reason for barricade – include actual and/or potential hazard(s).

Attachment points for barricade tape will be approximately the same height as a standard upper handrail

Person(s) erecting non-rigid barricades shall ensure the required area is completely barricaded to prevent workers from accidentally entering the hazardous area. For example, in addition to barricading same-level access to the hazardous area, stairway and ladder access will also be barricaded.

When placing barricade tape, GWTT will ensure exits and emergency vehicle routes are not blocked, unless necessary for employee safety. The barricaded area will be of the appropriate size to delineate the hazard, but not so large as to create an unnecessary problem for normal pedestrian flow of traffic. The practice of securing barricade tape to buildings and other permanent structures often results in an excessively large, barricaded area. Suitable anchor points for the barricade tape will be selected. Stanchions, traffic cones, sawhorses, and other portable anchor points are preferred because they can be better positioned.

Barricades shall be maintained in good condition while in use; when no longer required, barricades shall be completely removed, including loops of tape tied around supports. Tape shall be properly disposed of if not properly stored for reuse. When non-rigid barricades are erected around excavations, they shall be placed at least 6 ft from the edge of the excavation.

20.1 Danger Barricades (Red)

Predominantly red (black striping is permissible) barricade tape printed with the word “DANGER” shall be used to erect barricades for areas that contain or may present an immediately dangerous to life and health (IDLH) situation. Activities or conditions warranting a red danger barricade may include areas:

- Where overhead lifts are being performed.
- Within the counterweight swing radius of cranes.
- Near steam or chemical leaks.
- Beneath ice accumulations.

Only persons who have participated in the Job Safety Briefing for the work and are directly involved with the activities/conditions associated with a red danger barricade shall cross the red danger barricade, unless permission is granted by the owner of the barricade or a crew member involved with the work.

20.2 Caution Barricades (Yellow)

Predominantly yellow (black striping is permissible) barricade tape printed with the word “CAUTION” shall be used to erect barricades for areas that present a possible safety hazard. Activities or conditions

warranting a yellow caution barricade may include: • A minor oil leak that creates a slippery floor.

- A tripping hazards
- Washing down

Workers should avoid crossing yellow caution barricades when possible. Persons not directly involved with the activities/conditions associated with the erection of a yellow caution barricade may cross a yellow caution barricade as long they understand the nature of the hazard and they can avoid the hazard.

20.3 Barricades – Protective (Rigid)

Rigid barricades are required for, but not limited to, the following situations:

- Floor openings and wall openings (See SCO-SH-0910, Floor Openings, Wall Openings, and Guardrail Removal Procedure)
- Unprotected floor edges or platforms, to include leading edge work
- Excavations adjacent to passageways and those where a fall hazard exists

20.4 Traffic Barricades and Signs

When barricades and associated signs are erected on or adjacent to public roadways, they shall conform to Part VI of the Manual on Uniform Traffic Control Devices Note: Part VI of the Manual on Uniform Traffic Control Devices provides guidance on signs and warning devices required when working on or adjacent to public roads.

20.5 Barricade Removal

In the absence of the responsible person the plant/project manager or his or her designee may remove a barricade after all attempts to contact the individual who placed the barricade have been exhausted and a thorough assessment of the hazards has been conducted.

21. Cold Stress

This procedure applies to all GWTT field operations where field crews are working outdoors in damp and cool (below 50 degrees Fahrenheit [°F] conditions or anytime temperatures are below 32°F.

21.1 Purpose and Scope

This purpose of this procedure is to protect project personnel from hypothermia and frostbite.

21.2 Implementation

Implementation of this procedure is the responsibility of the GWTT Project Manager directing activities of the facility, site, or project location.

21.3 Requirements

- Carefully plan work anticipated to be performed in cool or cold conditions. Include costs in project budgets for specialized equipment and supplies needed to complete the field activities.
- Monitor weather forecasts immediately prior to entering the field. If possible, schedule heavy work during the warmer parts of the day. Implement a work-warming regimen by taking breaks out of the cold.
- Observe and monitor weather conditions such as ambient temperature, wind speed, and precipitation while in the field. If needed, use Supplemental Information A to determine wind chill.
- Wearing the right clothing is the most important way to avoid cold stress. The type of fabric also makes a difference. Cotton loses its insulation value when it becomes wet. Wool, on the other

hand, retains its insulation even when wet. Adequate insulating dry clothing will be required in air or wind chill temperatures below 40 °F.

- Wear at least 3 layers of clothing to help prevent cold stress. It is important to preserve the air space between the body and the outer layer of clothing to retain body heat.
- Wear an outer layer to break the wind and allow some ventilation (e.g., Gortex® or nylon).
- Wear a middle layer of down, wool, or similar materials to provide insulation.
- Wear an inner layer of cotton or synthetic weave to allow ventilation.
- Wear a hat or hardhat liner. Up to 40 percent of body heat can be lost when the head is left exposed.
- Wear insulated boots or other insulated footwear, and insulated gloves to help reduce the chance of frostbite.

22. FIELD PERSONNEL REVIEW

This form serves as documentation that field personnel have read, or have been informed of, and understand the provisions of this SSHASP for the site. It is maintained on-site by the SS as a project record. Each field team member shall sign this section after training in the contents of this SSHASP has been completed.

I have read, or have been informed of, the Health and Safety Plan and understand the information presented. I have also completed site-specific training for the work detailed in the project Work Plan. I will comply with the provisions contained therein.

NAME (PRINT AND SIGN)	DATE

Appendix A: Template of Job Hazard Analysis Form

Ground/Water Treatment & Technology, LLC

JOB HAZARD ANALYSIS (JHA)

Activity Task:	Job Number:	Date:	{ } New { } Updated

Person(s) Completing Analysis:
Required/Recommended PPE: Safety glasses, hard hats, safety toed boots, high visibility vests, work gloves, and hearing protection as required.

This JAHA must be updated for changing conditions, when job steps change, or a new job step is introduced. JAHA should be specific to work areas or job sites for major tasks. This may include work area conditions, tools used, personnel, training requirements, equipment, regulations, etc..

	Task Steps	Analyze Hazards	Hazard Controls
1	Assess task area	▪ Slips/trips	▪
2	Fill STARRT Form	▪ none	▪
3		▪	▪
4		▪	▪
5		▪	▪
6		▪	▪
7		▪	▪
8		▪	▪

Employee STOP Work Authorization

"I have the right and obligation, when knowledgeable of job hazards, to Stop Work, without fear of reprisal, to protect co-workers, others and myself from imminent hazard situations." **Employees are expected to stop working when they encounter one of these conditions and notify their supervisor. If an employee feels an issue has not been addressed adequately, they have the responsibility to raise the issue to a higher level.**

NOTE: Have employees drink plenty of water to avoid overheating. Assure that all employees know the evacuation route and assembly point. Post emergency contact numbers so all employees have access to them. Complete GWTT STAART before starting ANY task. Verify all permits have been obtained and are onsite before commencing work.

End of Day/Inclement Weather Procedures---At the end of each day or prior to a known weather event every effort will be made to secure the ends of all pipes and barricade the area to prevent unauthorized entry.

AT ALL TIMES: Be aware of Insects and other wildlife when moving or picking up of materials.

Ground/Water Treatment & Technology, LLC

JOB HAZARD ANALYSIS (JHA)

Activity Task:	Job Number:	Date:	{ } New { } Updated

Reviewed by Superintendent.	Date:	Approved by Safety:	Date:

EMPLOYEE JAHA REVIEW SIGNATURE PAGE

Print	Signature	Date	Print	Signature	Date

Appendix B: Job Hazard Analysis

General Physical Hazards and Controls	
Potential Hazards	**Controls**
All Hazards	• Manage projects so that adequate time is allowed to complete tasks • Manage projects so that proper equipment is available • Maintain and encourage a positive safety attitude/culture • **Look out for yourself and others at the site; provide feedback to each other on safety performance** • **Report near misses and safety observations** • Employees must review this Health and Safety Plan prior to work, and a copy must be available at the work site • Reevaluate the Job Safety Analysis daily; consider changes in weather conditions, work activities, and other site conditions • Complete STARRT forms daily

General Physical Hazards and Controls	
Potential Hazards	**Controls**
Heavy Equipment / Forklift	• Operators shall be qualified or licensed to operate. • Discuss work activities and location of ground personnel with equipment operators prior to work • Wear high-visibility clothing • Identify all energized contacts in the work area (overhead or subsurface) • Stay away from equipment when possible • Make eye contact with the operator prior to approaching equipment • Have the operator de-energize equipment prior to approaching • Watch out for blind spots • Inspect equipment prior to work and repair or replace defective equipment. • Operators must maintain three points of contact when entering and exiting equipment. • Engineering controls shall be employed to minimize particulate dust.
Drilling Operations	• Operator to inspect drill rig initially and daily. • Barricade work area. • Identify all energized contacts in the work area (overhead or subsurface) • Stay clear of drilling operations, especially the rotating auger and cables. • Know the location of and test emergency stop switches. • Never place hands on rotating equipment. • Recognize and avoid pinch and crush points. • Keep work area neat and organized.
Crane Operations	• Operator shall be certified for the specific type of crane utilized. • Crane shall be inspected initially upon arrival and daily by the operator. • Identify overhead power lines or other factors limiting operation. • Barricade crane's swing radius. • Crane operator's spotter shall be qualified and **pre-assigned**. • Assure the Anti-Two Blocking device is in place and working. • Loads shall be properly assessed for rigging. • Tag lines shall be applied to all loads. • Never pass under a suspended load or pass suspended loads over personnel. • Crane boom shall be retracted at the end of the workday. • Operators must maintain three points of contact when entering and exiting equipment. • Pre-discuss temporary suspension of crane operations if wind speed is forecasted to exceed 20 mph.

General Physical Hazards and Controls	
Potential Hazards	**Controls**
Rigging Safety	• Inspect all rigging devices prior to use. • Ensure project rigging possess a discernible manufacturer's label • Use softeners when rigging around sharp edges. • Assure rigging hitch when used is safe for the load weight and size. • Refer to rigging handbook for determining safe equipment selection and use. • Properly store rigging in a dry location free from damage.
Underground Utilities	• Call one-call utility locator (811) at least three days prior to subsurface activities • Mark dig locations when possible • Use all possible clues to identify/locate utilities (asphalt patches, meters, as-build drawings, facility operators) • Hire a private utility locate company if questions regarding utility locations remain. • Manually clear depth to approximately 54" prior to mechanized excavation.
Overhead Utilities	• Note the location of overhead utilities prior to work • Identify line voltage • Maintain a safe distance from utilities • When heavy equipment is in use, mark the location of overhead lines with signs at ground level
Excavations and/or Trenching	• Excavation deeper than four feet (1.2 meters) deep must be appropriately sloped and/or shored • A competent person must inspect the excavation daily and issue an excavation/trenching permit prior to entry • Avoid entry when possible by collecting samples from equipment buckets or by using long-handled scoops • Never stand adjacent to an open excavation due to the potential for the ground to cave in below you • Some excavation may be considered confined spaces
Noise	• Use hearing protection when heavy equipment is operating • Use hearing protection when operating portable power equipment • Use hearing protection in work areas when normal conservation cannot be heard due to background noise.
Driving/Vehicle Safety	• Inspect vehicles before use • Avoid driving when drowsy • Obey traffic rules • Use extra caution when entering roadways or backing • Completely exit roadways to park • Do not operate vehicles in unsafe conditions (e.g., on steep slopes, in deep mud)

General Physical Hazards and Controls	
Potential Hazards	**Controls**
	• Summon proper assistance if stuck. • Do not use cell phones and avoid other distractions when operating vehicles • Secure all loads, including equipment within the cab • Wear seat belts • Leave enough time to get to your destination without hurrying • Never follow to close • Avoid backing when possible • Be aware of heavy equipment and do not park or conduct work in the blind spot of the equipment operator; remember that “blind spots” of some equipment can be very large • Verify back-up alarms are functional for all heavy equipment; for pick-ups or SUVs with obstructed rear view, a back-up alarm or use a spotter when backing up
Cold Stress	• Stay inside when possible during extreme cold. • Hypothermia condition awareness and prevention. • Schedule outdoor work during mild weather • Stay dry • Dress in layers • Have a warm hat and socks available • Take breaks in heated areas
Heat Stress	• Stay inside when possible during extreme heat • Drink plenty of liquids early and often throughout the day. • Take breaks in a cool area as necessary • Wear a hat and use sunscreen • Wear loose fitting, light colored clothing • Moisten clothing to promote cooling • Use work / rest regiments when working in chemical protective clothing. • Acclamation to working in heat takes time (~1 week) in general. • Avoid excessive alcohol or caffeine the night before work
Severe Weather	• Check the radio or internet for severe weather warnings • Check road conditions with the state highway department • During high winds watch for blowing doors, gates, and other objects • During electrical storms follow the 30/30 rule – if you hear thunder with 30 seconds of seeing lightning, take a 30-minute break • Know safe locations and/or evacuation routes in case of severe weather such as hurricanes and tornadoes

General Physical Hazards and Controls	
Potential Hazards	**Controls**
Lifting	• Healthy employees should lift no more than 50 pounds. Test lift loads. • Get help to lift heavy objects • Bend at the knees; do not use your back • Do not twist during lifts • Minimize the movement of heavy objects • Carry loads should not obstruct forward vision. • Stretch before lifting • Store heavy objects on the ground or below waist height.
Sharp Objects	• Wear appropriate work safety-toe boots and work gloves • Use caution when working with any hand tool • Keep blades or cutting edges sharp • Use safe cutting tools instead. • Tools with fixed blades or pocketknives are prohibited. • Periodically inspect tools and equipment to ensure that they remain in good operating condition
Hand Tools and Portable Power Equipment	• Inspect all hand tools and portable powered equipment prior to use. • Use the correct tool for the task. • Select and use the proper PPE for the tool or equipment used. • Keep cutting tools sharp and sheathed. • Route electrical tools through a fixed or portable Ground Fault Circuit Interrupter (GFCI). • Use tool pouch to safety store tools when working overhead. • Use hearing protection with portable power tools. • Take damaged tools and equipment out of service and repair or replace.
Ladders	• Inspect ladders prior to use. • Use the correct ladder for the task • Select a ladder storage area and properly store ladders. • Limit the use of step ladders to minimal light tasks. • Take damage ladders out of service and repair or replace. • Do not use metal ladders near power lines.
Slips, Trips, and Falls	• Maintain good housekeeping • When possible, avoid steep and uneven terrain • Wear sturdy boots with good tread • Keep the work area free from water, ice or debris • Literally, watch where you step – mark slip, trip, fall hazards with flagging, etc. • Take the time to find a safe route to the desired location

General Physical Hazards and Controls	
Potential Hazards	**Controls**
	• Do not perform any activity with a fall exposure of 6 feet (1.8 meters) (construction industry) or 4 feet (1.2 meters) (general industry) or more without using fall protection • Use tool caddy or other equipment to avoid carrying to many items.
Aerial Lift Operations	• Trained personnel shall operate aerial lifts. • Inspect equipment daily. • Fall protection shall be worn and workers tied-off while in articulated boom lifts. • Operate in **"slow"** mode only. • Do not stand on rail system. • Security chains or self-closing safety gates must be operable on both types of aerial lifts (scissor and articulated) • Properly barricade all overhead work areas.
Vehicle traffic	• Contact the responsible authority for the road to determine if a right-of-way permit is required • For road blockages use a combination of orange cones and vehicle placement to ensure the work zone is protected. • Wear ANSI Class 2 high-visibility vests. • Expect the unexpected
Fire/Explosion	• Implement GWTT Hot Work Permit • Keep flammable and combustible materials properly stored. • Turn off equipment prior to refueling. • Smoke only in designated areas. • Do not park equipment over high grassy areas.
Confined Space Entry	• Entry to a confined space requires training, air monitoring, special equipment, and rescue provisions. • Simply crossing the plane of the space with any part of your body is considered an entry. • Entry into excavations with a depth four feet shall be initially assessed as confined space. • Refer to GWTT Confined Space Program
Electrical Safety	• Route electrical tools through a fixed or portable Ground Fault Circuit Interrupter (GFCI). • Use heavy duty extension cords. • Route extension cords in a manner that prevents tripping. • Safely take unsafe electrical appliances or tools out of service. • Servicing of electrical systems shall be performed by qualified or authorized personnel only.
Hot Work	• Welding areas shall be properly barricaded and screened. • Work areas shall be inspected for combustible / hazardous materials prior to commencing work. • Work areas shall possess a portable fire extinguisher.

General Physical Hazards and Controls	
Potential Hazards	**Controls**
	• A fire watch shall be assigned to remain on duty 30 minutes after activities.
Falls from Heights	• Workers shall be trained in the safe selection and use of fall protection systems and components thereof. • Select and use solid anchoring points located directly overhead of worker to minimize pendulum swing and struck against injuries in the event of a fall. • Use fall limiters as opposed to lanyards with deceleration device. • Inspect entire fall arrest system prior to use. • Use an aerial lift to safety rescue a fallen worker within 15 minutes of suspension. • PPE used in a fall situation shall be taken out of service and replaced.
Scaffolding	• Properly constructed and inspected by Competent Person • Fall protection required for those involved with scaffold construction. • Daily inspection and tagging system stating Use or Do Not Use. • Minimal storage of tools, materials, and equipment on scaffold towers. • Barricaded work areas below.

Chemical Hazards and Controls	
Potential Hazards	**Controls**
Chemicals of Concern	• Properly select chemical protective clothing and gloves based on the contaminants of concern. • Develop and implement engineering, administrative and PPE controls. • Monitor wind conditions during intrusive and waste handling operations. • Minimize the handling of contaminated materials. • Contain or cover contaminated materials to minimize release of vapors or particulate. • Using good personal hygiene practices; wash hands and face prior to eating or drinking) • Utilize the “Buddy System” in exclusion zones and other hazardous operations. • Properly containerize and label all project related waste. • Refer to provisions throughout this HASP • Refer to MSDS or NIOSH Pocket Guide Reference
Lead Paint Abatement	• GWTT will hire a New York state certified and licensed Lead Abatement contractor (Contractor) to remove lead containing finished from areas specified in the Scope of Work. • The Contractor shall develop a separate Lead Abatement Plan specifically for their operations to be submitted to GWTT prior to the commencement of work. • The Contractor shall furnish MSDS for all hazardous materials required for the work. • The Contractor shall assess potential effects of vapors and gases associated with the hazardous materials utilized and take the necessary precautions to properly protect building ventilation systems, building personnel and workers from exposure to such gases or vapors. • The Contractor shall properly remove and containerize all process related waste and properly label waste containers with content and date. • Work area shall have limited access to properly trained and protected workers. Access areas shall be complete with warning signage.
Hazardous Materials	• Material Safety Data Sheets (MSDS) must be available for all chemicals and brought on or used on site. • MSDS shall be displayed in an area where all project personnel are aware. • Label all containers with chemical name and hazard warning. • Use protective gear recommended on the MSDS • Store and dispose of hazardous materials in accordance with the MSDS.

Chemical Hazards and Controls	
Potential Hazards	**Controls**
Particulate Dust	• GWTT shall monitor exclusion zone perimeters during intrusive operations that have a potential to generate particulate dust using a pDR 1000 portable instrument. • GWTT shall employ wetting methods to minimize dust generation points when the action level for particulate dust is exceeded. • Workers performing pavement cutting operations shall select and use portable powered equipment that has associated with it a hose fitting to connect a potable water source to keep the blade wet and cool while operating. • Workers handling masonry raw materials shall handle materials safely with the proper PPE and properly don a N95 particulate dust mask or a half or full-face respirator equipped with a P100 cartridge.

Biological Hazards and Controls	
Potential Hazards	**Controls**
Stinging and Biting Insects	• Visually inspect work areas for insect activity (i.e., swarming, nesting) especially when working around crevices or eves. • Avoid reaching into dark or shaded areas where spiders may be nesting. • If necessary, to destroy a nest of hornets, wasp or other stinging insects best to do so by delivering a stream of insecticide on the nest early in the morning or late in the afternoon. • When using insecticides be sure no water or soil sampling is being conducted.
Vector borne disease	• Hantavirus may be present in mouse droppings or nesting materials • Histoplasmosis may be present in bird droppings • Do not generate dust from areas impacted by mouse or bird droppings • Eliminate locations for potential mouse and bird nests in equipment storage areas • Stay away from all animals especially if they appear to be ill or injured
Others	• Use caution when lifting objects that may provide shelter for spiders, snakes, hornets, and rodents • Use repellant with DEET if mosquitoes are a problem at the site • Livestock, domestic animals, and wild animals are all biological hazards to consider. • Be aware of ticks if working in a wooded area.

Appendix C: Applicable SOPs and Forms

- Cell Phone Policy
- Concrete and Masonry
- Confined Spaces
- Cranes and Rigging
- Electrical
- Emergency Procedures and First Aid
- Fire Protection and Prevention
- General PPE
- Hazard Communication
- Housekeeping
- Illumination
- Ladders
- Maintenance and Protection of Traffic
- Manlifts
- Material Handling
- Motor Vehicles and Equipment
- Noise Exposure
- Respiratory Protection
- Sanitation
- Scaffolds
- Silica
- Spill Response Procedures
- Tools
- Trenching and Excavation
- Welding and Cutting
- Zero Tolerance Policy

Appendix D: Job Specific Work Permits Required

ORR Agenda

A. For planning purposes, the CONTRACTOR shall assume that each readiness review session will take a minimum of 2 hours. The session shall be attended by the following CONTRACTOR and subcontractor staff:

1. CONTRACTOR: The CONTRACTOR shall have the following staff in attendance:

    a. Project Manager
    b. Superintendent
    c. Field ENGINEERs
    d. Quality Control personnel
    e. H&S personnel
    f. Plant operators

2. Subcontractors: All Subcontractors that will be involved in that particular phase of work. Each subcontractor shall have the following staff in attendance:

    a. Project Manager
    b. Superintendent
    c. Working Foreman

B. The following is the agenda for each readiness review session:

1. Introductions (sign-in sheet)

2. Purpose (to confirm and document the readiness of project team)

3. Roles and Responsibilities

4. Communication Protocol
    a. OWNER and CONTRACTOR (primary points of contact)
    b. Weekly Progress Updates at Weekly Job Meetings
    c. Communication with Regulatory and Public Agencies
    d. Communication with the Public/Community

5. Weather Protocols
    a. Earth Quake Procedures
    b. Flood & Evacuation Procedures

6. Lockheed Martin Rules
    a. Lockheed Martin Required Site Safety Orientation
    b. Site Access Control
    c. Health and Safety
    d. No tobacco use onsite, professional attire and behavior

e. Minimum PPE requirements (reflective vest, steel toe boots, safety glasses, long pants, hard hat, hearing protection when near noisy machinery)
f. Daily Tailgate Safety Meetings
g. Permitted Work Hours and Days
h. Noise and Traffic Requirements
i. Deliveries (including MSDS pre-approval for all chemicals)
j. Equipment and Material Storage Requirements

7. Review Scope of Construction Work/Operations (discuss in detail sequence of work, Subcontractors involved, equipment, materials, etc.)

   a. Site Preparation Activities (temporary offices/facilities, erosion control and temporary stormwater controls, site access and haul routes, material and equipment staging areas, test labs in place, surveying, etc.)
   b. Construction Activities
   c. Startup and Testing
   d. Operations
   e. QA/QC
   f. Health and Safety
   g. Special Environmental Requirements (transportation and disposal procedures, air monitoring, soil disposal, water disposal, waste management, sampling & analysis, storage of fuel onsite, etc.)
   h. Interfacing with Existing Facilities and Contractors
   i. Cleanup and Demobilization
   j. Record Keeping
   k. Inspections

8. Documentation Readiness

   a. OM&M Manual
   b. Work Plans
   c. Permits and Notices
   d. Test Reports
   e. Calibration Records
   f. Product Data/Cut Sheets
   g. Photographs/Videos
   h. Well Logs & Other Construction Reports
   i. Operator Exams
   j. Maintenance Tool Inventory
   k. Startup and Testing Procedures
   l. Other Pre-Work or Startup and Operations Procedures
   m. Certificates (OSHA Hazwoper, state licenses, certificates of disposal, etc.)
   n. Bill of Materials
   o. As-Built Drawings

9. Equipment Readiness

   a. Review Checklist

b. Physical Inspection and Positive Verification that Installed Equipment Meets Project Requirements
c. Check As-Builts
d. Testing and Acceptance of Piping, Equipment, and Systems (check inspection records, test results, local/state agency certificates in place to occupy or operate, etc.)
e. Construction Equipment Readiness (no leaking hoses, etc.)
f. Inspect Systems (electrical, mechanical, HVAC, I&C, and structural)

10. Material Readiness

    a. Positive Verification that Materials Received Onsite Match Project Requirements
    b. Type and Quantity of Materials Onsite
    c. Materials Laydown and Storage
    d. Security

11. Construction/Operation Worker Readiness (are workers qualified and ready to perform their duties?)

    a. Walkthrough of Equipment, Systems, and Controls
    b. Mimic SOPs and DOPs in the Field
    c. Review Regular System Checks

Lockheed Martin Corporation

Operations Readiness Review Compliance Checklist

	Location/Project Name:				
	Type of Work:				
	Date:				
	Completed by:				
No.	**Item**	**Yes**	**No**	**N/A**	**Comments**
	Permits and Notifications				
1	Verify all regulatory permits are in hand and copies are at the site				
	Safety Systems				
2	Do all workers have the required PPE available? Review the required PPE.				
3	Are any special PPE required for hazardous conditions at the site (carbon/chemical handling, electrical arc flash, etc.)				
4	Has an arc flash study been performed, and are arc flash labels present on ALL electrical panels?				
5	Is a current, complete and signed HASP readily available to all working at the site?				
6	Hazardous Material Summary Correct and up to date?				
7	Are MSDSs available and have they been reviewed for all on-site chemicals? Verify location of MSDS's.				
8	Has a joint Lockheed Martin and contractor safety walkthrough been performed?				
9	Are obstacles such as low overheads, step-ups, and step-downs clearly marked?				
10	Is work area lighting adequate?				
11	Are escape routes/emergency exits provided and identified?				
12	Have signs requiring hearing protection, no smoking, warning for presence of any hazards, load rating of elevated walkways, exclusion zones, emergency contact numbers, etc. been prominently displayed?				
13	Do the workers know who to call in the case of a life or death emergency?				
14	Do the workers know who to call in the case of a chemical spill greater than 5 gallons?				
15	Are fire extinguishers present?				
16	Have all workers been trained on the use of the fire extinguishers?				
17	Are personal injury hazards (e.g. protruding bolts, sharp edges) identified and mitigated?				

No.	Item	Yes	No	N/A	Comments
18	Have site tripping hazards or “head knockers” been identified and addressed?				
19	Have emergency shutdown devices been verified to be operating properly?				
	Building/Facility/Grounds				
20	Are all applicable utilities in working order (water, sewer, power, phone, internet, compressed air)				
21	Verify the work area is in a neat condition and clear of all obstructions and debris. Verify the floors are swept clean and work areas are neat and organized.				
22	Has Lockheed Martin conducted a housekeeping inspection of all working areas including offices?				
23	Verify that all hoses and electrical cords are rolled up and stored appropriately (not left out for trip hazard).				
24	Is all waste being stored and labeled per regulatory requirements?				
25	Will wastes generated be disposed of at a facility on the Lockheed Martin approved list?				
26	Are secondary containment structures and drum pads in place?				
27	Are trash and recycling receptacles in place?				
28	Are restroom facilities available to workers?				
29	Is all equipment properly grounded?				
30	Have all interior and exterior facility lighting systems been checked and functioning properly?				
	Workers				
31	Have all onsite personnel received site-specific safety orientation?				
32	Are all on-site personnel properly trained by individual equipment vendors to operate specific pieces of equipment?				
33	Verify that the workers know their chain of command and who to call in the case of an emergency.				
34	Do workers know what to do in the event of a chemical spill?				
35	Do workers know what to do in the event of a severe weather event (tornado, flood, hurricane)?				

OSHA 301 Equivalent

Claim Number/Reference Number_____

INCIDENT/ACCIDENT INVESTIGATION REPORT

Project Information:

Project Name and Number_____Date of Report _____

Date of Incident _____ Time Incident Occurred _____Safety Rep contacted_____
Print Name

Name of Person Who Reported Incident _____ Date Reported _____
Print Name

Name of Supervisor reported to _____ Time Reported_____
Print Name

Type of Incident: (check all that apply)
☐ Injury ☐ Property Damage ☐ Vehicle Incident ☐ Hazardous Condition ☐ Theft ☐ Water Damage ☐ Criminal Threat ☐ Bomb Threat ☐ Violence Threat

Person Involved in Incident: (**If more than one person involved list additional names and personal information on page 5**)

Name _____ Date of Birth _____ SS# _____
For Worker's Compensation only

Address _____State_____Phone_____

GWTT Employee ☐ Yes ☐ No If no, Employer Name:_____

Date of Hire _____Employee's occupation _____Sex ☐ Male ☐ Female

Supervisor _____ Time employee reported to work _____ ☐ AM ☐ PM
Print Name

Type of injury and body part affected _____

Is injury believed to be job related ☐ Yes ☐ No ☐ Unknown?

Facility (include address) where treated _____

Was injured treated in emergency room? ☐ Yes ☐ No Was injured hospitalized overnight as an in-patient? ☐ Yes ☐ No

Drug/Alcohol test done? ☐ Yes ☐ No If yes, where and who has results?

Were any authorities involved? If yes, Police Fire Other Report Number

Name: _____Contact Information: _____

Were others injured? ☐ Yes, identify separately on page 5. ☐ No

Recording Information: (check all that apply)
☐ First Aid Only (Provided by _____) ☐OSHA Recordable ☐Non-recordable

☐Restricted Work ☐Lost Work Days _____(Date return to work _____)

☐I do not wish to be provided medical treatment at this time. _____
(Employee Signature) and Print Name

☐ Date released from "Modified/Light Duty": _____

OSHA 301 Equivalent

Claim Number/Reference Number_____

INCIDENT/ACCIDENT INVESTIGATION REPORT

Incident Information:

Detailed description of Incident (Who, What, Where, Why, When, and How)

Description of property damage:

Value of property damage _____ Owner of property/material _____

If this is a vehicle: Make_____ License number: _____ Drivers License #: _____

GWTT vehicle: ☐ Yes ☐ No Private vehicle: ☐ Yes ☐ No

Auto Insurance Information: Insurance Company:_____Phone:_____

Location of damaged property/material _____

Witness(s) _____
Name Address Contact Day Phone

Witness(s) _____
Name Address Contact Day Phone

Claim Number/Reference Number_____

INCIDENT/ACCIDENT INVESTIGATION REPORT

Cause Factors: (All must be answered or "Not Applicable")

Weather conditions: ☐Rain ☐Wind ☐Sun ☐Fog ☐Ice
Details: _____

Site conditions: ☐Mud ☐Dust ☐Lighting ☐Unprotected hazard
Details: _____

Housekeeping: ☐Debris ☐Cords/hoses ☐Building materials
Details: _____

Personal conditions: ☐Physical ☐Prescription meds ☐Non-prescription meds
Details: _____

Equipment: ☐ Damaged ☐ Malfunction
Details: _____

Criminal: ☐ Vandalism ☐ Mischief ☐ Theft ☐ Trespassing ☐ Vagrant ☐Weapons
Details: _____

Bomb Threat: Location of Bomb: _____
☐Phone Location ☐ Mail

Violent Threat: _____
☐ Against property ☐Against people ☐ Loudness/profanity ☐ Possession of a weapon

Other Comments:

Corrective Actions:

Claim Number/Reference Number_____

INCIDENT/ACCIDENT INVESTIGATION REPORT

What actions have been taken or are planned to be taken to prevent recurrence of this or similar incidents?

Report prepared by:_____ _____ Signature _____
Print Name

Employer GWTT: ____ Other:_____ Title/Position:_____

Authorized Signature: _____ Date _____
(Print and Sign)

Claim Number/Reference Number: _____

SUPPLEMENTAL INFORMATION STATEMENT

1. Complete form as necessary for incident.
2. Have each witness complete separate statement.

Date of Incident: _____ Time of Incident: _____

Name of Individuals involved: (1) _____ (2) _____

(3) _____ (4) _____

Describe exactly what you observed. If you only heard something, observed only the aftermath of the incident or only know what was told to you by someone else, please explain that. Describe where you were when the incident occurred:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Name of Person Completing Form: _____ Signature: _____

Print Name

Phone Number of Person Completing Form: _____ Date of Statement: _____

Ground/Water Treatment & Technology, LLC Page 1 of 2

Date _____ **DAILY LOG** **Job No.** 3727

Client WOOD **Job Name** SSD Booster System **Attachments** Yes X

Location: New Hyde Park, NY No _____

Work Performed:

Weather Description

Temp °F Low Hi

Tailgate Meeting Topics

Work Force	ST	OT/DT
Field Engineer:		
Superintendent:		
Other:		
Subc: Ticket Attached. L 66	OT	OT
Other:	ST	OT
LEB - Ticket # xxxx	ST	OT
Advanced Utility Locating	ST	OT
Tom Nucatola	n/a	n/a
Total:		

Material:	Equipment:

Testing/Results: *None*

Delays: *None*

Directions From Engineer: *None*

Health & Safety Issues: *None*

Other: None

Signature below indicates that the party representative agrees that the above information is an acceptable account of the field work conducted for this day

GWTT Representative Kevin J Marchut **Date** 1/0/1900

Client Representative _____ **Date** _____

Ground/Water Treatment & Technology, LLC

Date 1/0/1900 **DAILY LOG**

Client WOOD **Job Name** SSD Booster System **Page** 2 **of** 2

Location: New Hyde Park, NY **Job No.** 3727

Work Performed Con't from pg. 1:

Signature below indicates that the party representative agrees that the above information is an acceptable account of the field work conducted for this day

GWTT Representative *Kevin J Marchut* **Date** *1/0/1900*

Client Representative _____ **Date** _____

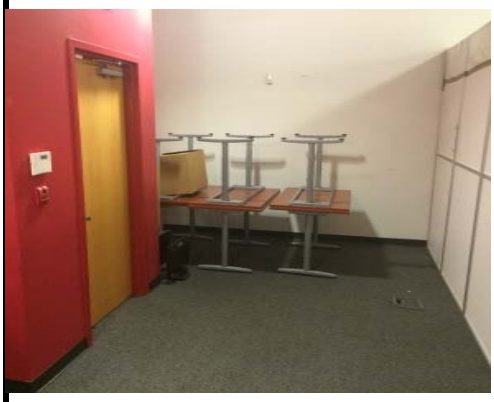
Ground/Water Treatment & Technology, LLC

Date 1/0/1900 **DAILY LOG**

Client WOOD **Job Name** SSD Booster System **Page** 2 **of** 2

Location: New Hyde Park, NY **Job No.** 3727

Work Performed Con't from pg. 1:

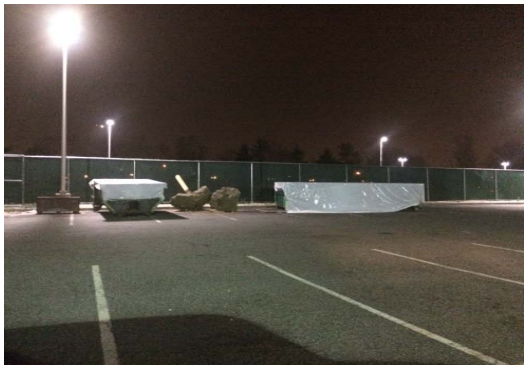


Above: 12/11 - Desks Moved and Stacked from 12/10

Above: 12/11 - Vault Wall and 3rd Borehole with Vault Bottom

Above: 12/11 - Vault Bottom approx 7-ft bgs

Above: 12/11 - Secure Trench



Above: 12/11 - Covered Dumpsters

Signature below indicates that the party representative agrees that the above information is an acceptable account of the field work conducted for this day

GWTT Representative Kevin J Marchut **Date** 1/0/1900

Client Representative _____ **Date** _____

GWTT
Ground/Water Treatment & Technology, LLC

627 Mt. Hope Road
Wharton, New Jersey 07885
Tel: (800) 770-0901
(973) 983-0901
Fax: (973) 983-0903

Hot Work Permit

Date _____ **Time** _____

Issued to: GWTT **Job Name** _____ **Job No.** _____

	Yes	No
Work Performed Today_____		
_____		
1. Can job be done outside in a safe area rather than in the building?	____	____
If no, give reason (such as weather): _____		
_____		
_____		
2. Have all process materials (solids, liquids, gasses) been removed from the equipment?	____	____
3. Have all lines been disconnected, blanked or locked-out?	____	____
4. Has an explosimeter test been taken?	____	____
Results:_____		
Signature of tester: _____		
5. Has fire watch been set up?	____	____
6. Is fire extinguisher or water hose available for fire watch?	____	____
7. Can flames or sparks ignite material in vicinity or on a lower floor level?	____	____

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AERIAL LIFT INSPECTION FORM

Equipment ID No.	Hour Meter Reading	Pre Shift	Post Shift

Equipment Name:	Week Ending:

ITEM INSPECTED	Check if Satisfactory	MON	TUE	WED	THR	FRI	SAT
Manufacturer's Operations Manual							
Travel Alarm							
Fall Protection Anchor Points							
Brakes							
Lights							
Horn							
Informational Plate Markings							
Fire Extinguisher							
Hydraulic Systems							
Hydraulic Fluid Level							
Hydraulic Controls							
Gauge and Instrument Operations							
Tires							
Steering							
Guardrails / Safety Chains							
Cables and Wires							
Platform							
Outriggers							
Electrical System							
Battery Charge							
Engine Compartment							
Oil Level							
Fuel Level							
Coolant Level							
Operator's Initials							

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Heavy Equipment Inspection Form

Equipment ID Number_____ Operator's Name _____

Equipment Name_____ Employee Number_____

Begin Hours_____ End Hours_____ Date_____

ITEM INSPECTED	Check if Satisfactory	MON	TUE	WED	THR	FRI	SAT
Equipment Operation Manuals Available							
Falling Object Protective Structure (FOP)							
Roll Over Protection Structure (ROP)							
Seat Belt							
Operator Seat Bar							
Side Shields, Screens , or Cab							
Lift –Arm Device							
Grab Handles							
Back-up Alarm – Operational							
Lights							
Guards							
Horn							
Windshield Wiper							
Glass, Mirrors							
Anti-Skid Tread Clear of Mud							
Safety / Warning Signs, Various Locations							
Fire Extinguisher							
General Condition							
Fuel Connection							
Fluid Levels (Engine & Hydraulic System)							
Controls Function Properly							
Parking Break							
Steering							
Tires / Track							
Lift Arms and Bucket							
Operator's Signature							

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Traffic Control Device Inspection Checklist

Project Name _____ **Project Number** _____

Inspect the following items:			
	YES	NO	NA
Are any devices missing?			
Do any devices need repair?			
Were all replaced or repaired?			
Notes:			
2. Are any lights (flashers, etc.) not functioning?			
Were they all replaced or repaired?			
Notes:			
3. Are any devices improperly placed?			
Were all positions corrected?			
Notes:			
4. Do any devices require cleaning?			
Were all devices cleaned?			
Notes:			

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Traffic Control Device Inspection Checklist

5.			
Notes:			

Remarks:

Inspector Name _____ **Date of Inspection** _____ **Time** _____

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Lockout/Tagout Permit

Equipment / System to be Isolated

Building:_____ **Floor:**_____ **Panel:**_____

Other Location:_____

Purpose of Isolation:_____

Type of Isolation:_____

Authorized Employee:_____ **Date:**_____

Special Instructions:_____

Lockout / Tagout Performed:_____

Tag No.	Device No.	Blgd / Floor/ Panel / Other	Installed By	Removed By

Verification System Is Safe for Specific Work to Start

Authorized Employee: _____ **Date:**_____ **Time:**_____

Accountability - Accepts Protection

Requesting Authority:_____**Date:**_____**Time:**_____

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Lockout/Tagout Permit

Accountability Releases Protection

Requesting Authority:_____**Date:**_____**Time:**_____

Lockout / Tagout Removal Authority

Authorized Employee:_____**Date:**_____**Time:**_____

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Excavation/Trenching Permit

Authorization Number _____Competent Person_____

Project Name_____Excavation/Trench Location_____

Date/Time Permit Valid_____Date/Time Permit Expires_____

Description of Special Procedures:

ESTIMATED DIMENSIONS						SOIL TYPE		
Depth=						Stable Rock		
Top=	W		L			Type A		
Bottom =	W		L			Type B		
SOIL ANALYSIS METHOD USED						Type C		
Visual		Manual		Tabulated Data		Avg. Compression Strength:		tsf
						Compression Strength Data:		

SOIL CHARACTERISTICS				MANUAL TEST USED			
Cemented		Plastic		Plasticity		Dry Testing	
Cohesive		Dry		Dry Strength		Other	
Layered		Moist		Ribbon			
Fissured		Saturated		Thumb Penetration			
Granular		Submerged		Pocket Penetrometer			

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Excavation/Trenching Permit

PROTECTIVE SYSTEMS Protective systems for excavations / trenches deeper than 20 feet must be designed and approved by a Registered Professional Engineer.				UTILITIES	
				One Call Service Notified	
				Utilities marked by Public Utility	
				Property Owner Contacted	
				Utility Drawings Reviewed	
SLOPING and BENCHING				Private Utility Locating Company Utilized	
ESTIMATED DIMENSIONS				SOIL TYPE	
PROTECTIVE SYSTEMS Protective systems for excavations / trenches deeper than 20 feet must be designed and approved by a Registered Professional Engineer.				UTILITIES	
				One Call Service Notified	
				Utilities marked by Public Utility	
				Property Owner Contacted	
				Utility Drawings Reviewed	
SLOPING and BENCHING				Private Utility Locating Company Utilized	
Vertical (90°)		11/2:1 (34°)		Name of Utility Locating Company:	
¾:1 (53°)		2:1 (26°)			
1:1 (45°)		Other			

SHORING SYSTEM / METHOD		KNOWN OBSTRUCTIONS			
Timber		Electrical		Drain	
Aluminum Hydraulic		Telephone		Process	
Trench Shield		Water		Footing	
Trench Box		Sewer		Pilings	
Designed Protected System		Steam		Concrete Encasement	
Other:		Alarm		Other:	
OTHER		OTHER			
Means of Safe Egress Required		Means of Egress Required			
Confined Space Permit Required					

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Excavation/Trenching Permit

SPECIAL INSTRUCTIONS and WORK INSTRUCTIONS

All unsafe conditions must be corrected prior to excavation entry. If any hazardous conditions are observed, the excavation must be evacuated immediately and entry prohibited until all corrective actions have been taken under the supervision of the Competent Person.

APPROVAL SIGNATURES and DATES			
TITLE	**PRINT NAME**	**SIGNATURE**	**DATE**
Excavation Competent Person			
Client Representative (if applicable)			
Site Superintendent / Supervisor			
Project Manager			
Subcontractor Representative			
Other : Title			

Lockheed Martin Minimum Requirements for Intrusive Fieldwork Work Plans

PURPOSE

The purpose of this requirements document is to prevent damage to subsurface and overhead utilities and structures and unexpected chemical releases during ground disturbance activities such as drilling, augering, direct-push technologies, excavation, trenching, chemical injection, grading or other similar operations.

SCOPE

This document provides minimum requirements for subsurface clearance activities, which must be followed prior to and during ground disturbance activities at any Lockheed Martin remediation project sites. Even after completing the subsurface clearance activities identified in this procedure, all ground disturbance activities shall proceed with caution.

This document also provides requirements on implementing in situ chemical injection programs, on managing significant field changes in field work plans and worksite housekeeping.

The Lockheed Martin Project Lead (PL), the managing contractor, and the performing contractor will be responsible for fulfilling the objectives of this document by ensuring that these requirements are carried out by the performing contractor's employees, sub-contractors and their employees and any other persons involved in the intrusive activity. The work requirements outlined below shall be incorporated into the work plan.

WORK REQUIREMENTS

General

The performing contractor's project manager and the supervisor of the intrusive field work subcontractor must review and sign the Risk Handling Checklist and complete Dig Permit found within the Corporate Staff Procedure EO-28, Digging Projects. Requirements and questions within the Risk Handling Checklist including identification of potential failure modes and hazards, traffic control, and excavation requirements shall be addressed in the work plan. In addition to the provisions of CS-28, relevant state, local and facility requirements must be identified in the work plan and in place before initiating any work. CS-28, the Risk Handling Checklist and the Dig Permit are included in Appendix A of this document.

The permit and the checklist shall be completed and approved by the PL before initiating any ground disturbance activities. The PL shall forward these items to the Environment, Safety and Health (ESH) professional, the performing contractor responsible for oversight, and the facility manager, as necessary, for their review.

Utility and Underground Structure Clearance

A utility and underground structure location survey which includes, but is not limited to records research, consultation with site facilities personnel, site inspection to locate physical evidence of underground or overhead utilities or structures and geophysical or other appropriate remote sensing techniques must be performed by a qualified utility location firm at least two weeks prior to initiating any intrusive activities. The survey shall include the appropriate equipment necessary to detect buried foundations and slabs, piping, direct-bury cables and other buried conduits and structures using the technologies appropriate to the anticipated utilities such as electromagnetic detector; ground penetrating radar; acoustic plastic pipe locator; probe, beacon, or trace wire; or cesium magnetometer. A table summarizing applicability of technologies for detecting various utilities is presented in Appendix B.

Because undocumented or inactive utilities can result in problems as severe as or more severe than documented utilities, utility location work must include, at minimum, ground penetrating radar as a screening tool to identify objects that may not be documented on utility record plans and other records.

The utility location/survey firm operators shall have at least 2 years of experience on industrial sites and preferably direct experience on the site under review. The utility survey firm shall be approved by the Lockheed Martin PL.

In addition to the utility survey, the state or other legally-mandated utility clearing organization ("Dig Safe," "U-Dig" or other such organization) having jurisdiction over the region in which the work is to occur, shall be notified within the time period required by that organization, state and local regulations. Even if all of the work is conducted entirely on Lockheed Martin or other private property, the utility clearing organization shall be contacted.

All aboveground indicators of subsurface and overhead utilities/services that may be leading to or from buildings and structures within the planned intrusive work area must be located and marked out in the field. Locations of utilities and structures detected by remote sensing equipment shall also be marked out in the field. Public utility mark-outs by for all exterior locations must be identified within required time period. Physical evidence of underground or overhead utilities may include, but is not limited to lights, signs, telephone systems, drains, electrical junction boxes, manhole covers, valve boxes, hand holes, pavement patching or other evidence of prior excavations, and natural gas meters.

The contractor shall make all efforts to avoid known or observed utilities in planning the work. If, however, subsurface structures are known or observed by geophysical survey within five feet of the work area and the work area cannot be moved, the performing contractor and/or its subcontractor shall carefully excavate to within two vertical feet of the expected top of the utility, then hand dig, air lance or otherwise gently remove the remaining soil to expose the utility. Additional precautions shall be described in the work plan if the intrusive work is to be performed in frozen soils.

The performing contractor must witness the utility clearance work to verify that the expected scope is performed and be available to work with the utility location contractor to answer questions and facilitate additional research or discussions with site facilities personnel.

The utility clearance contractor's report must include details concerning the methods used to locate utilities and documentation of how specific utilities were located in plan and depth, including a copy of instrument output when instruments producing output are used. It is not sufficient for the report to merely state that the utilities on the site plan were verified or that no utilities were found without providing supporting documentation.

Pre-Planning for Soil Fracturing and In Situ Injection Work

If subsurface disturbance activities such as soil fracturing or geophysical techniques that significantly alter the natural soil conditions are to be employed, the utility location survey shall be conducted at least one month prior to any chemical injection. Attention must be given not only to the locations of utilities and underground structures but also to the fact that utilities, structures and earth bedding can provide short-circuit pathways for the injected substance to travel significant distance to be intercepted by other utilities (sewers and drains), to be accumulated in undesirable locations (manholes or handholes) or to be discharged to surface waters.

Additionally, an aquifer assessment should be conducted to determine the nature of the aquifer receiving the chemical injections before and after any subsurface disturbance is conducted. Calculations and chemical injection volumes shall be determined as to what volume of chemical would be expected to fill the opened up pore space. An evaluation must be made of the quality and quantity of the data and assumptions that form the basis for design. Examples of typical data requirements that form the basis for design include aquifer

transmissivity, soil type, effective porosity, contaminated thickness, presence of confining layers, potentiometric surface configuration, and ambient groundwater flow velocity.

Upon completion of soil fracturing, the field data collected shall be thoroughly reviewed and assessed relative to the types and sizes of the resultant fractures and potential connection of fractures to short circuit migration pathways. Injection can proceed only after this review is completed and appropriate monitoring and contingency measures are in place to detect and prevent unwanted migration of injected medium.

A technical expert in the injection technique shall be employed and fully integrated in the project team. The PL will have responsibility for engaging the technical expert. This expert will be part of the managing contractor staff and shall have responsibilities including reviewing and approving the technical and functional requirements, the design, the work plan, and the injection procedures. This expert will engage with the PL to ensure that all potential failure modes and effects have been identified and mitigation strategies employed as necessary. The failure modes and mitigation strategies shall be documented and submitted to the PL for records retention.

Field Implementation Activities

All field personnel must review the approved work plan, subsurface utility location survey data, and related information prior to becoming involved in subsurface disturbance/intrusive activities. The field personnel must sign the authorization form in Appendix C indicating their review. This form shall be scanned and electronically submitted to the PL once all personnel have signed the form.

Change Management

Significant changes made during the field implementation should be avoided as much as possible. If such changes are required to the field work plan, the program should be temporarily suspended as long as is necessary so that effectiveness and unintended consequences can be thoroughly evaluated by the project manager, PL and performing contractors (including specialty subcontractors) and the necessary equipment and procedural changes can be developed, communicated, approved and implemented. The PL should be contacted immediately and the performing contractor overseeing the work shall be included in any decisions to modify the approved work plan.

In Situ Injection Implementation

If soil fracturing is required before chemical injection, injection can proceed only after review of the fracture patterns is completed, as stipulated in the "Pre-Planning" section and appropriate monitoring and contingency measures are in place to detect and prevent unwanted migration of injected medium. The contingency measure shall be outlined in the work plan. If monitoring shows that the injected compound is detected in unwanted locations (such as a storm drain or sewer), injection shall be halted and measures taken to prevent further unwanted migration.

The chemical injection method should be thoroughly defined in the work plan and followed during the field implementation program. If chemical daylighting (surface leaks from subsurface injections) or seeps are observed the injection should be immediately stopped. The surface leaks should then be properly contained to prevent runoff and allowed, if feasible, to percolate back into the subsurface. As a result of this condition, subsequent injection rates should be reduced by at least 20% or until chemical daylighting is no longer observed.

In most cases, low pressure methods should be employed whereby gravity or low flow recirculation systems are established to let the chemical slowly percolate into the subsurface. In no case should the injection pressures at or near the surface be greater than the available water table elevation distance to the ground surface unless approved by the PL or the PL's designated representative. Water table elevation changes as a result of chemical injections must be monitored and kept to a minimum as much as practicable.

Spill Prevention, Containment, Cleanup and Reporting

Chemicals stored onsite, including oil and fuels, reagents, injection medium, shall be placed in vessels within 110% volume secondary containment. Good housekeeping procedures must be practiced. Even benign reagents are contaminants if they migrate to a sensitive receptor. In no case should incidental spills or transfer leaks be tolerated on the site. All spills must be contained, cleaned and reported immediately to the site's spill response coordinator and the Lockheed Martin PL. Local storm drains should be temporarily plugged or booms or berms be placed to divert storm water flow from the storage area away from active storm drains.

DEVIATIONS

All deviations from this procedure must have prior approval by the Director of Environmental Remediation. The approval shall be documented and uploaded to the Lockheed Martin Document Management System.

APPENDIX A


EO-28


Dig Permit


Risk Handling Checklist

APPENDIX B


Utility / Underground Structure Clearance T

APPENDIX C


Invasive Fieldwork Authorization

Lockheed Martin Invasive Fieldwork

Project: _____
Fieldwork Description:
_____

By signing this form, you are indicting that you have reviewed the field work plan, utility location survey data, and Health and Safety Plan relevant to the project listed above.

	Name:	Date:
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		
16.		

This form shall be scanned and electronically submitted to the Lockheed Martin Project Lead.

NOTE: Each project may have unique conditions, therefore do not use this chart as the sole decision criteria for technology selection. Use the chart as a starting point to assess available technology(s) applicable.

KEY	Description
Green	Generally and applicable technology
Yellow	May or may not be applicable
Red	Not generally applicable
*	Indicates best technology for given object. Site structures, rebar in concrete, etc. can significantly affect performance and reliability of any electromagnetic method.
□	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. US requires DOT, Office of Pipeline Safety Standards.
∇	Most sensitive to interpretation; the skill, training, and experience of the operator are critical.
≡	Emerging technology with limited availability.
+	Access: induce unique electronic signature, apply acoustical impulse, or insert probe/beacon/sonde.

Subsurface Mark-out Technology Application Chart

Technology → / Object ↓	Electro-Magnetic Detector	Ground Pentrating Radar (GPR) ∇	Acoustic Plastic Pile Locator	Probe, Beacon Sonde, or Trace Wire	Cesium Magnetometer ≡
Power/Instrument Line (Energized/Signaled □)	* G	Y	R	R	Y
Power Line (Non-energized)	Y	* Y	R	R	Y
Sewer/Water Line (Metalllic)	* G	> 12" diameter G < 12" diameter Y	Y	G	Y
Sewer/Water Line (Non-metallic)	R	> 12" diameter G < 12" diameter Y	G	* G	Y
Instrument/Telecomm Lines (non-energized)	R	R	R	R	R
Natural Gas Line (Pipeline) ♦	* G	> 12" diameter G < 12" diameter Y	R	R	G
Metallic/Non-metallic Line (w/ Tracer Wire)	* G	> 12" diameter G < 12" diameter Y	Y	Y	Y
Metallic/Non-metallic Line (w/o Tracer Wire)	R	> 12" * diameter G < 12" * diameter Y	Y	Y	R
Metal UST	* G	* G	R	R	G
Fiberglass UST	R	* G	R	R	Y

Additional Considerations

Technology → / Variable ↓	Electro-Magnetic Detector	Ground Pentrating Radar (GPR) ∇	Acoustic Plastic Pile Locator	Probe, Beacon Sonde, or Trace Wire	Cesium Magnetometer ≡
Moist Soil	G	Y	G	G	Y
Dry Soil	Y	G	Y	G	G
Clay	Y	R	G	G	Y
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	N/A
No Access to Line +	Y	G	R	R	G
Ferrous Metal	G	G	G	G	G
Non-Ferrous Metal	Y	G	G	G	Y

LOCKHEED MARTIN

Dig Permit

See Enterprise Operations Procedure EO-28, Digging Projects, for instructions.

Date	Project Manager
Building/Location	
Purpose of excavation	
Company/LM organization performing dig	

Planned dig date	Duration	Start time
Expected depth	Width	Length

Underground utilities identified?	Overhead utilities?	Electrical lines?	Gas lines?
☐ Yes ☐ No	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No	☐ Yes ☐ No
Sewer?	Water?	Telecommunications?	Other? Specify:
☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No

Site-specific or customer utility locating requirements completed?

☐ Yes ☐ No ☐ N/A

Sketch of dig project (or attach drawing)

Project Manager	Date	Customer	Date
Telecommunications	Date	Customer	Date
ESH	Date	Customer	Date
Building/Facility Manager			Date

SITE SPECIFIC HEALTH AND SAFETY PLAN
SUB-SLAB DEPRESSURIZATION BOOSTER SYSTEM PROJECT

LOCKHEED MARTIN CORPORATION
FORMER UNISYS FACILITY, GREAT NECK
LAKE SUCCESS, NEW YORK
NYSDEC Site ID #130045

August 2021
Revision 1

GWTT
Ground / Water Treatment & Technology

627 Mount Hope Rd
Wharton, NJ 07885

SAFETY POLICY FOR GROUND/WATER TREATMENT & TECHNOLOGY

The purpose of this policy is to develop a high standard of safety throughout all operations of Ground/Water Treatment & Technology and to ensure that no employee is required to work under any conditions, which are hazardous or unsanitary.

We believe that each employee has the right to derive personal satisfaction from his/her job, and the prevention of occupational injury or illness is of such consequence to this belief that it will be given top priority at all times.

It is our intention here at Ground/Water Treatment & Technology to initiate and maintain complete accident prevention and safety training programs. Everyone from top management to the working person is responsible for the safety and health of those persons in their charge and coworkers around them. By accepting mutual responsibility to operate safely, we will all contribute to the wellbeing of our employees.

CONTRACTOR APPROVALS

By their signature, the undersigned hereby certify that this Site-Specific Health and Safety Plan (SSHASP) has been reviewed, modified for site-specific hazards, and approved for use at the Former Unisys Facility located at 1111 Marcus Avenue, Great Neck, New York.

GWTT Project Manager — Date: 9-1-2021

GWTT Health and Safety Director — Date: 9-1-2021

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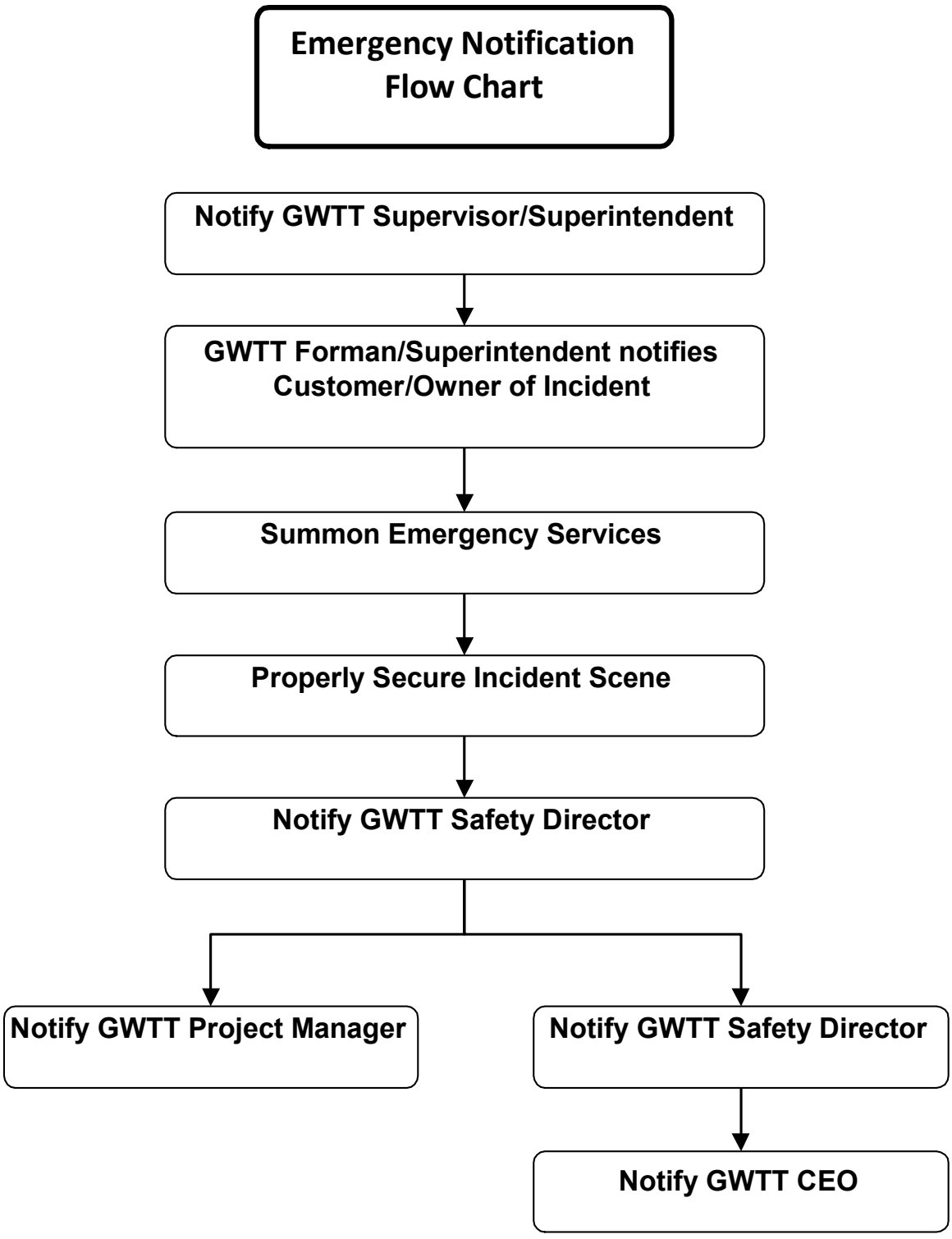
1. Critical Project Information

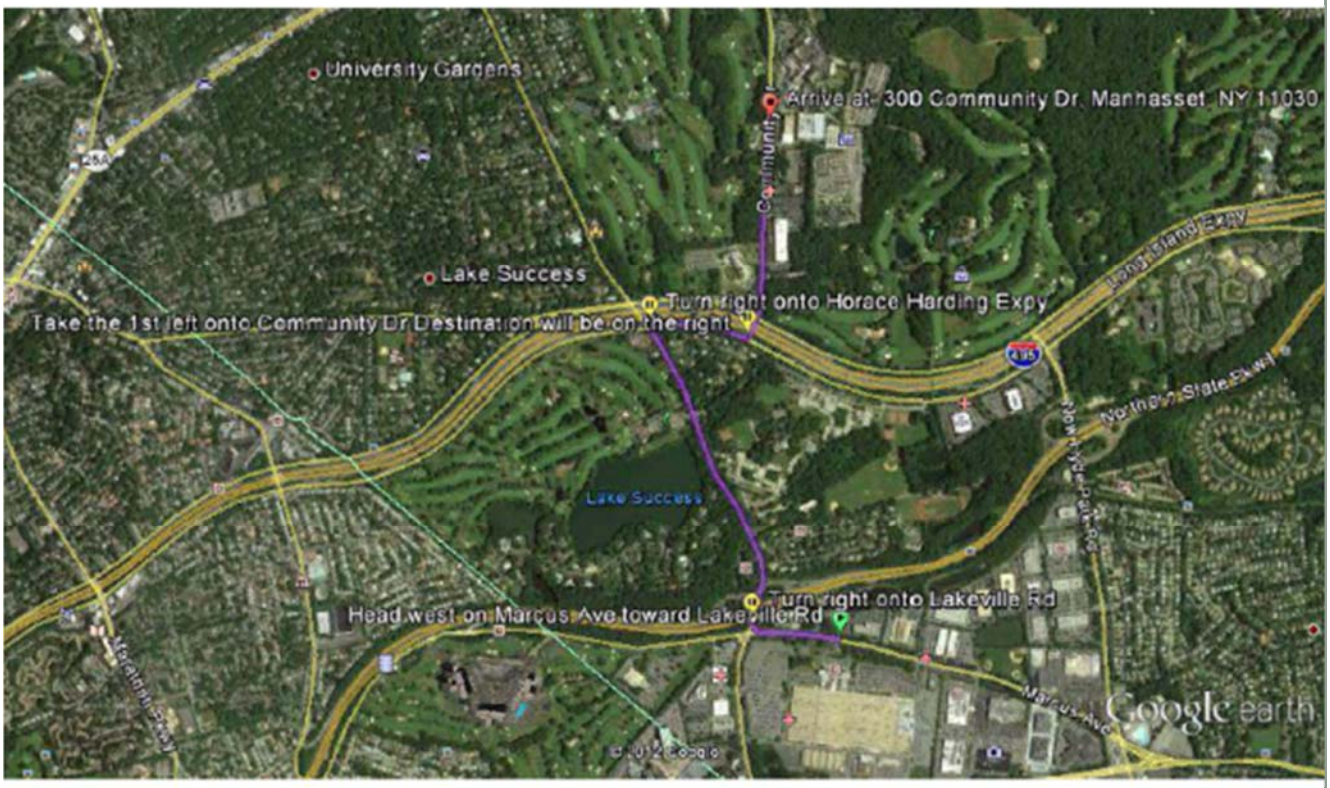
Site & Customer/Owner Information	
Site Location	1111 Marcus Avenue, Great Neck, NY
Customer Project Manager/Engineer of Record Stuart Pearson	Office: 207-828-3426 Cell: 207-776-4251
Customer Offsite Support/Construction QC William Whitacre	Office: 609-689-6771 Cell: 646-831-5662
Customer Primary Contact Eduard Chenette	Office: 207-828-3282 Cell: 207-710-4602
Customer Safety Officer/Construction QC Jack Feng	Office: NA Cell: 646-392-5252
Customer Safety Manager Jeff Tweeddale	Office: 860-529-7191 Cell: 860-670-5908

GWTT Personnel Contact Information	
GWTT Project Manager (PM) Kevin Marchut	Office: 973-983-0903 Cell: 973-513-58122
GWTT Safety Director (GSD) Roger Huth	Office: 973-983-0903 Cell: 201-274-3041
GWTT Site Superintendent (SS) Mike VanVliet	Office: 973-983-0903 Cell: 973-903-2945

Emergency Information	
Emergency Services (Ambulance, Fire, Police)	**CALL 911**
Hospital Name	North Shore Community Hospital
Hospital Address	300 Community Dr, Manhasset, NY
Hospital Phone Number	516-562-4125 (ER)
GWTT Safety Director (GSD) Roger Huth	Office: 973-983-0903 Cell: 201-274-3041


Emergency Notification Flow Chart
Notify GWTT Supervisor/Superintendent
GWTT Forman/Superintendent notifies Customer/Owner of Incident
Summon Emergency Services
Properly Secure Incident Scene
Notify GWTT Safety Director
Notify GWTT Project Manager
Notify GWTT Safety Director
Notify GWTT CEO

Hospital Map and Directions



Directions to the Hospital:

From Site located at: 1111 Marcus Ave, Great Neck, NY

1. Head west on Marcus Ave toward Lakeville Rd	0.2mi
2. Turn right onto Lakeville Rd	0.7mi
3. Turn right onto Horace Harding Expy	0.2mi
4. Take the 1st left onto Community Dr Destination will be on the right	0.5mi

Address of the Hospital:

300 Community Dr
Manhasset, NY

EMERGENCY FIRST AID PROCEDURES

THE RESPONDER SHOULD HAVE APPROPRIATE TRAINING TO ADMINISTER FIRST AID OR CPR.

1. Survey the situation. Do not endanger your own life. **DO NOT ENTER A CONFINED SPACE TO RESCUE SOMEONE WHO HAS BEEN OVERCOME. FOLLOW PROTOCOLS INCLUDING THAT A STANDBY PERSON IS PRESENT.** IF APPLICABLE, REVIEW SDSs TO EVALUATE RESPONSE ACTIONS FOR CHEMICAL EXPOSURES.
2. Call On-Site Security (see above numbers) **IMMEDIATELY**. Explain the physical injury, chemical exposure, fire, or release.
3. Decontaminate the victim if it can be done without delaying life-saving procedures or causing further injury to the victim.
4. If the victim's condition appears to be non-critical, but seems to be more severe than minor cuts, he/she should be transported to the nearest hospital by the SS or designated personnel.

STOP BLEEDING AND CPR GUIDELINES	
To Stop Bleeding	CPR
1. Give medical statement indicating that you are trained in First Aid. 2. Assure: airway, breathing and circulation. 3. Use DIRECT PRESSURE over the wound with clean dressing or your hand (use non-permeable gloves). Direct pressure will control most bleeding. 4. Bleeding from an artery or several injury sites may require DIRECT PRESSURE on a PRESSURE POINT. Use pressure on pressure points for 30 to 60 seconds to help control severe bleeding. 5. Continue primary care and seek medical aid as needed.	1. Give medical statement indicating that you are trained in CPR. 2. Check for responsiveness: Tap shoulders and shout, “Are you OK?” If unresponsive and not breathing: 3. Send someone to call **911** and to obtain an AED and first aid kit (or, if you are alone, complete these actions yourself). It is very important to call for emergency assistance prior to initiating CPR. 4. Open the airway with the person lying on his or her back, tilt head back slightly to lift chin. Check for breathing for no more than 10 seconds. If there is no breathing: 5. Immediately begin CPR, starting with compressions: COMPRESSIONS: - at least 2 inches deep - rate of 100 to 120 compressions per minute RESCUE BREATHS: - Open airway: tilt head past neutral position and lift chin. - Pinch nose and form seal over mouth. 6. Continue CPR steps performing compressions and rescue breaths until breathing resumes or emergency services arrive. 7. When AED is available, use it in accordance with the AED instructions. If breathing resumes, maintain an open airway and monitor for any changes in condition.

2. Scope of Work

1. Mobilization / Pre-construction Activities
2. Installation of Sub-Slab Depressurization Booster Points (two locations)
3. Booster Point Work Area Restoration
4. Roof and Interior Piping Installation and Connections
5. Electrical Connections
6. Heat Trace and Insulation
7. SSDS Startup and Testing

2.1 Mobilization / Pre-Construction Activities

Upon mobilization of all labor, materials, and equipment to site the following activities will take place:

- Site Specific Health & Safety orientation and training
- Establishment of work zones and staging areas
- Set up Privacy Fencing around work areas
- LMC dig permit and checklist
- Notify one-call of activity and obtain utility clearance prior to groundbreaking
- Private utility markout / survey using GPR and precision utility locator by qualified geophysical contractor.
- Take pre-construction photos and submit portfolio
- Installation of soil erosion and sediment controls

2.2 General Requirements On-site Activities

- Daily safety tailgate meetings (at least 1 per shift)
- Daily progress reporting
- Attend coordination meetings as required including:
  - Internal GWTT
  - Project Team
  - Building Manager and Tenants
  - Weekly schedule update

2.3 Construction Activities

2.3.1 Installation of Sub-Slab Depressurization Extraction Point (two points)

- Set up SESC measures and safety / privacy fencing
- Clear grass and segregate, if possible, for later reuse
- Begin continuous monitoring of workspace air with calibrated four / five gas meter
- Remove soils to 2-ft below grade around the work area, and deeper as necessary to facilitate core drilling of one (1) or two (2) 6-inch diameter hole(s) through 12-inch thick foundation wall.
- Stage spoil pile at least 2-feet away from shallow pit – keep pit less than 4-ft below grade and sloped. Manage spoil pile by surrounding workspace with 3-ft silt fence and plastic cover.
- Excavate soils on opposite side of foundation wall by applying vacuum.

- Install 4-in dia Sch 40 PVC pipe with link seal between cored foundation wall and OD of pipe
- Plug and grout secondary hole if applicable
- Measure off location of point relative to nearest building corner

2.3.2 Booster Point Work Area Restoration

- Seal buried connections with bentonite chips
- Backfill around exterior piping with a 12-inch pipe bedding box and use clean imported fill to backfill installation pit. Restore in 12-inch compacted lifts.
- Install buried utility identification tape.
- Restore original cover (mulch) over in pit area and in track access to pit from road.
- Maintain SESC measures
- Transport and handle soil spoils onsite into 55-gallon drum containers for sampling and disposal.
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2.3.3 Vertical EP Piping to Roof

- Route 4-inch dia. sch. 10 galvanized steel pipe from Sch 80 PVC stub up and valve connection to building wall. Extend piping vertically to roof and secure to brick wall as per drawings.
- Secure stack to building using masonry fasteners Unistrut and pipe clamps every 10-ft and before and after lower spool piece.

2.3.4 Roof and Interior Piping Installation and Connections

This task includes the installation of horizontal roof piping and connections to existing piping network.

- The specifications and approved shop drawings will be followed including rooftop protection pads, floating pipe supports with pipe hangers, use of rigid and flexible couplings, and expansion loops.
- Piping on north and south shall be sloped from high points of run back to booster point and interior tie in.
- The interior connections shall be made in coordination with the Engineer's representative to ensure that system downtime is minimized.
- Instrument spools shall be constructed and mounted in place with isolation valves prior to tie in.
- Tie in shall consist of shutting down the system, removing existing piping and modifying the existing spool piece to allow for the new EP connection.
- GWTT shall utilize a rack truck or box truck to relocate equipment and materials from the SSDS plant staging area to the nearest available entrance to the work site and begin by providing protective cover along the flooring. This will include a combination of paper, plastic and matting or plywood as required.
- Electric manlifts, material carts and ladders will be brought into the work area and the tie in locations will be evaluated to ensure all parts are on hand to complete the work.

- GWTT will have temporary caps, flanges, and valves available for use should they be needed to stop work and resume at a later date.
- The SSDS will be shut down by Wood operational staff.
- From the newly installed tee, piping will be routed and supported with Unistrut style supports to the glass block wall for penetration onto the roof. This work must be done in dry conditions and requires removal of several glass blocks. The glass block will be fitted with a pipe boot on the interior and exterior to seal the penetration.

2.3.5 Electrical and Controls

All programming, live troubleshooting and work related to communication network shall be completed by others.

GWTT shall manage the Electrical subcontractor, LEB Electric. LEB's scope is as follows:

- North and south sides supply and install galvanized conduit with conductors (200' each) with all expansion fittings from instrument tie into RP panel in respective fan house. These runs shall be to power and control devices at the extraction point instrument spools.
- Include local disconnect switch at each valve.
- Terminate wires inside existing panels at Wood direction.
- Conduit routed on pipe stands where allowed transition to wooden blocks on rooftop back to existing catwalk. Conduits to run below catwalk and drop off for routing to fan house at each location.
- Penetrations in fan houses shall be sealed with non-shrink grout.
- Tie in with new breaker at existing distribution panels inside the fan-houses for each heat trace runs.
- Install meter to monitor power usage at each location.
- Run conduit and wire from fan house to heat trace circuits as needed.

2.3.6 Heat Trace & Insulation

- See above 2.3 for Heat Trace Power Installation
- Install heat trace along bottom of EP piping and secure with proper tape
- Insulate all EP piping and fittings in both north and south bays from glass block wall penetrations and down to grade on west side of facility.

2.3.7 Startup and Testing Activities

This task includes coordination with the main OMM contractor to facilitate the start-up and shake-down of newly installed booster system components. This may include:

- Calibration of instrumentation and control devices,
- Perform regular inspections and testing – collection of field parameters
- Confirm connectivity and communication of newly integrated equipment
- Troubleshoot issues

2.4 Demobilization Activities

Demobilization activities includes the following:

- Remove and properly manage materials and equipment that are not part of the permanent installation

- Take post-work photographs and submit portfolio
- Prepare final red-lines and record documents, including Operation and Maintenance Manual for equipment and devices.
- Perform any final site restoration including temporary fence removal, SESC measures removal, final clean up and re-seeding with hay.

3. Project Organization and Responsibilities

This section specifies GWTT project organization and responsibilities. All GWTT personnel, including its subcontractors, will be responsible for adherence to the safety procedures during the performance of this project. Deviations from this SSHASP will not be allowed without express consent of the GWTT Safety Director (GSD). Project management and field supervisors for subcontractors are responsible for ensuring that their personnel will follow the procedures of this SSHASP. Violations of this SSHASP will result disciplinary action up to dismissal from site operations.

3.1 Project Manager (PM) – Kevin Marchut

The GWTT PM responsibilities include the following:

- Ensures implementation of the SSHASP;
- Participates in incident investigations;
- Ensures the SSHASP has all the required approvals before any site work is conducted; and
- Ensures the PS, SS, and GSD are informed of project changes which require modifications of the site safety plan.

3.2 GWTT Safety Director (GSD) – Roger Huth

The GSD responsibilities include the following:

- Assists in the development and approval of the SSHASP;
- Approves revised or new safety protocols for field operations;
- Approves individuals who are assigned Health and Safety responsibilities;
- Coordinates revisions of this SSHASP with field personnel;
- Assists in Coordinating upgrades or downgrades of personal protective equipment with the PS and the site SS;
- Assists with safety walkthroughs and safety inspections;
- Assists with the implementation of the SSHASP;
- Assists in the investigation of all accidents/incidents; and
- GSD or GWTT Corporate Safety Manager will perform quarterly corporate safety audits.

3.3 Safety Supervisor (SS) – (responsibilities will be handled by site management)

The site Safety Supervisor responsibilities include the following:

- Ensures that all health and safety activities identified in this SSHASP are conducted and/or implemented;
- Determines upgrades or downgrades of personal protective equipment (PPE) based on site conditions and/or real-time monitoring and personnel sampling results;

- Identifies operational changes which require modifications to health and safety procedures and site safety plans, and ensures that the procedure modifications are implemented and documented through changes to the SSHASP, with GSD approval;
- Directs and coordinates health and safety monitoring activities;
- Ensures proper personal protective equipment is utilized by field teams;
- Conducts weekly safety inspections of work areas;
- Monitors compliance with this SSHASP;
- Serves as the primary contact to review health and safety matters that may arise;
- Approves revised or new safety protocols for field operations;
- Approves individuals who are assigned health and safety responsibilities;
- Coordinates revisions of this SSHASP with field personnel;
- Assists in the investigation of accidents/incidents;
- Performs real-time monitoring and personnel sampling and reporting/recordkeeping;
- Coordinates health and safety monitoring activities with PS/PM; and
- Has overall project responsibility for Project Health and Safety.

3.4 Project Superintendent (PS) – Mike VanVliet

The Project Superintendent's responsibilities include the following:

- Ensures that the SSHASP is implemented in conjunction with the GSD and SS;
- Ensures that work is scheduled with adequate personnel and equipment resources to complete the job safely;
- Ensures that adequate communication between field crews and emergency response personnel is maintained;
- Ensures that site personnel are adequately trained and qualified to work at the site;
- Enforces site health and safety rules;
- Conducts and documents daily safety briefings;
- Conducts periodic inspections;
- Stops work if necessary;
- Notifies GSD and SS of accidents/incidents;
- Reports to the GSD and SS to provide summaries of field operations and progress; and
- Acts as the primary point of contact with the owner (or its agents) for site related activities and coordination with project related site operations.

3.5 Site Personnel

The Site Personnel responsibilities include the following:

- Perform work tasks according to the GWTT Code of Safe Work Practices;
- Report any unsafe or potentially hazardous conditions to the PS and SS;
- Maintain knowledge of the information, instructions and emergency response actions contained in the SSHASP;
- Comply with rules, regulations and procedures as set forth in this SSHASP and any revisions;
- Prevent admittance to work sites by unauthorized personnel;
- Inspect all tools and equipment, including PPE, prior to use each day; and
- All site personnel have the authority to stop work if they deem the task unsafe.

3.6 Subcontractors

At a minimum, GWTT subcontractors will comply with this SSHASP. GWTT subcontractors will also maintain an independent SSHASP that complies with their specific site related tasks. If necessary, the applicable sections of the subcontractor SSHASP will be added to this SSHASP to cover additional hazards. GWTT will evaluate the safety performance of its on-site subcontractors in the same manner that it evaluates its own performance.

GWTT subcontractors will submit a addendums to this SSHASP that include:

- A written description of required safety needed for the job;
- Applicable safety training documentation as well as licenses and certifications; and
- The name and telephone number of the site safety coordinator responsible for safety on site.
- Job Activity Hazard Analyses
- Subcontractors will be required to participate in all safety meetings and discussions and adhere to the GWTT SSHASP and Client Safety Requirements.

4. Location and Site Description

The former Unisys Site is located at 1111 Marcus Avenue, Great Neck in the Village of Lake Success and the Town of North Hempstead, Nassau County, New York. The site is bounded by Marcus Avenue to the north, Union Turnpike to the south, Lakeville Road to the west, and the Triad Office Park to the east. The site is approximately 90.5 acres in size. The property is fully developed consisting primarily of the former main manufacturing building, various smaller support buildings, three recharge basins, and parking lots. The site has been redeveloped for commercial use and presently houses multiple tenants. The proposed northwestern SSD booster system is in the Village of Lake Success, an incorporated Village in the Town of North Hempstead. The proposed southwestern SSD booster system is located solely in the Town of North Hempstead.

5. Control of Work / Permits

5.1 Safety Orientation

All GWTT employees and sub-contractors who participate in fieldwork at this project will attend safety orientation training; it will be administered to all employees prior to the initial work assignment.

The orientation will consist of all required training programs as well as job and site-specific safety and health information. All GWTT personnel and management will adhere to the SSHASP along with any local OSHA or site safety requirements.

5.2 Daily Job Safety Analysis/STARRT forms

Each day before work commences and when there is a change to procedures all employees shall complete a GWTT STARRT form. At the end of their shift the STARRT form shall be turned in to their supervisor, scanned and saved to the job file, then forwarded to the appropriate department for filing. GWTT will incorporate Customer and/or forms for daily safety briefings as requested.

5.3 Safety Meetings

GWTT employees will follow the procedure of communicating the possible hazards any time they are on site. Weekly safety talks will be communicated and be either site specific or issued by corporate. Employees will be given safety briefings by their respective supervisors on a daily basis. STARRT communication will also be given immediately:

- Each morning prior to work beginning.
- When tasks change or environment changes during the day.
- When an injury occurs during the task.
- When manufacturers provide safety-related information pertaining to defects, use, etc. for equipment used by this company.

5.4 Job Activity Hazard Analysis (JAHA)

The Control of Work process requires that field personnel prior to initiating work conduct a Job Activity Hazard Analysis (JAHA), also known as Job Safety Analysis (JSA) and Job Hazard Analysis (JHA). A JAHA is a written review of the work activities to be completed in a sequential manner where each step is evaluated for anticipated hazards with applicable controls developed. If needed, the SS can assist with the development of the JAHA with an example form included as **Appendix A**; however, subcontractors are encouraged to utilize their own template. **Appendix B** includes a list of potential hazards and associated control measures.

Once the JAHA has been developed it should be submitted to the SS, or other designee, for review and confirmation that work does not conflict with other activities being performed in that immediate area. If necessary, the SS will identify and initiate coordination with additional parties on-Site before allowing activities to occur. Additionally, the SS or other designated IA would issue work permits for high-risk activities such as ground disturbance, hot work, confined space entry, working near live overhead utilities, lifting operations, working at heights and energy isolation as part of their JAHA review. If a Work Permits is deemed necessary to complete activities outlined on the JAHA, then that step of the task should not proceed until the appropriate permit has been issued by the SS or designated personnel.

5.5 Hot Work Permit

A Hot Work Permit is required before conducting any activity that uses or creates a heat source, spark, or open flame (i.e. welding, cutting, brazing, etc.). The work area must be evaluated for flammable or combustible hazards as well as a potential hazardous atmosphere. A copy of the Hot Work Permit form is included in **Appendix C**. Additional information regarding hazards associated with the use of hand and power tools, welding and cutting along with potential explosions is included Section 2 as applicable to the project scope of work.

5.6 Confined Space Entry

Entry into confined spaces will be conducted in strict accordance with 29 CFR 1910.146 and 29 CFR 1926 Subpart AA 1200-1213. Confined spaces will be evaluated prior to entry to determine if hazards are present that could pose a risk to entrants. Before workers may enter a permit-required confined space, an entry permit must be issued. The SS or PS will only issue the permit if all requirements for entry are met. Refer to **Appendix C** for the Confined Space Entry Permit. A copy of the Confined Space Entry Permit form is included in **Appendix C**. Note that as part of permit issuance, the development of a rescue plan is also required. If a permit required confined space entry is needed, a rescue plan must be developed and approved prior to the start of work.

5.7 Working Near Overhead Utilities

A Work Near Overhead Utilities Permit is required before conducting any activity that is in proximity from overhead utilities (i.e. power lines, communication lines, guy wires, etc.). Any work ≤10 feet from any overhead utility or any work where a power line is rated as ≥50kV requires the issuance of actual voltage for distance to be determined. Work that could reach within minimum approach distance near energized power line must have a permit for work prior to start of work.

Table 1: Minimum Safe Working Distances*

Line Voltage	Required Minimum Safe Working Clearance Distances
0-50kV	10' (3.05m)
51-100kV	12' (3.66m)
101-200kV	15' (4.57m)
201-300kV	20' (6.1m)
301-500kV	25' (7.62m)
501-750kV	35' (10.67m)
751-1000kV	45' (13.72m)

*For those locations where utility companies specify more stringent safe distances, those distances shall be observed.

5.8 Energy Isolation / Lock Out Tag Out (LOTO)

An Isolation Control Register/Permit also known as a Lockout/Tagout (LOTO) Permit is required before conducting any activity that requires work on any potential energy sources (i.e. electrical, mechanical, hydraulic, thermal or piping systems - liquid or gas, etc.) Documentation of the energy sources and isolation methods must be done. Utilize Lock-out/Tag-out procedures to render equipment inoperable and/or systems de-energized during the work process. Tags indicating ownership of the lockout device and the equipment/system that has been de-energized. All Lock-out/Tag-out activities require coordination with the SSO prior to commencing work.

5.9 Lifting Operations

Lifting operations includes the use of cranes, hoists, slings or other lifting equipment to lift and move heavy loads. Lifts can be subdivided into 'critical' and 'non-critical' depending on the weight of the load and the rating of the lifting equipment. When utilizing a forklift in hoisting operations "below the forks – free rigging" is prohibited unless approved by the manufacturer and an approved boom attachment is utilized with the weight capacity clearly marked on both

sides of the attachment with supporting documentation presented to the SS. All forklifts or Lulls will have hydraulic adjustable forks. Only trained and authorized persons can participate in critical lifts. A Lifting Operations Pre-Lift Form must be issued for all critical and non-critical lifts with a copy of this form included in **Appendix C**. All crane lifts require a lifting permit from Southern Company. Any lifting over 500lbs by a piece of equipment other than a crane also requires a permit. All cranes brought on site will require verification of annual crane inspection. Crane operators must be NCCCO certified for the model of crane they are operating.

5.10 Vehicle and Equipment Safety

All vehicles and equipment shall not exceed 10 mph speed limit unless posted otherwise. All GWTT vehicles shall be equipped with first aid kits and 10-pound ABC dry chemical fire extinguishers. All GWTT equipment shall be equipped with a 10- pound ABC dry chemical fire extinguisher. All equipment used requires make/model specific training including written and fundamental tests, including gators or buggies, etc. Trucks and equipment will be visually inspected daily and any defects shall be reported to the site supervisor/superintendent, if the defect poses a hazard or potential hazard the equipment shall be immediately removed from service until repaired by a qualified mechanic.

7. Hazard Analysis

This section presents an assessment of the chemical, biological, and physical hazards that may be encountered during the tasks specified under Section 2. This section is intended to serve as a general overall hazard assessment and safe work practices for the entire project. In performance of the work, all project team members shall comply with all applicable health and safety requirements, including:

- Federal, state, and local statutes, regulations, and ordinances
- Customer H&S requirements
- GWTT SSHASP requirements
- Subcontractor H&S requirements

7.1 Biological Hazards

During the project, there is a potential for workers to come into contact with biological hazards such as animals, insects and plants. Workers will be instructed in hazard recognition, health hazards, and control measures during site-specific training.

7.1.1 Animals

During the conduct of site operations, wild animals such as stray dogs or cats, raccoons, rats, birds, and mice may be encountered. Workers shall use discretion and avoid all contact with wild animals. If these animals present a problem, efforts will be made to remove these animals from the site by contacting a licensed animal control technician.

7.1.2 Insects

Insects, including bees, wasps, hornets, mosquitoes, ticks, and spiders, may be present at the Site making the chance of a bite possible. Some individuals may have a severe allergic reaction to an insect bite or sting that can result in a life-threatening condition; any individuals who have been bitten or stung by an insect should notify a supervisor immediately. The following is a list of preventive measures:

- Apply insect repellent prior to performing any field work and as often as needed throughout the work shift.
- Wear proper protective clothing (work boots, socks and light-colored pants).
- When walking in wooded areas, avoid contact with bushes, tall grass, or brush as much as possible.
- Field personnel who may have insect allergies shall have bee sting allergy medication on site and should provide this information to the PS and SS prior to commencing work.
- It is recommended that personnel check themselves when in areas that could harbor insects, wear light color clothing, and visually check themselves and their buddy when coming from wooded or vegetated areas.

7.1.3 Plants

The potential for contact with poisonous plants exists when performing fieldwork in undeveloped and wooded areas. During clearing and grubbing of the site, poison ivy, sumac, and oak may be encountered. Poison ivy can be found as vines on tree trunks or as upright bushes. Poison ivy consists of three leaflets with notched edges. Two leaflets form a pair on opposite sides of the stalk, and the third leaflet stands by itself at the tip. Poison ivy is red in

the early spring and turns shiny green later in the spring. Poison sumac can be present in the form of a flat-topped shrub or tree. It has fern-like leaves, which are velvety dark green on top and pale underneath. The branches of immature trees have a velvety "down." Poison sumac has white, "hairy" berry clusters. Poison oak can be present as a sparingly branched shrub. Poison oak is like poison ivy in that it has the same leaflet configuration; however, the leaves have slightly deeper notches. Prophylactic application of Tecnu may prevent the occurrence of exposure symptoms. Post exposure over the counter products are available and should be identified at the local pharmacist. Susceptible individuals should notify the PS or SS.

Contact with poison ivy, sumac, or oak may lead to a skin rash, characterized by reddened, itchy, blistering skin which needs first aid treatment. If you believe you have contacted one of these plants, immediately wash skin thoroughly with soap and water, taking care not to touch your face or other body parts.

7.3 Physical Hazards

A variety of physical hazards may be present during Site activities. The most common hazards are struck-by/against hazards; slips, trips, and falls; equipment hazards and temperature extreme (cold and heat) stress. Other physical hazards are due to the use of hand and power tools and material handling. Additional specific safety requirements may be covered during safety briefings at the Site. The following physical hazards, as marked below, have been identified and may be encountered during scheduled field activities:

☒ **Driving/Vehicle Operation**	☒ **Work on or Near Roadways**	☒ **Slips, Trips and Falls**
☒ **Housekeeping**	☒ **Noise**	☒ **Materials and Equipment Handling/Lifting**
☐ **Overhead Utilities**	☒ **Underground Utilities**	☒ **Elevated Platforms/Working Surfaces**
☒ **Stairway or Ladder Use**	☒ **Portable Hand and Power Tools**	☒ **Removing/Replacing Manhole Covers**
☒ **Electrical Hazards**	☒ **Energy/System Isolation**	☐ **Personal Safety - Crime Prone Areas**
☒ **Arc Flash**	☒ **Equipment Refueling**	☐ **Personal Safety - Forested Areas**
☐ **Confined Spaces**	☒ **Excavations**	☐ **Personal Safety - Hunting Areas**
☒ **Heavy/Mobile Equipment**	☐ **Fire/Explosion**	☐ **Personal Safety - Shooting Ranges**
☐ **Drilling**	☐ **High-Pressure Hazards**	☐ **Preserved Laboratory Sample Kits**
☐ **ATV or UTV Use**	☐ **Working on or Near Water**	☐ **Groundwater Sampling**
☐ **Building Collapse**	☒ **Fatigue**	☒ **Working at Night**
☒ **Drum Handling**	☐ **Mobile Data Collection**	☒ **Welding and Cutting (Hot Work)**
☒ **Aerial Boom/Scissor Lift**	☐ **Troxler Nuclear Density Gauge**	☒ **Hoisting and Rigging (Cranes)**
☐ **Demolition**	☒ **Other:** Radon, VOCs, other air pollutants	☒ **Other:** Heavy Vehicle Traffic

Actions to be taken to protect against the hazards identified are provided in the sections below. During all activities, personnel shall strictly adhere to the following:

- The buddy system or line of sight will be used during intrusive work; and
- If field personnel perceive an unsafe condition or situation, the SS will be notified immediately.

7.3.2 Housekeeping

Personnel shall maintain a clean and orderly work environment. Keep aisles and passageways clear and in good repair to provide free and safe movement of employees and material-handling equipment. Make sure that all materials stored in tiers are stacked, racked, blocked, interlocked, or secured to prevent sliding, falling, collapse or overturning. Do not allow materials to accumulate to a degree that it creates a safety or fire hazard.

During construction activities, scrap and form lumber with protruding nails and other items shall be kept clear from work areas, passageways and stairs. Combustible scrap and debris shall be removed at regular intervals. Safe means must be provided to facilitate removal of debris. Containers must be provided for collecting and separating waste, used rags and other debris. Containers used for garbage and other oily flammable or hazardous waste such as caustics, acids, harmless dusts, etc., must be separated and equipped with covers. Garbage and other waste shall be disposed of at frequent and regular intervals.

7.3.3 Stairway or Ladder Use

Stairway and ladders should be maintained in good condition, dry and free from debris or other tripping hazards. On constructions sites, except where more stringent requirements may exist, all stairways and ladders shall be constructed and used in accordance with OSHA 29 CFR 1926 Subpart X. If work performed from a stairway or ladder is >4 feet above ground or lower level, then 100% fall protection is required (i.e. guardrail, fall arrest system, fall restraint system, etc.). Where 100% fall protection is not typically required or not feasible (i.e. accessing or working from a portable/permanent ladder, trailer, scaffold, excavation, etc.) then the use of a Permit may need to be utilized and the project SS or PM should be consulted. If and area does not allow for 100% fall protection, a deviation would be required.

Ladders

- Ladders are to be visually inspected for possible signs of damage or defects daily before each use. Defective ladders should be removed from service and “tagged”.
- All ladders must be 1A or greater on site.
- All ladder inspections shall be identified with the appropriate color code for the period as established by the project.
- Where possible, portable straight rung ladders shall be set up so that the horizontal distance from the top support to the foot of the ladder is ¼ of the working length of the ladder. The ladder shall be secured by tying it off to a firm point or held in place by another worker while in use. If the ladder is used to gain access to a roof or platform, the side rails shall extend at least 3 feet beyond the point of support at the edge of the roof or platform.
- Step ladders shall always be set up properly so that they are in the “A” frame position, level and with all four feet on firm ground and fully opened with the spreaders locked in place. Personnel are forbidden to stand on the top cap or on the last step of a stepladder, or to stand on the hinged back of a stepladder. A stepladder shall never be used at a straight ladder.
- Ladders are rated by the total amount of weight (i.e., person’s weight, clothing and PPE weight, weight of tools and supplies that will be carried and stored on ladder) they can safely support.

Type IAA (Extra Heavy Duty)	375 pounds
Type IA (Extra Heavy Duty)	300 pounds

To prevent falls from ladders, make sure the following controls are in-place:

- Use only ladders designed to handle the job that needs to be done.
- Be sure step ladders are fully open and locked before climbing them.
- Place ladder on a hard, flat, and secure surface.
- Place ladder on non-movable base.
- Lean ladder against a secure surface, not boxes or barrels that could collapse.
- Do not place ladder in front of a door.
- Check shoes to ensure they are free of grease or mud prior to ascending or descending.
- Mount the ladder from the center, not from the side.
- Face ladder when ascending or descending and hold on with both hands.
- Carry tools in pockets, in a bag attached to a belt or raised and lowered by rope.
- Do not climb higher than the third rung from the top.
- Work facing the ladder.
- Do not overreach, always keep your torso between the ladder rails.
- Avoid outdoor ladder use on windy days.
- No aluminum ladders allowed on site.

Stairways

- Stairways must be between 30 and 50 degrees from the horizontal with no more than ¼ inch variation in riser height or stair tread width.
- Handrails and top rails must withstand a force of at least 200 pounds applied within 2 inches of the top edge, without failure.
- Temporary handrails shall have a minimum of 3 inches of clearance between the handrail and walls or other objects.
- When ascending or descending stairs, personnel should always use the handrail.
- Personnel should avoid using both hands to carry objects while on stairways; if unavoidable, use extra precautions.

7.3.4 Cold Stress

At certain times of the year, workers may be exposed to the hazards of working in cold environments. Potential hazards in cold environments include frostbite, trench foot or immersion foot, hypothermia as well as slippery surfaces, brittle equipment, poor judgment, and unauthorized procedural changes.

7.3.5 Heat Stress

Heat stress is a significant potential hazard, which is greatly exacerbated with the use of PPE in hot environments. The potential hazards of working in hot environments include dehydration, cramps, heat rash, heat exhaustion, and heat stroke. A heat stress prevention program will be implemented when ambient temperatures exceed 70ºF for personnel wearing impermeable clothing.

7.3.6 Noise

Noise is a potential hazard associated with the operation of heavy equipment, power tools, pumps and generators. Site workers who will perform suspected high noise tasks and operations for short durations (less than 1-hour) would be provided with hearing protection devices. If deemed necessary, the PS and SS will be consulted on the need for additional hearing protection and the need to monitor sound levels for site activities. GWTT corporate hearing conservation program can be found in GWTT Corporate HASP.

7.3.7 Hand and Power Tools

To complete the various tasks for the project, personnel will utilize hand and power tools. The use of hand and power tools can present a variety of hazards, including physical harm from being struck by flying objects, being cut or struck by the tool, fire, and electrocution. Work gloves, safety glasses, and hard hats will always be worn by the operating personnel when utilizing hand and power tools and GFI-equipped circuits will be used for all power tools. Tool inspections will be conducted prior to each work shift. Damaged tools will be tagged out of service and repaired.

7.3.8 Slips, Trips, and Falls

Working in and around the site will pose slip, trip and fall hazards due to slippery surfaces that may be oil covered, or from surfaces that are wet from rain or ice. Excavation at the sites will cause uneven footing in the trenches and around the spoil piles. Daily housekeeping inspections of the work areas will be conducted to identify, eliminate, and control slip trip and fall hazards.

7.3.9 Fire and Explosion

When conducting excavating activities, the opportunity of encountering fire and explosion hazards exists from contamination in the soil and the possibility of free product in the underground pipelines. This will be especially hazardous when pipelines are sawed or broken to grout the ends. Before an inactive utility line can be sawed or broken for capping purposed, a Line Break Permit is required to be duly executed by GWTT PS and reviewed by the SS.

Additionally, the use of a diesel engine on excavating equipment could present the possibility of encountering fire and explosion hazards. See GWTT Corporate HASP for further precautions and procedures in dealing with Fire and Explosions.

If a fire or explosion is serious enough to warrant evacuation or coordinated emergency response; all employees will be instructed to follow Emergency Response Plan.

7.3.11 Manual Lifting

Manual lifting of heavy objects such as sections of pipe may be required. Manual lifting max weight is 50lbs. Failure to follow proper lifting technique can result in back injuries and strains. Site workers will be instructed to use power equipment to lift heavy loads whenever possible and to evaluate loads before trying to lift them (i.e. they should be able to easily tip the load and then return it to its original position). Carrying heavy loads with a buddy and proper lifting techniques:

1) Make sure footing is solid.
2) Make back straight with no curving or slouching.
3) Center body over feet.
4) Grasp the object firmly and as close to your body as possible.
5) Lift with legs.
6) Turn with your feet, to avoid stress in the lower back.

Back injuries are a serious concern as they are the most common workplace injury, often resulting in lost or restricted work time, and long treatment and recovery periods. In addition, hand digging for pipes may present lifting/ergonomic hazards.

7.3.12 Heavy Equipment Operations

Equipment including earth-moving equipment, cranes, haul trucks, drill rigs or other heavy machinery designed to move dirt, material or equipment will be operated in compliance with the manufacturer's instructions, specifications and limitations, as well as any applicable regulations. The operator of equipment shall be appropriately training and qualified for role and is responsible for inspecting the equipment prior to use each work shift to verify that it is functioning properly and maintaining documentation of noted deficiencies and resolutions, as applicable. On active construction Sites, except where more stringent requirements may exist, all mobile equipment operations shall be in accordance with OSHA 29 CFR 1926 Subpart O. Operator should have make/model specific training, including written and functional test.

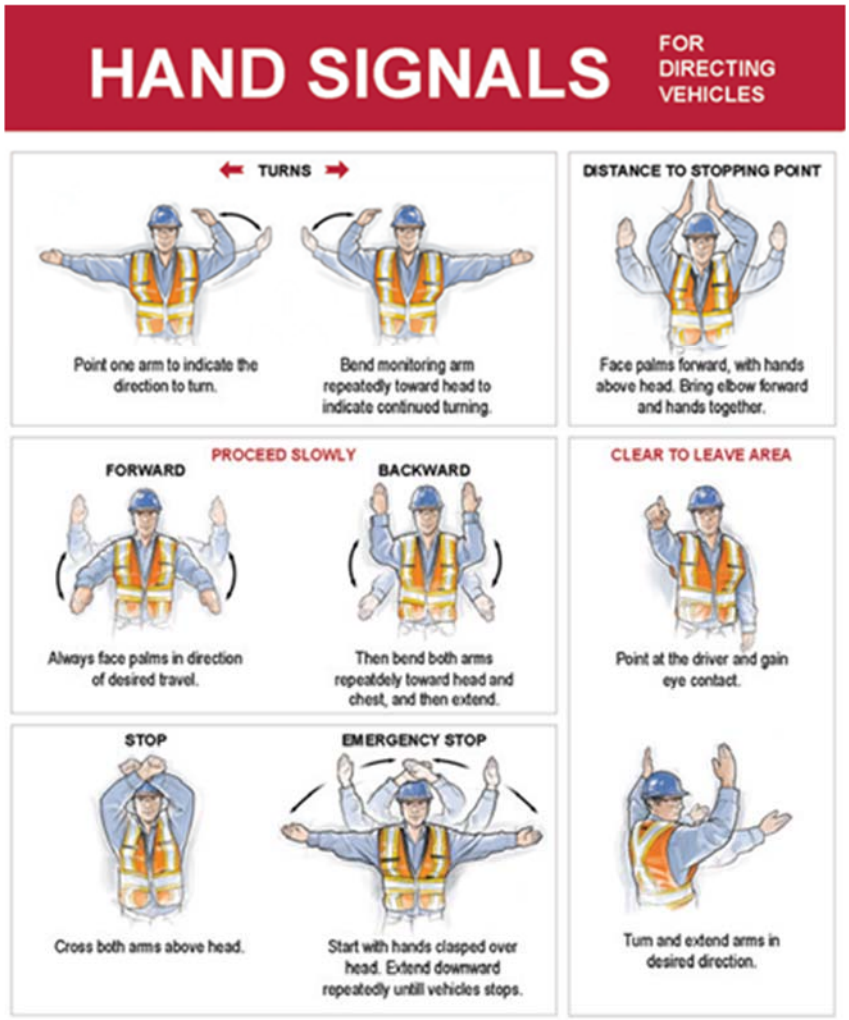
<u>Important</u>
Many types of mobile equipment have large blind spots and inhibit the operator's ability to clearly see all around the equipment as well as a huge swing radius. Because of this, personnel must always be aware of the location and operations of mobile equipment and never assume that the operator sees them. Personnel should not walk directly in the swing radius or in front, back or sides of mobile equipment without first making eye contact with the operator and obtaining approval. The use of high visibility safety vest is required.

The following precautions should be observed whenever heavy/mobile equipment is in use:

- PPE should include steel-toed boots, foam backed safety glasses, high visibility vests and hard hats, cut 4 level gloves with impact protection at a minimum.
- Personnel must be aware of the location and operation of heavy equipment and take precautions to avoid getting in the way of its operation. Workers must never assume that the equipment operator sees them; eye contact and hand signals should be used to inform the operator of the worker's intent.
- Personnel should not walk directly behind, or to the side of, heavy equipment without the operator's knowledge. Workers should avoid entering the swing radius of

equipment and be aware of potential pinch points.
- Nonessential personnel will be kept out of the work area.

The following are common hand signals used to communicate with mobile equipment operators. It should be noted that hand signals do occasionally vary by region and should be confirmed with the operator prior to starting work with the contractor.



Cooperation and clear, consistent communication between operators and spotters can minimize the potential for harm or damage. A spotter is a person designated to assist the operator in the safe movement of their equipment to make sure the heavy equipment doesn't inadvertently damage people, property and/or equipment/vehicles. Generally, spotters are required when:

- The operator's view of the intended path of travel or any part of its travel is obstructed (e.g. reversing, restricted side clearances)
- Operating equipment is in a location in which a person may be endangered by its intended path of travel

- Equipment is passing beneath or near overhead hazards (e.g. overhead power lines, communication lines, pipe racks)
- The above-mentioned list is not all inclusive; the operator may identify other situations in which the use of a spotter will help prevent an incident. Spotters should be appropriately trained and qualified to perform task.

The following are general expectations for use of mobile equipment on GWTT project Sites:

- Use of personal electronic devices including, but not limited to, cellular phones, tablets and smartwatches are prohibited while operating mobile equipment.
- Always use safe operating practices including observing the posted speed limit.
- Where required, the use of seat belts is always required while the equipment is energized.
- All vehicles and equipment with one ton or above weight must have the emergency brake set and wheels must be chocked if the vehicle is parked on a grade.
- When parking equipment, any forks, buckets, booms, etc. shall be lowered to the ground, controls neutralized, power shut-off, and the brakes set.
- All cab glass shall be safety glass or equivalent that introduces no visible distortion.
- All mobile equipment shall be equipped with a functioning back-up alarm audible above the surrounding noise level.
- Personnel are not permitted under any equipment suspended loads.
- Loads should be stable and only elevated as high as necessary for safe travel.
- Engines shall be shut off during fueling or maintenance operations and when left unattended.
- Trip handles for tailgates of dump trucks and heavy equipment shall be arranged so that, in dumping, the operator will be clear.
- No personnel shall get on or off moving vehicles or equipment or be permitted to ride in the bed of a truck unless seats, seatbelts, and roll-over protection are provided.
- Rollover protection (ROPS) as specified by federal, regional, local is required for all applicable equipment operated on the project.
- No vehicle or equipment shall cross over the top of power cables or pipes except at designated crossings where it has been protected from damage.

7.3.13 Lockout/Tagout

Lockout/tagout (LOTO) procedures in accordance with 29 CFR 1910.147 will be performed before activities begin on or near energized or mechanical equipment that may pose a hazard to Site personnel. The purpose of the LOTO system is to safeguard exposure from machinery, energized electrical circuits, piping under pressure or any type of energy source from unexpected energization or start-up that could cause harm to an individual. Workers conducting the operation will positively isolate the piece of equipment, lock/tag the energy source, and verify effectiveness of the isolation. Only employees who perform the lockout/tagout procedure may remove their own tags/locks.

Whenever multiple personnel (or multiple employers are working on the same Site) are to be engaged in activities requiring LOTO, employees/employers shall inform each other of their activities and coordinate their respective LOTO procedures. When applicable, GWTT shall request an owner's representative to initiate the LOTO procedure and apply the first lock. When initiated by others, GWTT will remove their locks prior to leaving a facility. Whenever a

group lockout/tagout procedure must be performed, they shall utilize a procedure that affords the same level of protection as that provided by the implementation of a personal lockout or tagout device. Group LOTO devices shall meet the requirements of 29 CFR 1910.145(f)(3). GWTT will be trained on and adhere to Customer/Owner policy and procedures when required.

Portable Equipment

Portable electrical equipment such as hand drills, computers, and power saws that use plug type connectors must be unplugged prior to any task that may expose the employee to energized portions of the equipment. Removal of the plug from the power source, such as the generator or wall socket, may be combined with a tagout system, particularly if the plug is at a distance from the equipment being repaired.

7.3.14 Confined Space Entry

Tanks, vessels on site will be considered potential permit required confined spaces. Prior to entry, each will be monitored for oxygen content, combustible gases, and toxic gases and vapors. A GWTT Confined Space Assessment will be conducted. When atmospheric conditions are below action levels, normal entry will be permitted, and monitoring will be continued. If action levels are exceeded, the tank will be immediately vacated, and the area will then be re- classified as a Permit Required Confined Space.

7.3.15 Fall Protection

GWTT has a 6-foot maximum fall height requirement above a lower level requiring 100 percent tie off on this site. GWTT will observe Customer/Owner fall protection requirements. During the construction, there is a potential for injuries caused by falls from unprotected leading edges. GWTT shall take precautions to ensure that all leading edges are protected in accordance with OSHA 29 CFR 1926. If during installation, a worker is required to assist the process in an aerial lift, they shall be protected from falls by an appropriate harness and latching system as described in OSHA CFR 1926. All aerial work platforms will have secondary guarding to avoid entrapment.

- Full body harness is the only acceptable means of fall arrest for personnel working over surfaces greater than 4 feet in height. A Fall Arrest System consisting of safety harness and anchor lanyard must be worn by anyone working on elevated surfaces that lack “general” fall protection such as railings, etc.
- Lanyards must be tied off at a point above the worker’s head and to a firm structure or a portion thereof designed to hold a weight of 5,000 lbs. Only hooks with locking snaps that operate in “as new” condition will be used. These hooks are also referred to as “double action lanyard hooks”. Lanyards used on site must be small, double locking type hook. Large lanyard hooks will not be allowed unless personnel are working on scaffold erection and have been approved Southern Safety Representatives. No pelican hooks allowed unless personnel are building scaffolds.
- When other possible means of fall protection (railings, etc.) are not available, individuals working at heights of less than 6 feet must tie-off if there is danger of impalement, especially if the impalement hazard cannot be mitigated in accordance with OSHA standards.
- All workers must perform routine inspection of harnesses and lanyards prior to their use. The employer shall conduct regular inspections (every three months) of all fall protection

equipment. In addition, there shall be an inspection of all workers' personal tools and equipment prior to the employees using them on the job. GWTT will adhere to monthly inspection color codes that are issued as site specific.
- Lanyards are to be used for tie-off purposes only. Harnesses and lanyards that are damaged or where involved in a fall arrest must be retired and discarded.

Protection from Falling Objects

- Personnel exposed to falling objects should wear hard hats.
- Objects on elevated surfaces must be positioned far enough away from the surface's edge to prevent those objects from falling over the edge if accidentally displaced.
- In addition to hard hats and object positioning, at least one of the following protective measures should be implemented to prevent falling objects:
- Erect toe boards, screens, or guardrail systems that prevent objects from falling to lower levels.
- Erect a canopy structure to contain falling objects.
- Barricade the area where objects could fall and prohibit entry into the barricaded area.
- Guardrail systems, when used as falling object protection, must have all openings small enough to prevent passage of potential falling objects.
- Canopies, when used as falling-object protection, must be strong enough to prevent collapse, and prevent penetration by any objects that may fall onto the canopy.

7.3.16 Working at Night

Working at night presents multiple hazards to field personnel from increased slips, trips and falls from reduced visibility to high vehicle incidents due to combine less traffic and higher speeds to alcohol impaired or drowsy drivers.

When working at night, field staff will be required to illuminate their personal workspace with headlamps and/or flashlights. Depending on the situation, additional portable light stands may need to be acquired. PPE for activities should include, at a minimum, an ANSI Class 2 high visibility vest or outerwear. Any work that begins or ends during the dark should include check-in (work starts) and check-out (work ends) calls to the PM or other designated person. Additionally, field staff should plan to adjust their sleep schedule to make sure they are rested and alert when conducting work at night.

Working at night not only impacts visibility at the Site, but also makes it difficult to get enough sleep. Sleep after night work usually is shorter and less refreshing or satisfying than sleep during the normal nighttime hours. The combination of sleep loss and working at the body's low point can cause excessive fatigue and sleepiness, which makes it difficult to perform well increasing risk of accidents. Also, shiftwork can be stressful because of frequent switching from a day to night schedule. Personnel should take responsibility for getting enough sleep to feel rested and restored. When switching back to days after the night shift, it is best to get most of your sleep the following night. Sleep just a couple of hours shortly after night shift to shake off sleepiness. Then stay awake all day and go to sleep at your regular bedtime at night.

7.3.17 Welding and Cutting Safety

All employees performing welding and cutting on site must adhere to GWTT Welding and Cutting Safety Rules and must complete Customer/Owner Hot Work training. In addition, all employees must abide by GWTT's Hot Work Program. GWTT fire watch will remain 30 minutes after hot work is complete.

7.3.18 Electrocution

The use of power tools and extension cords may pose electrical hazards to workers. Additionally, electrical cords or tools are of potential concern during treatment system setup operations. Site specific precautions will be followed to maintain a safe working distance and to alert all workers to the electrical dangers. Potential adverse effects of electrical hazards include shocks, burns, and electrocution, which could result in death. GWTT will adhere to monthly inspection color codes that are issued as site specific.

Extension Cords

Extension cords may not be used as a permanent means of providing power and will be removed from service if they are worn, frayed, or if the grounding prong is missing. Portable GFCI's will be required on portable electrical tools and cord sets used in wet environments and not plugged into a permanent power source with GFCI's present.

Extension cord precautions include the following:

- Be aware of exposed or bare wires, especially on metal grating. Warning: Electrical contact with metal can cause fatal electrocution.
- Prior to use, inspect cords for exposed or bare wires, worn or frayed cords, and incorrect splices. Splices are permitted, but there must be insulation equal to the cable, including flexibility.
- Cables and extension cords in passageways, steps or any area where there may be foot traffic should be secured to not create a tripping hazard. Overhead cables and extension cords shall be rigged to a height greater than 7 feet.
- Shield extension cords that must run across driveways or areas where vehicle traffic is present.
- Do not run cords across doorways or windows where they can be frayed or cut by a closed door or window.
- Do not run wires through wet or puddled areas.
- Flexible cord sets that are used on construction Sites or in damp locations shall be of hard usage or extra hard usage type.

Temporary Grounding

For portable generators greater than 5 kilowatts (kW), refer to the operator's manual for grounding requirements. When temporary grounding is required, a ground rod or listed grounding wire cable clamp must be utilized. Minimum ground rod requirements are 5/8"x10', must be driven perpendicular to the surface, and should be considered disposable after installation (unlikely to be able to be removed).
Portable generator manufacturers have different operation requirements so it is prudent to review the owner's/operations manual prior to renting or transporting to a remote field location.

7.3.19 Arc Flash

An arc flash is a short circuit through the air when insulation or isolation between electrified conductors is breached or can no longer withstand the applied voltage. The temperature of an arc can reach more than 35,000 degrees Fahrenheit as it creates a brilliant flash of light and a loud noise. Concentrated energy explodes outward from the electrical equipment, spreading hot gases, molten metal, causing death or severe burns and creating pressure waves that can damage hearing or brain function and a flash that can damage eyesight. The fast-moving pressure wave also can send loose material such as pieces of equipment, metal tools and other objects flying, injuring anyone standing nearby.

An arc flash can be caused by common occurrences such as dropping tools, accidental contact with electrical systems and buildup of dirt or corrosion. For prevention of arc flash generation, the following are recommended proactive steps to be implemented:

- Keep equipment and tools a safe distance from energized equipment so that if they fell they would not contact or electrical panels.
- Routinely inspect and coordinate the cleaning of energized equipment or electrical panels to prevent the buildup of dirt or corrosion.

Regulations require the calculation of the “flash protection boundary” inside which qualified workers must be protected when working. This boundary is an imaginary sphere surrounding the potential arc point, “within which a person could receive a second-degree burn if an electrical arc flash were to occur,” according to the National Fire Protection Association (NFPA) 70E standard. GWTT’s Safety Supervisor (SS) should be consulted for assistance in determining the “flash protection boundary” for the project or scope if not previously established via a risk assessment.

Newly installed/serviced electrical equipment may contain an Arc Flash Label that will identify the energy, hazard category and PPE requirements associated with the equipment. For all other unlabeled equipment, where the specific flash protection boundary (energy, hazard category and applicable PPE) is not established or cannot be established first (prior to live electrical exposure), GWTT personnel must maintain a 4-foot minimum observation distance (10 feet is preferred) from the exposed (i.e. doors open, covers off) live electrical equipment rated 600V and below. In the event that the flash protection boundary must be crossed, only GWTT personnel deemed ”Qualified” will don PPE appropriate for Hazard/Risk Category 2. For equipment rated above 600V, personnel must maintain a 10-foot minimum observation distance and not enter the flash protection boundary unless qualified and approved to do so.

Personnel should treat electrical equipment and circuits as energized until:

- Lock-Out/Tag-Out (LOTO) procedures have been implemented (refer to the energy isolation hazard description for additional information regard LOTO procedure) and the equipment or circuit has been tested to verify “no voltage” present, by a trained and qualified electrical worker, or
- The equipment or circuit has been physically isolated from every power source, tested and clearly labeled.
- For personnel involved with energized electrical work (i.e. design verification, equipment checkout or start-up adjustments), the following ordered approach must be followed:

- A trained and qualified electrical worker shall perform all energized electrical hands-on work (i.e. switching, metering, testing, etc.) while GWTT employees remain outside the flash protection boundary, with the exception of those GWTT employees who have completed NFPA 70 E training and have appropriately planned, including appropriate PPE, for the task.
- GWTT employees that closely supervise work within the flash protection boundary shall develop, in writing, the possible electrical hazards, appropriate PPE and mitigation techniques to be implemented during the activities via a detailed work plan that will be attached to this plan. The project SS or SS's designee should be consulted during the development of this plan and must approve the work plan with identified shock or arc flash hazards as part of the overall plan approval. Additionally, a permit may be required to conduct the activities in the field and the SS or PM should be consulted.

DEFINITIONS

- Energized Electrical Work. Work performed on or near energized electrical systems or equipment with exposed components operating at 50 volts or greater. Electrical system testing, thought to be de energized, but not proven to be (for example, a LO/TO effectiveness check).
- Flash Protection Boundary. The distance from energized exposed electrical equipment at which an unprotected person will receive a curable burn: 2nd degree burn or blistering. Work performed inside this boundary requires that the person be a "qualified person" and the use of appropriate personal protective equipment (PPE) to protect against arc flash burns.
- Qualified Personnel. A person with the training and experience having knowledge of energized electrical equipment hazards from an operational standpoint and from the safety-training standpoint. Educational credentials alone do not make a person qualified. Determination of qualification must be established by the employee's supervisor or other designated knowledgeable management representative.

7.3.20 Severe Weather

Outdoor operations will cease in the event of severe weather conditions. All heavy equipment use will cease prior to the onset of a thunderstorm regardless of the stage of activity. Indoor / Outdoor evacuation areas will be identified after mobilization and site setup. GWTT will adhere to all site-specific evacuation regulations.

7.4 Chemical Hazards

Chemicals not identified in this SSHASP may be used during system setup activities. Prior to the initiation of these tasks, Safety Data Sheets (See SDS Binder) will be obtained for each of the chemicals to be used and all site workers and visitors who may potentially be exposed will be made aware of these hazards. A separate SDS binder will be maintained in the GWTT on-site trailer.

If the SS determines that monitoring will be required to determine if these chemicals are potentially migrating off-site, a monitoring program will be established that is consistent OSHA regulations for Hazard Communication.

8. Personal Protective Equipment (PPE)

A hierarchical approach that employs engineering and administrative controls including Personal Protective Equipment (PPE) will be utilized to mitigate hazards likely to be encountered during the performance of the project scope of work. Where possible, an attempt to mitigate identified hazards will be made using the following hierarchy:

1. Elimination
2. Substitution
3. Engineering
4. Administrative
5. Personal Protective Equipment

However, even with the implementation of good management practice, some form of PPE will generally always be required. The amount and type of PPE used will be based on the nature of the hazard encountered or anticipated.

All project personnel shall use the required PPE specified or identified to be required for certain tasks. Each work task will be reviewed as to the hazards present with appropriate mitigation implemented including providing necessary PPE. Note: Jewelry shall not be worn where moving parts or equipment is located, where chemicals are being used or when working on electrical equipment (live or de-energized).

Based on the hazards identified for this project, the following levels of PPE will be required and used. Changes to the specified levels of PPE will not be made without the approval of the SS after consultation with the PS.

8.1 Required PPE

In general, Site activities will commence in Level D PPE unless otherwise specified, or if the SS, GSD or PM determines on-site that a higher level of PPE is required. Level D PPE will be permitted as long as air monitoring data indicates that airborne concentrations of chemicals of concern are maintained below the Site-specific action levels defined in Section 5. Level A or B PPE is not anticipated and is therefore not addressed in this plan. If Level A or B PPE is necessary, this HASP will be revised to reflect changes as appropriate.

The following is the minimum PPE required to conduct activities at the Site:

- Work shirt (sleeved) and long pants
- ANSI- or ASTM-approved steel/safety-toed boots
- ANSI-approved safety glasses with side-shields with foam backing.
- ANSI-approved (Class 2 or 3) High-visibility traffic safety vest or outerwear.
- ANSI-approved hard hat.
- Work gloves that are cut level 2.

Additional PPE to be donned prior to entering the project construction zone includes the following:

- Hearing protection with a Noise Reduction Rating (NRR) of 28 or above when working around operating equipment, or other environment where excessive noise exposure is a potential.
- Flame/fire Resistant Clothing (FRC) for working within petrochemical manufacturing or

steel mills and during energized electrical assessment activities.

- Insulating gloves (e.g., rubber with leather protector) with appropriate voltage classification for task being performed.
- Full-body Harness with appropriate lanyard(s) and tie-off when performing confined space entry or working at heights.
- Chemical goggles, when in contact with chemical liquids, can be reasonably expected, or when handling corrosive chemicals. In addition, a face shield may be required to protect the face from splash hazards.
- Using the Rule of Thumb provided by the AIHA;
- Total airborne concentration of contaminants is anticipated to be less than 100 ppm;
- The humidity is expected to be less than 85%; and
- Desorption of the contaminants (including those with poor warning properties) after partial use of the chemical cartridge can occur after a short period (hours) without use (e.g., overnight) and result in a non-use exposure

8.1.1 Equipment Refueling

Care shall be exercised while refueling generators, pumps, vehicles and other equipment to prevent fire and spills. Personnel shall eliminate static electricity by grounding themselves (touching metal) prior to using refueling hoses and or containers of petroleum liquids. Items being refueled shall be grounded or be located on the ground and not on a trailer, workbench or inside a truck bed. Equipment that is hot must be allowed to cool prior to refueling. Spill response materials shall be available when conducting refueling operations. All equipment must be turned off for refueling.

10. Emergency Response Plan

On-site personnel will use the following standard emergency procedures. GWTT Superintendent shall be notified of any on site emergencies and be responsible for ensuring that the appropriate procedures are followed. Emergency procedures should be modified as required for the incident. All evacuation procedures and assembly points will follow current standard operating procedures.

10.1 Fire/Explosion:

In the event of a fire or explosion, procedures will include immediately evacuating the work area. Personnel will then immediately notify the GC and site safety. No personnel will fight a fire beyond the stage where it can be put out with a portable extinguisher (incipient stage). Adhering to the following precautions will prevent fires:

- Good housekeeping and storage of materials.
- Storage of flammable liquids and gases away from oxidizers.
- No smoking in the exclusion zone or any work area.
- No hot work without a properly executed hot work permit.
- Shutting off engines to refuel.
- Grounding and bonding metal containers during transfer of flammable liquids.
- Use of UL approved flammable storage cans.
- Fire extinguishers rated at least 10 pounds ABC
- Monthly inspections of all fire extinguishers.

11. Site Control Measures

The SS will conduct routine safety inspections of the Site to verify compliance with the requirements of the HASP. These routine inspections will occur weekly (at a minimum) and the initial day of returning to work following extended downtimes (i.e. holidays, temporary demobilizations, etc.). Recommended frequency of inspection includes following the addition of a new subcontractor on-Site or change in Site construction activities/conditions. The SS will document the completion of these inspections of the Site Safety Checklist Form **Appendix C** or other similar form. It will be the responsibility of the SS, or person completing inspection on the SS's behalf, to communicate observation of unsafe conditions or acts with field personnel and/or subcontractor, stopping work if necessary. The SS will also be responsible for working with said personnel or subcontractor to determine corrective action and to document completion of corrective action on the Site Safety Checklist Form and on the JHA and/or active permit for activity. Depending on type of corrective action, the action should be shared during the next morning safety brief/meeting if beneficial to all Site workers. Additionally, subcontractors are required to conduct a daily H&S review of the work area and encouraged to utilize their own form, but an example has been included in **Appendix C** for use if needed. Note that the completion of this daily review along with JHAs is a requirement to contain a permit. Site visitors should contact the SS prior to leaving the project support area.

13. Training Requirements

Field personnel, including subcontractors, conducting work in controlled areas of the site, must have completed the appropriate training as required by 29 CFR 1926. GWTT will coordinate Customer/Owner required training based on duties of employees onsite. These trainings will be required prior to employee arrival onsite. GWTT field personnel will have completed the OSHA 10-Hr Construction Safety Course. Field personnel, including subcontractors, performing specialty tasks such as equipment operators or serving as competent personnel will have additional complete appropriate training for task.

Further site-specific training for the field personnel, including subcontractors, will be the responsibility of GWTT. This site orientation training will include, but will not necessarily be limited to, emergency procedures, site control, personnel responsibilities, and the provisions of this HASP. Each employee will document that they have been briefed on the hazards identified at the Site and that they have read and understand the requirements of this HASP by signing the H&S Plan Acknowledgement Form attached as the last section prior to appendices. A daily morning briefing to cover safety procedures and contingency plans in the event of an emergency is to be included with a discussion of the day's activities. These daily meetings will be recorded on the GWTT STARRT form.

15. Contingency Procedures

Minimum emergency equipment maintained on Site will include a fully charged ABC dry chemical fire extinguisher, an adequately stocked first aid kit, and an emergency eyewash station (when corrosive chemicals are present).

In the event of an emergency, Site personnel will follow the GWTT emergency procedures identified in the site orientation. Communication signals, such as hand signals, must be established where communication equipment is not feasible or in areas of loud noise.

It is the SS's duty to evaluate the seriousness of the situation and to notify appropriate authorities. The first part of this plan contains emergency telephone numbers as well as directions to the hospital. Nearby telephone access must be identified and available to communicate with local authorities. If a nearby telephone is not available, a cellular telephone will be maintained on Site during work activities. The operation of the cellular phone will be verified to confirm that a signal can be achieved at the work location.

The SS, or designee, should follow Site emergency processes in the event of an emergency. After emergency services are notified, the PM and SP will be notified of the situation as soon as possible. If personal injury, property damage or equipment damage occurs, the PM and GWTT Safety Director will be contacted as soon as practicable. A Preliminary Incident Investigation Report form will be completed within 24 hours by the SS, supported by the PM. The final report to be completed within one week of the initial incident.

15.1 Injury or Illness

If an exposure or injury occurs, work will be temporarily halted until an assessment can be made to determine it is safe to continue work. The SS, in consultation with the PM, will make the decision regarding the safety of continuing work. The SS will conduct an investigation to determine the cause of the incident and steps to be taken to prevent recurrence.

In the event of an injury, the extent and nature of the victim's injuries will be assessed and first aid/CPR will be rendered as appropriate. Any injury on site will be first assessed by the on safety rep, he SS and the GSD. If necessary, emergency services will be contacted, or the individual may be transported to the nearby medical center. The mode of transportation and the eventual destination will be based on the nature and extent of the injury. A hospital route map is presented at the front of this HASP for injuries requiring emergent medical services or for injuries that are life threatening. The site job file has additional information for injuries that are not life threatening but may still require medical attention. The medical facility information and authorization forms for non-life threatening injuries are found there.

In the event of a life-threatening emergency, the injured person will be given immediate first aid and emergency medical services will be contacted by dialing the number listed in the Critical Project Information section at the beginning of this plan. The individual rendering first aid will follow directions given by emergency medical personnel via telephone.

15.2 Vehicle Collision or Property Damage

If a vehicle collision or property damage event occurs, the SS, SSO, PM or designee, will contact the Safety Director for appropriate action.

15.3 Fire

In the event of fire, personnel will ensure an ABC fire extinguisher is within reach of any tool, operation, or piece of equipment that may catch fire. Personnel will use the PASS method to extinguish fire. Only trained, experienced fire fighters should attempt to extinguish substantial fires at the Site. Site personnel should not attempt to fight fires, unless properly trained and equipped to do so. Site personnel should not attempt to fight a fire if it poses a risk to their personal safety. GWTT personnel will also adhere to any site-specific requirements that Southern has in place regarding fire protection.

Note that smoking is not permitted in areas near flammable or combustible materials, or in areas designated by the facility as non-smoking areas. Personnel will smoke in designated areas only.

15.4 Site Evacuation

The SS will meet with Customer/Owner site supervision to identify evacuation routes and refuge areas to be used in the event of a Site emergency. The SS, or designated representative, will count and identify site personnel to verify that all have been evacuated safely.

15.5 Spill of Hazardous Materials

If a hazardous material spill occurs, Site personnel should locate the source of the spill and determine the hazard to the H&S of Site workers and the public. Attempts to stop or reduce the flow should only be performed if it can be done without risk to personnel.

Isolate the spill area and do not allow entry by unauthorized personnel. De-energize sources of ignition within 100 feet of the spill, including vehicle engines. Should a spill be of the nature or extent that it cannot be safely contained or poses an imminent threat to human health or the environment, an emergency cleanup contractor will be called out as soon as possible. Spill containment measures listed below are examples of responses to spills.

- Right or rotate containers to stop the flow of liquids. This step may be accomplished as soon as the spill or leak occurs, providing it is safe to do so.
- Sorbent pads, booms, or adjacent soil may be used to dike or berm materials, subject to flow, and to solidify liquids.
- Sorbent pads, soil, or booms, if used, must be placed in appropriate containers after use, pending disposal.
- Contaminated tools and equipment shall be collected for subsequent cleaning or disposal.

17. Drug Testing

GWTT will follow the GWTT Drug Testing Policy and protocols for drug testing. Drug and Alcohol Testing will be done by a professional testing services facility. Alcohol testing is only required under suspicion, post-accident, or reasonable cause situations.

Authorization forms will be filled out by GWTT and given to the collector/clinic each time drug testing is performed. Proper completion of this form will ensure that all appropriate information is used for testing, billing, and reporting.

All donors are required to show valid photo identification to the collector before a test will be performed. All donors must provide their full Social Security Number to take a drug screen.

There is a 3-hour time limit for contract workers to provide a specimen. If a specimen is not provided in 3 hours, it will be considered a refusal to test, which may be treated as a positive. If there is a medical reason as to why the donor is not able to provide a specimen, the donor may contact GWTT HR and Safety Director for review.

17.1 Fitness for Duty (Non-Negative Prescriptions)

GWTT employees with non-negative drug tests as result of a prescription medication will be verified by the MRO. Additional information may be required for employees in safety sensitive positions prior to returning to site. If the MRO's review of the non-negative test, results in a positive confirmation, the worker will be removed from site. Documentation used to evaluate contract employee's ability to safely perform his/her duties while taking prescription medication shall be kept in accordance with GWTT HR Policies.

18. Site Access

GWTT employees and Sub-Contractors must present an unexpired, "official" state or federal identification credential, which includes the individual's picture whenever requested.

20. Site Specific Barricade Procedure

A barricade tag will be affixed to all non-rigid barricades in a prominent location. Multiple barricade tags will be used when necessary (for example, large barricades or multiple approach paths). Barricade tags will be predominately orange in color and, at a minimum, include the following:

- Name
- Name of the person responsible for the barricade for each shift where work is being performed and means of contact (for example, radio or phone number).
- Date barricade was erected.
- Reason for barricade – include actual and/or potential hazard(s).

Attachment points for barricade tape will be approximately the same height as a standard upper handrail

Person(s) erecting non-rigid barricades shall ensure the required area is completely barricaded to prevent workers from accidentally entering the hazardous area. For example, in addition to barricading same-level access to the hazardous area, stairway and ladder access will also be barricaded.

When placing barricade tape, GWTT will ensure exits and emergency vehicle routes are not blocked, unless necessary for employee safety. The barricaded area will be of the appropriate size to delineate the hazard, but not so large as to create an unnecessary problem for normal pedestrian flow of traffic. The practice of securing barricade tape to buildings and other permanent structures often results in an excessively large, barricaded area. Suitable anchor points for the barricade tape will be selected. Stanchions, traffic cones, sawhorses, and other portable anchor points are preferred because they can be better positioned.

Barricades shall be maintained in good condition while in use; when no longer required, barricades shall be completely removed, including loops of tape tied around supports. Tape shall be properly disposed of if not properly stored for reuse. When non-rigid barricades are erected around excavations, they shall be placed at least 6 ft from the edge of the excavation.

20.1 Danger Barricades (Red)

Predominantly red (black striping is permissible) barricade tape printed with the word “DANGER” shall be used to erect barricades for areas that contain or may present an immediately dangerous to life and health (IDLH) situation. Activities or conditions warranting a red danger barricade may include areas:

- Where overhead lifts are being performed.
- Within the counterweight swing radius of cranes.
- Near steam or chemical leaks.
- Beneath ice accumulations.

Only persons who have participated in the Job Safety Briefing for the work and are directly involved with the activities/conditions associated with a red danger barricade shall cross the red danger barricade, unless permission is granted by the owner of the barricade or a crew member involved with the work.

20.2 Caution Barricades (Yellow)

Predominantly yellow (black striping is permissible) barricade tape printed with the word “CAUTION” shall be used to erect barricades for areas that present a possible safety hazard. Activities or conditions

warranting a yellow caution barricade may include: • A minor oil leak that creates a slippery floor.

- A tripping hazards
- Washing down

Workers should avoid crossing yellow caution barricades when possible. Persons not directly involved with the activities/conditions associated with the erection of a yellow caution barricade may cross a yellow caution barricade as long they understand the nature of the hazard and they can avoid the hazard.

20.3 Barricades – Protective (Rigid)

Rigid barricades are required for, but not limited to, the following situations:

- Floor openings and wall openings (See SCO-SH-0910, Floor Openings, Wall Openings, and Guardrail Removal Procedure)
- Unprotected floor edges or platforms, to include leading edge work
- Excavations adjacent to passageways and those where a fall hazard exists

20.4 Traffic Barricades and Signs

When barricades and associated signs are erected on or adjacent to public roadways, they shall conform to Part VI of the Manual on Uniform Traffic Control Devices Note: Part VI of the Manual on Uniform Traffic Control Devices provides guidance on signs and warning devices required when working on or adjacent to public roads.

20.5 Barricade Removal

In the absence of the responsible person the plant/project manager or his or her designee may remove a barricade after all attempts to contact the individual who placed the barricade have been exhausted and a thorough assessment of the hazards has been conducted.

21. Cold Stress

This procedure applies to all GWTT field operations where field crews are working outdoors in damp and cool (below 50 degrees Fahrenheit [°F] conditions or anytime temperatures are below 32°F.

21.1 Purpose and Scope

This purpose of this procedure is to protect project personnel from hypothermia and frostbite.

21.2 Implementation

Implementation of this procedure is the responsibility of the GWTT Project Manager directing activities of the facility, site, or project location.

21.3 Requirements

- Carefully plan work anticipated to be performed in cool or cold conditions. Include costs in project budgets for specialized equipment and supplies needed to complete the field activities.
- Monitor weather forecasts immediately prior to entering the field. If possible, schedule heavy work during the warmer parts of the day. Implement a work-warming regimen by taking breaks out of the cold.
- Observe and monitor weather conditions such as ambient temperature, wind speed, and precipitation while in the field. If needed, use Supplemental Information A to determine wind chill.
- Wearing the right clothing is the most important way to avoid cold stress. The type of fabric also makes a difference. Cotton loses its insulation value when it becomes wet. Wool, on the other

hand, retains its insulation even when wet. Adequate insulating dry clothing will be required in air or wind chill temperatures below 40 °F.

- Wear at least 3 layers of clothing to help prevent cold stress. It is important to preserve the air space between the body and the outer layer of clothing to retain body heat.
- Wear an outer layer to break the wind and allow some ventilation (e.g., Gortex® or nylon).
- Wear a middle layer of down, wool, or similar materials to provide insulation.
- Wear an inner layer of cotton or synthetic weave to allow ventilation.
- Wear a hat or hardhat liner. Up to 40 percent of body heat can be lost when the head is left exposed.
- Wear insulated boots or other insulated footwear, and insulated gloves to help reduce the chance of frostbite.

22. FIELD PERSONNEL REVIEW

This form serves as documentation that field personnel have read, or have been informed of, and understand the provisions of this SSHASP for the site. It is maintained on-site by the SS as a project record. Each field team member shall sign this section after training in the contents of this SSHASP has been completed.

I have read, or have been informed of, the Health and Safety Plan and understand the information presented. I have also completed site-specific training for the work detailed in the project Work Plan. I will comply with the provisions contained therein.

NAME (PRINT AND SIGN)	DATE

Appendix A: Template of Job Hazard Analysis Form

Ground/Water Treatment & Technology, LLC

JOB HAZARD ANALYSIS (JHA)

Activity Task:	Job Number:	Date:	{ } New { } Updated

Person(s) Completing Analysis:
Required/Recommended PPE: Safety glasses, hard hats, safety toed boots, high visibility vests, work gloves, and hearing protection as required.

This JAHA must be updated for changing conditions, when job steps change, or a new job step is introduced. JAHA should be specific to work areas or job sites for major tasks. This may include work area conditions, tools used, personnel, training requirements, equipment, regulations, etc..

	Task Steps	Analyze Hazards	Hazard Controls
1	Assess task area	▪ Slips/trips	▪
2	Fill STARRT Form	▪ none	▪
3		▪	▪
4		▪	▪
5		▪	▪
6		▪	▪
7		▪	▪
8		▪	▪

Employee STOP Work Authorization

"I have the right and obligation, when knowledgeable of job hazards, to Stop Work, without fear of reprisal, to protect co-workers, others and myself from imminent hazard situations." **Employees are expected to stop working when they encounter one of these conditions and notify their supervisor. If an employee feels an issue has not been addressed adequately, they have the responsibility to raise the issue to a higher level.**

NOTE: Have employees drink plenty of water to avoid overheating. Assure that all employees know the evacuation route and assembly point. Post emergency contact numbers so all employees have access to them. Complete GWTT STAART before starting ANY task. Verify all permits have been obtained and are onsite before commencing work.

End of Day/Inclement Weather Procedures---At the end of each day or prior to a known weather event every effort will be made to secure the ends of all pipes and barricade the area to prevent unauthorized entry.

AT ALL TIMES: Be aware of Insects and other wildlife when moving or picking up of materials.

Ground/Water Treatment & Technology, LLC

JOB HAZARD ANALYSIS (JHA)

Activity Task:	Job Number:	Date:	{ } New { } Updated

Reviewed by Superintendent.	Date:	Approved by Safety:	Date:

EMPLOYEE JAHA REVIEW SIGNATURE PAGE

Print	Signature	Date	Print	Signature	Date

Appendix B: Job Hazard Analysis

General Physical Hazards and Controls	
Potential Hazards	**Controls**
All Hazards	• Manage projects so that adequate time is allowed to complete tasks • Manage projects so that proper equipment is available • Maintain and encourage a positive safety attitude/culture • **Look out for yourself and others at the site; provide feedback to each other on safety performance** • **Report near misses and safety observations** • Employees must review this Health and Safety Plan prior to work, and a copy must be available at the work site • Reevaluate the Job Safety Analysis daily; consider changes in weather conditions, work activities, and other site conditions • Complete STARRT forms daily

General Physical Hazards and Controls	
Potential Hazards	**Controls**
Heavy Equipment / Forklift	• Operators shall be qualified or licensed to operate. • Discuss work activities and location of ground personnel with equipment operators prior to work • Wear high-visibility clothing • Identify all energized contacts in the work area (overhead or subsurface) • Stay away from equipment when possible • Make eye contact with the operator prior to approaching equipment • Have the operator de-energize equipment prior to approaching • Watch out for blind spots • Inspect equipment prior to work and repair or replace defective equipment. • Operators must maintain three points of contact when entering and exiting equipment. • Engineering controls shall be employed to minimize particulate dust.
Drilling Operations	• Operator to inspect drill rig initially and daily. • Barricade work area. • Identify all energized contacts in the work area (overhead or subsurface) • Stay clear of drilling operations, especially the rotating auger and cables. • Know the location of and test emergency stop switches. • Never place hands on rotating equipment. • Recognize and avoid pinch and crush points. • Keep work area neat and organized.
Crane Operations	• Operator shall be certified for the specific type of crane utilized. • Crane shall be inspected initially upon arrival and daily by the operator. • Identify overhead power lines or other factors limiting operation. • Barricade crane's swing radius. • Crane operator's spotter shall be qualified and **pre-assigned**. • Assure the Anti-Two Blocking device is in place and working. • Loads shall be properly assessed for rigging. • Tag lines shall be applied to all loads. • Never pass under a suspended load or pass suspended loads over personnel. • Crane boom shall be retracted at the end of the workday. • Operators must maintain three points of contact when entering and exiting equipment. • Pre-discuss temporary suspension of crane operations if wind speed is forecasted to exceed 20 mph.

General Physical Hazards and Controls	
Potential Hazards	**Controls**
Rigging Safety	• Inspect all rigging devices prior to use. • Ensure project rigging possess a discernible manufacturer's label • Use softeners when rigging around sharp edges. • Assure rigging hitch when used is safe for the load weight and size. • Refer to rigging handbook for determining safe equipment selection and use. • Properly store rigging in a dry location free from damage.
Underground Utilities	• Call one-call utility locator (811) at least three days prior to subsurface activities • Mark dig locations when possible • Use all possible clues to identify/locate utilities (asphalt patches, meters, as-build drawings, facility operators) • Hire a private utility locate company if questions regarding utility locations remain. • Manually clear depth to approximately 54" prior to mechanized excavation.
Overhead Utilities	• Note the location of overhead utilities prior to work • Identify line voltage • Maintain a safe distance from utilities • When heavy equipment is in use, mark the location of overhead lines with signs at ground level
Excavations and/or Trenching	• Excavation deeper than four feet (1.2 meters) deep must be appropriately sloped and/or shored • A competent person must inspect the excavation daily and issue an excavation/trenching permit prior to entry • Avoid entry when possible by collecting samples from equipment buckets or by using long-handled scoops • Never stand adjacent to an open excavation due to the potential for the ground to cave in below you • Some excavation may be considered confined spaces
Noise	• Use hearing protection when heavy equipment is operating • Use hearing protection when operating portable power equipment • Use hearing protection in work areas when normal conservation cannot be heard due to background noise.
Driving/Vehicle Safety	• Inspect vehicles before use • Avoid driving when drowsy • Obey traffic rules • Use extra caution when entering roadways or backing • Completely exit roadways to park • Do not operate vehicles in unsafe conditions (e.g., on steep slopes, in deep mud)

General Physical Hazards and Controls	
Potential Hazards	**Controls**
	• Summon proper assistance if stuck. • Do not use cell phones and avoid other distractions when operating vehicles • Secure all loads, including equipment within the cab • Wear seat belts • Leave enough time to get to your destination without hurrying • Never follow to close • Avoid backing when possible • Be aware of heavy equipment and do not park or conduct work in the blind spot of the equipment operator; remember that “blind spots” of some equipment can be very large • Verify back-up alarms are functional for all heavy equipment; for pick-ups or SUVs with obstructed rear view, a back-up alarm or use a spotter when backing up
Cold Stress	• Stay inside when possible during extreme cold. • Hypothermia condition awareness and prevention. • Schedule outdoor work during mild weather • Stay dry • Dress in layers • Have a warm hat and socks available • Take breaks in heated areas
Heat Stress	• Stay inside when possible during extreme heat • Drink plenty of liquids early and often throughout the day. • Take breaks in a cool area as necessary • Wear a hat and use sunscreen • Wear loose fitting, light colored clothing • Moisten clothing to promote cooling • Use work / rest regiments when working in chemical protective clothing. • Acclamation to working in heat takes time (~1 week) in general. • Avoid excessive alcohol or caffeine the night before work
Severe Weather	• Check the radio or internet for severe weather warnings • Check road conditions with the state highway department • During high winds watch for blowing doors, gates, and other objects • During electrical storms follow the 30/30 rule – if you hear thunder with 30 seconds of seeing lightning, take a 30-minute break • Know safe locations and/or evacuation routes in case of severe weather such as hurricanes and tornadoes

General Physical Hazards and Controls	
Potential Hazards	**Controls**
Lifting	• Healthy employees should lift no more than 50 pounds. Test lift loads. • Get help to lift heavy objects • Bend at the knees; do not use your back • Do not twist during lifts • Minimize the movement of heavy objects • Carry loads should not obstruct forward vision. • Stretch before lifting • Store heavy objects on the ground or below waist height.
Sharp Objects	• Wear appropriate work safety-toe boots and work gloves • Use caution when working with any hand tool • Keep blades or cutting edges sharp • Use safe cutting tools instead. • Tools with fixed blades or pocketknives are prohibited. • Periodically inspect tools and equipment to ensure that they remain in good operating condition
Hand Tools and Portable Power Equipment	• Inspect all hand tools and portable powered equipment prior to use. • Use the correct tool for the task. • Select and use the proper PPE for the tool or equipment used. • Keep cutting tools sharp and sheathed. • Route electrical tools through a fixed or portable Ground Fault Circuit Interrupter (GFCI). • Use tool pouch to safety store tools when working overhead. • Use hearing protection with portable power tools. • Take damaged tools and equipment out of service and repair or replace.
Ladders	• Inspect ladders prior to use. • Use the correct ladder for the task • Select a ladder storage area and properly store ladders. • Limit the use of step ladders to minimal light tasks. • Take damage ladders out of service and repair or replace. • Do not use metal ladders near power lines.
Slips, Trips, and Falls	• Maintain good housekeeping • When possible, avoid steep and uneven terrain • Wear sturdy boots with good tread • Keep the work area free from water, ice or debris • Literally, watch where you step – mark slip, trip, fall hazards with flagging, etc. • Take the time to find a safe route to the desired location

General Physical Hazards and Controls	
Potential Hazards	**Controls**
	• Do not perform any activity with a fall exposure of 6 feet (1.8 meters) (construction industry) or 4 feet (1.2 meters) (general industry) or more without using fall protection • Use tool caddy or other equipment to avoid carrying to many items.
Aerial Lift Operations	• Trained personnel shall operate aerial lifts. • Inspect equipment daily. • Fall protection shall be worn and workers tied-off while in articulated boom lifts. • Operate in **"slow"** mode only. • Do not stand on rail system. • Security chains or self-closing safety gates must be operable on both types of aerial lifts (scissor and articulated) • Properly barricade all overhead work areas.
Vehicle traffic	• Contact the responsible authority for the road to determine if a right-of-way permit is required • For road blockages use a combination of orange cones and vehicle placement to ensure the work zone is protected. • Wear ANSI Class 2 high-visibility vests. • Expect the unexpected
Fire/Explosion	• Implement GWTT Hot Work Permit • Keep flammable and combustible materials properly stored. • Turn off equipment prior to refueling. • Smoke only in designated areas. • Do not park equipment over high grassy areas.
Confined Space Entry	• Entry to a confined space requires training, air monitoring, special equipment, and rescue provisions. • Simply crossing the plane of the space with any part of your body is considered an entry. • Entry into excavations with a depth four feet shall be initially assessed as confined space. • Refer to GWTT Confined Space Program
Electrical Safety	• Route electrical tools through a fixed or portable Ground Fault Circuit Interrupter (GFCI). • Use heavy duty extension cords. • Route extension cords in a manner that prevents tripping. • Safely take unsafe electrical appliances or tools out of service. • Servicing of electrical systems shall be performed by qualified or authorized personnel only.
Hot Work	• Welding areas shall be properly barricaded and screened. • Work areas shall be inspected for combustible / hazardous materials prior to commencing work. • Work areas shall possess a portable fire extinguisher.

General Physical Hazards and Controls	
Potential Hazards	**Controls**
	• A fire watch shall be assigned to remain on duty 30 minutes after activities.
Falls from Heights	• Workers shall be trained in the safe selection and use of fall protection systems and components thereof. • Select and use solid anchoring points located directly overhead of worker to minimize pendulum swing and struck against injuries in the event of a fall. • Use fall limiters as opposed to lanyards with deceleration device. • Inspect entire fall arrest system prior to use. • Use an aerial lift to safety rescue a fallen worker within 15 minutes of suspension. • PPE used in a fall situation shall be taken out of service and replaced.
Scaffolding	• Properly constructed and inspected by Competent Person • Fall protection required for those involved with scaffold construction. • Daily inspection and tagging system stating Use or Do Not Use. • Minimal storage of tools, materials, and equipment on scaffold towers. • Barricaded work areas below.

Chemical Hazards and Controls	
Potential Hazards	**Controls**
Chemicals of Concern	• Properly select chemical protective clothing and gloves based on the contaminants of concern. • Develop and implement engineering, administrative and PPE controls. • Monitor wind conditions during intrusive and waste handling operations. • Minimize the handling of contaminated materials. • Contain or cover contaminated materials to minimize release of vapors or particulate. • Using good personal hygiene practices; wash hands and face prior to eating or drinking) • Utilize the “Buddy System” in exclusion zones and other hazardous operations. • Properly containerize and label all project related waste. • Refer to provisions throughout this HASP • Refer to MSDS or NIOSH Pocket Guide Reference
Lead Paint Abatement	• GWTT will hire a New York state certified and licensed Lead Abatement contractor (Contractor) to remove lead containing finished from areas specified in the Scope of Work. • The Contractor shall develop a separate Lead Abatement Plan specifically for their operations to be submitted to GWTT prior to the commencement of work. • The Contractor shall furnish MSDS for all hazardous materials required for the work. • The Contractor shall assess potential effects of vapors and gases associated with the hazardous materials utilized and take the necessary precautions to properly protect building ventilation systems, building personnel and workers from exposure to such gases or vapors. • The Contractor shall properly remove and containerize all process related waste and properly label waste containers with content and date. • Work area shall have limited access to properly trained and protected workers. Access areas shall be complete with warning signage.
Hazardous Materials	• Material Safety Data Sheets (MSDS) must be available for all chemicals and brought on or used on site. • MSDS shall be displayed in an area where all project personnel are aware. • Label all containers with chemical name and hazard warning. • Use protective gear recommended on the MSDS • Store and dispose of hazardous materials in accordance with the MSDS.

Chemical Hazards and Controls	
Potential Hazards	**Controls**
Particulate Dust	• GWTT shall monitor exclusion zone perimeters during intrusive operations that have a potential to generate particulate dust using a pDR 1000 portable instrument. • GWTT shall employ wetting methods to minimize dust generation points when the action level for particulate dust is exceeded. • Workers performing pavement cutting operations shall select and use portable powered equipment that has associated with it a hose fitting to connect a potable water source to keep the blade wet and cool while operating. • Workers handling masonry raw materials shall handle materials safely with the proper PPE and properly don a N95 particulate dust mask or a half or full-face respirator equipped with a P100 cartridge.

Biological Hazards and Controls	
Potential Hazards	**Controls**
Stinging and Biting Insects	• Visually inspect work areas for insect activity (i.e., swarming, nesting) especially when working around crevices or eves. • Avoid reaching into dark or shaded areas where spiders may be nesting. • If necessary, to destroy a nest of hornets, wasp or other stinging insects best to do so by delivering a stream of insecticide on the nest early in the morning or late in the afternoon. • When using insecticides be sure no water or soil sampling is being conducted.
Vector borne disease	• Hantavirus may be present in mouse droppings or nesting materials • Histoplasmosis may be present in bird droppings • Do not generate dust from areas impacted by mouse or bird droppings • Eliminate locations for potential mouse and bird nests in equipment storage areas • Stay away from all animals especially if they appear to be ill or injured
Others	• Use caution when lifting objects that may provide shelter for spiders, snakes, hornets, and rodents • Use repellant with DEET if mosquitoes are a problem at the site • Livestock, domestic animals, and wild animals are all biological hazards to consider. • Be aware of ticks if working in a wooded area.

Appendix C: Applicable SOPs and Forms

- Cell Phone Policy
- Concrete and Masonry
- Confined Spaces
- Cranes and Rigging
- Electrical
- Emergency Procedures and First Aid
- Fire Protection and Prevention
- General PPE
- Hazard Communication
- Housekeeping
- Illumination
- Ladders
- Maintenance and Protection of Traffic
- Manlifts
- Material Handling
- Motor Vehicles and Equipment
- Noise Exposure
- Respiratory Protection
- Sanitation
- Scaffolds
- Silica
- Spill Response Procedures
- Tools
- Trenching and Excavation
- Welding and Cutting
- Zero Tolerance Policy

Appendix D: Job Specific Work Permits Required

ORR Agenda

A. For planning purposes, the CONTRACTOR shall assume that each readiness review session will take a minimum of 2 hours. The session shall be attended by the following CONTRACTOR and subcontractor staff:

1. CONTRACTOR: The CONTRACTOR shall have the following staff in attendance:

    a. Project Manager
    b. Superintendent
    c. Field ENGINEERs
    d. Quality Control personnel
    e. H&S personnel
    f. Plant operators

2. Subcontractors: All Subcontractors that will be involved in that particular phase of work. Each subcontractor shall have the following staff in attendance:

    a. Project Manager
    b. Superintendent
    c. Working Foreman

B. The following is the agenda for each readiness review session:

1. Introductions (sign-in sheet)

2. Purpose (to confirm and document the readiness of project team)

3. Roles and Responsibilities

4. Communication Protocol
    a. OWNER and CONTRACTOR (primary points of contact)
    b. Weekly Progress Updates at Weekly Job Meetings
    c. Communication with Regulatory and Public Agencies
    d. Communication with the Public/Community

5. Weather Protocols
    a. Earth Quake Procedures
    b. Flood & Evacuation Procedures

6. Lockheed Martin Rules
    a. Lockheed Martin Required Site Safety Orientation
    b. Site Access Control
    c. Health and Safety
    d. No tobacco use onsite, professional attire and behavior

e. Minimum PPE requirements (reflective vest, steel toe boots, safety glasses, long pants, hard hat, hearing protection when near noisy machinery)
f. Daily Tailgate Safety Meetings
g. Permitted Work Hours and Days
h. Noise and Traffic Requirements
i. Deliveries (including MSDS pre-approval for all chemicals)
j. Equipment and Material Storage Requirements

7. Review Scope of Construction Work/Operations (discuss in detail sequence of work, Subcontractors involved, equipment, materials, etc.)

   a. Site Preparation Activities (temporary offices/facilities, erosion control and temporary stormwater controls, site access and haul routes, material and equipment staging areas, test labs in place, surveying, etc.)
   b. Construction Activities
   c. Startup and Testing
   d. Operations
   e. QA/QC
   f. Health and Safety
   g. Special Environmental Requirements (transportation and disposal procedures, air monitoring, soil disposal, water disposal, waste management, sampling & analysis, storage of fuel onsite, etc.)
   h. Interfacing with Existing Facilities and Contractors
   i. Cleanup and Demobilization
   j. Record Keeping
   k. Inspections

8. Documentation Readiness

   a. OM&M Manual
   b. Work Plans
   c. Permits and Notices
   d. Test Reports
   e. Calibration Records
   f. Product Data/Cut Sheets
   g. Photographs/Videos
   h. Well Logs & Other Construction Reports
   i. Operator Exams
   j. Maintenance Tool Inventory
   k. Startup and Testing Procedures
   l. Other Pre-Work or Startup and Operations Procedures
   m. Certificates (OSHA Hazwoper, state licenses, certificates of disposal, etc.)
   n. Bill of Materials
   o. As-Built Drawings

9. Equipment Readiness

   a. Review Checklist

b. Physical Inspection and Positive Verification that Installed Equipment Meets Project Requirements
c. Check As-Builts
d. Testing and Acceptance of Piping, Equipment, and Systems (check inspection records, test results, local/state agency certificates in place to occupy or operate, etc.)
e. Construction Equipment Readiness (no leaking hoses, etc.)
f. Inspect Systems (electrical, mechanical, HVAC, I&C, and structural)

10. Material Readiness

    a. Positive Verification that Materials Received Onsite Match Project Requirements
    b. Type and Quantity of Materials Onsite
    c. Materials Laydown and Storage
    d. Security

11. Construction/Operation Worker Readiness (are workers qualified and ready to perform their duties?)

    a. Walkthrough of Equipment, Systems, and Controls
    b. Mimic SOPs and DOPs in the Field
    c. Review Regular System Checks

Lockheed Martin Corporation

Operations Readiness Review Compliance Checklist

	Location/Project Name:				
	Type of Work:				
	Date:				
	Completed by:				
No.	**Item**	**Yes**	**No**	**N/A**	**Comments**
	Permits and Notifications				
1	Verify all regulatory permits are in hand and copies are at the site				
	Safety Systems				
2	Do all workers have the required PPE available? Review the required PPE.				
3	Are any special PPE required for hazardous conditions at the site (carbon/chemical handling, electrical arc flash, etc.)				
4	Has an arc flash study been performed, and are arc flash labels present on ALL electrical panels?				
5	Is a current, complete and signed HASP readily available to all working at the site?				
6	Hazardous Material Summary Correct and up to date?				
7	Are MSDSs available and have they been reviewed for all on-site chemicals? Verify location of MSDS's.				
8	Has a joint Lockheed Martin and contractor safety walkthrough been performed?				
9	Are obstacles such as low overheads, step-ups, and step-downs clearly marked?				
10	Is work area lighting adequate?				
11	Are escape routes/emergency exits provided and identified?				
12	Have signs requiring hearing protection, no smoking, warning for presence of any hazards, load rating of elevated walkways, exclusion zones, emergency contact numbers, etc. been prominently displayed?				
13	Do the workers know who to call in the case of a life or death emergency?				
14	Do the workers know who to call in the case of a chemical spill greater than 5 gallons?				
15	Are fire extinguishers present?				
16	Have all workers been trained on the use of the fire extinguishers?				
17	Are personal injury hazards (e.g. protruding bolts, sharp edges) identified and mitigated?				

No.	Item	Yes	No	N/A	Comments
18	Have site tripping hazards or “head knockers” been identified and addressed?				
19	Have emergency shutdown devices been verified to be operating properly?				
	Building/Facility/Grounds				
20	Are all applicable utilities in working order (water, sewer, power, phone, internet, compressed air)				
21	Verify the work area is in a neat condition and clear of all obstructions and debris. Verify the floors are swept clean and work areas are neat and organized.				
22	Has Lockheed Martin conducted a housekeeping inspection of all working areas including offices?				
23	Verify that all hoses and electrical cords are rolled up and stored appropriately (not left out for trip hazard).				
24	Is all waste being stored and labeled per regulatory requirements?				
25	Will wastes generated be disposed of at a facility on the Lockheed Martin approved list?				
26	Are secondary containment structures and drum pads in place?				
27	Are trash and recycling receptacles in place?				
28	Are restroom facilities available to workers?				
29	Is all equipment properly grounded?				
30	Have all interior and exterior facility lighting systems been checked and functioning properly?				
	Workers				
31	Have all onsite personnel received site-specific safety orientation?				
32	Are all on-site personnel properly trained by individual equipment vendors to operate specific pieces of equipment?				
33	Verify that the workers know their chain of command and who to call in the case of an emergency.				
34	Do workers know what to do in the event of a chemical spill?				
35	Do workers know what to do in the event of a severe weather event (tornado, flood, hurricane)?				

OSHA 301 Equivalent

Claim Number/Reference Number_____

INCIDENT/ACCIDENT INVESTIGATION REPORT

Project Information:

Project Name and Number_____Date of Report _____

Date of Incident _____ Time Incident Occurred _____Safety Rep contacted_____
Print Name

Name of Person Who Reported Incident _____ Date Reported _____
Print Name

Name of Supervisor reported to _____ Time Reported_____
Print Name

Type of Incident: (check all that apply)
☐ Injury ☐ Property Damage ☐ Vehicle Incident ☐ Hazardous Condition ☐ Theft ☐ Water Damage ☐ Criminal Threat ☐ Bomb Threat ☐ Violence Threat

Person Involved in Incident: (**If more than one person involved list additional names and personal information on page 5**)

Name _____ Date of Birth _____ SS# _____
For Worker's Compensation only

Address _____State_____Phone_____

GWTT Employee ☐ Yes ☐ No If no, Employer Name:_____

Date of Hire _____Employee's occupation _____Sex ☐ Male ☐ Female

Supervisor _____ Time employee reported to work _____ ☐ AM ☐ PM
Print Name

Type of injury and body part affected _____

Is injury believed to be job related ☐ Yes ☐ No ☐ Unknown?

Facility (include address) where treated _____

Was injured treated in emergency room? ☐ Yes ☐ No Was injured hospitalized overnight as an in-patient? ☐ Yes ☐ No

Drug/Alcohol test done? ☐ Yes ☐ No If yes, where and who has results?

Were any authorities involved? If yes, Police Fire Other Report Number

Name: _____Contact Information: _____

Were others injured? ☐ Yes, identify separately on page 5. ☐ No

Recording Information: (check all that apply)
☐ First Aid Only (Provided by _____) ☐OSHA Recordable ☐Non-recordable

☐Restricted Work ☐Lost Work Days _____(Date return to work _____)

☐I do not wish to be provided medical treatment at this time. _____
(Employee Signature) and Print Name

☐ Date released from "Modified/Light Duty": _____

OSHA 301 Equivalent

Claim Number/Reference Number_____

INCIDENT/ACCIDENT INVESTIGATION REPORT

Incident Information:

Detailed description of Incident (Who, What, Where, Why, When, and How)

Description of property damage:

Value of property damage _____ Owner of property/material _____

If this is a vehicle: Make_____ License number: _____ Drivers License #: _____

GWTT vehicle: ☐ Yes ☐ No Private vehicle: ☐ Yes ☐ No

Auto Insurance Information: Insurance Company:_____Phone:_____

Location of damaged property/material _____

Witness(s) _____
Name Address Contact Day Phone

Witness(s) _____
Name Address Contact Day Phone

Claim Number/Reference Number_____

INCIDENT/ACCIDENT INVESTIGATION REPORT

Cause Factors: (All must be answered or "Not Applicable")

Weather conditions: ☐Rain ☐Wind ☐Sun ☐Fog ☐Ice
Details: _____

Site conditions: ☐Mud ☐Dust ☐Lighting ☐Unprotected hazard
Details: _____

Housekeeping: ☐Debris ☐Cords/hoses ☐Building materials
Details: _____

Personal conditions: ☐Physical ☐Prescription meds ☐Non-prescription meds
Details: _____

Equipment: ☐ Damaged ☐ Malfunction
Details: _____

Criminal: ☐ Vandalism ☐ Mischief ☐ Theft ☐ Trespassing ☐ Vagrant ☐Weapons
Details: _____

Bomb Threat: Location of Bomb: _____
☐Phone Location ☐ Mail

Violent Threat: _____
☐ Against property ☐Against people ☐ Loudness/profanity ☐ Possession of a weapon

Other Comments:

Corrective Actions:

Claim Number/Reference Number_____

INCIDENT/ACCIDENT INVESTIGATION REPORT

What actions have been taken or are planned to be taken to prevent recurrence of this or similar incidents?

Report prepared by:_____ _____ Signature _____
Print Name

Employer GWTT: ____ Other:_____ Title/Position:_____

Authorized Signature: _____ Date _____
(Print and Sign)

Claim Number/Reference Number: _____

SUPPLEMENTAL INFORMATION STATEMENT

1. Complete form as necessary for incident.
2. Have each witness complete separate statement.

Date of Incident: _____ Time of Incident: _____

Name of Individuals involved: (1) _____ (2) _____

(3) _____ (4) _____

Describe exactly what you observed. If you only heard something, observed only the aftermath of the incident or only know what was told to you by someone else, please explain that. Describe where you were when the incident occurred:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Name of Person Completing Form: _____ Signature: _____

Print Name

Phone Number of Person Completing Form: _____ Date of Statement: _____

Ground/Water Treatment & Technology, LLC Page 1 of 2

Date _____ **DAILY LOG** **Job No.** 3727

Client WOOD **Job Name** SSD Booster System **Attachments** Yes X

Location: New Hyde Park, NY No _____

Work Performed:

Weather Description

Temp °F Low Hi

Tailgate Meeting Topics

Work Force	ST	OT/DT
Field Engineer:		
Superintendent:		
Other:		
Subc: Ticket Attached. L 66	OT	OT
Other:	ST	OT
LEB - Ticket # xxxx	ST	OT
Advanced Utility Locating	ST	OT
Tom Nucatola	n/a	n/a
Total:		

Material:	Equipment:

Testing/Results: *None*

Delays: *None*

Directions From Engineer: *None*

Health & Safety Issues: *None*

Other: None

Signature below indicates that the party representative agrees that the above information is an acceptable account of the field work conducted for this day

GWTT Representative Kevin J Marchut **Date** 1/0/1900

Client Representative _____ **Date** _____

Ground/Water Treatment & Technology, LLC

Date 1/0/1900 **DAILY LOG**

Client WOOD **Job Name** SSD Booster System **Page** 2 **of** 2

Location: New Hyde Park, NY **Job No.** 3727

Work Performed Con't from pg. 1:

Signature below indicates that the party representative agrees that the above information is an acceptable account of the field work conducted for this day

GWTT Representative *Kevin J Marchut* **Date** *1/0/1900*

Client Representative _____ **Date** _____

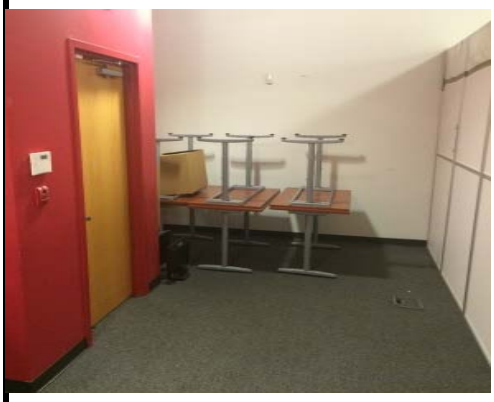
Ground/Water Treatment & Technology, LLC

Date 1/0/1900 **DAILY LOG**

Client WOOD **Job Name** SSD Booster System **Page** 2 **of** 2

Location: New Hyde Park, NY **Job No.** 3727

Work Performed Con't from pg. 1:

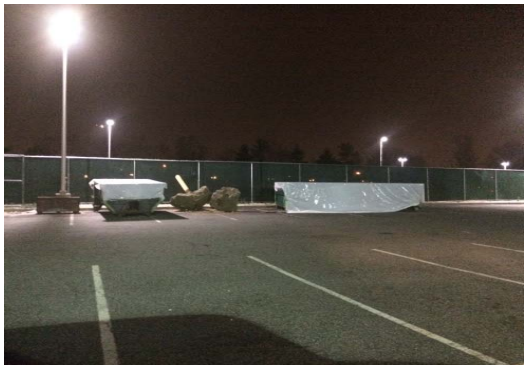


Above: 12/11 - Desks Moved and Stacked from 12/10

Above: 12/11 - Vault Wall and 3rd Borehole with Vault Bottom

Above: 12/11 - Vault Bottom approx 7-ft bgs

Above: 12/11 - Secure Trench



Above: 12/11 - Covered Dumpsters

Signature below indicates that the party representative agrees that the above information is an acceptable account of the field work conducted for this day

GWTT Representative Kevin J Marchut **Date** 1/0/1900

Client Representative _____ **Date** _____

GWTT
Ground/Water Treatment & Technology, LLC

627 Mt. Hope Road
Wharton, New Jersey 07885
Tel: (800) 770-0901
(973) 983-0901
Fax: (973) 983-0903

Hot Work Permit

Date _____ **Time** _____

Issued to: GWTT **Job Name** _____ **Job No.** _____

	Yes	No
Work Performed Today_____		
_____		
1. Can job be done outside in a safe area rather than in the building?	____	____
If no, give reason (such as weather): _____		
_____		
_____		
2. Have all process materials (solids, liquids, gasses) been removed from the equipment?	____	____
3. Have all lines been disconnected, blanked or locked-out?	____	____
4. Has an explosimeter test been taken?	____	____
Results:_____		
Signature of tester: _____		
5. Has fire watch been set up?	____	____
6. Is fire extinguisher or water hose available for fire watch?	____	____
7. Can flames or sparks ignite material in vicinity or on a lower floor level?	____	____

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AERIAL LIFT INSPECTION FORM

Equipment ID No.	Hour Meter Reading	Pre Shift	Post Shift

Equipment Name:	Week Ending:

ITEM INSPECTED	Check if Satisfactory	MON	TUE	WED	THR	FRI	SAT
Manufacturer's Operations Manual							
Travel Alarm							
Fall Protection Anchor Points							
Brakes							
Lights							
Horn							
Informational Plate Markings							
Fire Extinguisher							
Hydraulic Systems							
Hydraulic Fluid Level							
Hydraulic Controls							
Gauge and Instrument Operations							
Tires							
Steering							
Guardrails / Safety Chains							
Cables and Wires							
Platform							
Outriggers							
Electrical System							
Battery Charge							
Engine Compartment							
Oil Level							
Fuel Level							
Coolant Level							
Operator's Initials							

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Heavy Equipment Inspection Form

Equipment ID Number_____ Operator's Name _____

Equipment Name_____ Employee Number_____

Begin Hours_____ End Hours_____ Date_____

ITEM INSPECTED	Check if Satisfactory	MON	TUE	WED	THR	FRI	SAT
Equipment Operation Manuals Available							
Falling Object Protective Structure (FOP)							
Roll Over Protection Structure (ROP)							
Seat Belt							
Operator Seat Bar							
Side Shields, Screens , or Cab							
Lift –Arm Device							
Grab Handles							
Back-up Alarm – Operational							
Lights							
Guards							
Horn							
Windshield Wiper							
Glass, Mirrors							
Anti-Skid Tread Clear of Mud							
Safety / Warning Signs, Various Locations							
Fire Extinguisher							
General Condition							
Fuel Connection							
Fluid Levels (Engine & Hydraulic System)							
Controls Function Properly							
Parking Break							
Steering							
Tires / Track							
Lift Arms and Bucket							
Operator's Signature							

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Traffic Control Device Inspection Checklist

Project Name _____ **Project Number** _____

Inspect the following items:			
	YES	NO	NA
Are any devices missing?			
Do any devices need repair?			
Were all replaced or repaired?			
Notes:			
2. Are any lights (flashers, etc.) not functioning?			
Were they all replaced or repaired?			
Notes:			
3. Are any devices improperly placed?			
Were all positions corrected?			
Notes:			
4. Do any devices require cleaning?			
Were all devices cleaned?			
Notes:			

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Traffic Control Device Inspection Checklist

5.			
Notes:			

Remarks:

Inspector Name _____ **Date of Inspection** _____ **Time** _____

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Lockout/Tagout Permit

Equipment / System to be Isolated

Building:_____ **Floor:**_____ **Panel:**_____

Other Location:_____

Purpose of Isolation:_____

Type of Isolation:_____

Authorized Employee:_____ **Date:**_____

Special Instructions:_____

Lockout / Tagout Performed:_____

Tag No.	Device No.	Blgd / Floor/ Panel / Other	Installed By	Removed By

Verification System Is Safe for Specific Work to Start

Authorized Employee: _____ **Date:**_____ **Time:**_____

Accountability - Accepts Protection

Requesting Authority:_____**Date:**_____**Time:**_____

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Lockout/Tagout Permit

Accountability Releases Protection

Requesting Authority:_____**Date:**_____**Time:**_____

Lockout / Tagout Removal Authority

Authorized Employee:_____**Date:**_____**Time:**_____

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Excavation/Trenching Permit

Authorization Number _____Competent Person_____

Project Name_____Excavation/Trench Location_____

Date/Time Permit Valid_____Date/Time Permit Expires_____

Description of Special Procedures:

ESTIMATED DIMENSIONS						SOIL TYPE		
Depth=						Stable Rock		
Top=	W		L			Type A		
Bottom =	W		L			Type B		
SOIL ANALYSIS METHOD USED						Type C		
Visual		Manual		Tabulated Data		Avg. Compression Strength:		tsf
						Compression Strength Data:		

SOIL CHARACTERISTICS				MANUAL TEST USED			
Cemented		Plastic		Plasticity		Dry Testing	
Cohesive		Dry		Dry Strength		Other	
Layered		Moist		Ribbon			
Fissured		Saturated		Thumb Penetration			
Granular		Submerged		Pocket Penetrometer			

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Excavation/Trenching Permit

PROTECTIVE SYSTEMS Protective systems for excavations / trenches deeper than 20 feet must be designed and approved by a Registered Professional Engineer.				UTILITIES	
				One Call Service Notified	
				Utilities marked by Public Utility	
				Property Owner Contacted	
				Utility Drawings Reviewed	
SLOPING and BENCHING				Private Utility Locating Company Utilized	
ESTIMATED DIMENSIONS				SOIL TYPE	
PROTECTIVE SYSTEMS Protective systems for excavations / trenches deeper than 20 feet must be designed and approved by a Registered Professional Engineer.				UTILITIES	
				One Call Service Notified	
				Utilities marked by Public Utility	
				Property Owner Contacted	
				Utility Drawings Reviewed	
SLOPING and BENCHING				Private Utility Locating Company Utilized	
Vertical (90°)		11/2:1 (34°)		Name of Utility Locating Company:	
¾:1 (53°)		2:1 (26°)			
1:1 (45°)		Other			

SHORING SYSTEM / METHOD		KNOWN OBSTRUCTIONS			
Timber		Electrical		Drain	
Aluminum Hydraulic		Telephone		Process	
Trench Shield		Water		Footing	
Trench Box		Sewer		Pilings	
Designed Protected System		Steam		Concrete Encasement	
Other:		Alarm		Other:	
OTHER		OTHER			
Means of Safe Egress Required		Means of Egress Required			
Confined Space Permit Required					

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Excavation/Trenching Permit

SPECIAL INSTRUCTIONS and WORK INSTRUCTIONS

All unsafe conditions must be corrected prior to excavation entry. If any hazardous conditions are observed, the excavation must be evacuated immediately and entry prohibited until all corrective actions have been taken under the supervision of the Competent Person.

APPROVAL SIGNATURES and DATES			
TITLE	**PRINT NAME**	**SIGNATURE**	**DATE**
Excavation Competent Person			
Client Representative (if applicable)			
Site Superintendent / Supervisor			
Project Manager			
Subcontractor Representative			
Other : Title			

Lockheed Martin Minimum Requirements for Intrusive Fieldwork Work Plans

PURPOSE

The purpose of this requirements document is to prevent damage to subsurface and overhead utilities and structures and unexpected chemical releases during ground disturbance activities such as drilling, augering, direct-push technologies, excavation, trenching, chemical injection, grading or other similar operations.

SCOPE

This document provides minimum requirements for subsurface clearance activities, which must be followed prior to and during ground disturbance activities at any Lockheed Martin remediation project sites. Even after completing the subsurface clearance activities identified in this procedure, all ground disturbance activities shall proceed with caution.

This document also provides requirements on implementing in situ chemical injection programs, on managing significant field changes in field work plans and worksite housekeeping.

The Lockheed Martin Project Lead (PL), the managing contractor, and the performing contractor will be responsible for fulfilling the objectives of this document by ensuring that these requirements are carried out by the performing contractor's employees, sub-contractors and their employees and any other persons involved in the intrusive activity. The work requirements outlined below shall be incorporated into the work plan.

WORK REQUIREMENTS

General

The performing contractor's project manager and the supervisor of the intrusive field work subcontractor must review and sign the Risk Handling Checklist and complete Dig Permit found within the Corporate Staff Procedure EO-28, Digging Projects. Requirements and questions within the Risk Handling Checklist including identification of potential failure modes and hazards, traffic control, and excavation requirements shall be addressed in the work plan. In addition to the provisions of CS-28, relevant state, local and facility requirements must be identified in the work plan and in place before initiating any work. CS-28, the Risk Handling Checklist and the Dig Permit are included in Appendix A of this document.

The permit and the checklist shall be completed and approved by the PL before initiating any ground disturbance activities. The PL shall forward these items to the Environment, Safety and Health (ESH) professional, the performing contractor responsible for oversight, and the facility manager, as necessary, for their review.

Utility and Underground Structure Clearance

A utility and underground structure location survey which includes, but is not limited to records research, consultation with site facilities personnel, site inspection to locate physical evidence of underground or overhead utilities or structures and geophysical or other appropriate remote sensing techniques must be performed by a qualified utility location firm at least two weeks prior to initiating any intrusive activities. The survey shall include the appropriate equipment necessary to detect buried foundations and slabs, piping, direct-bury cables and other buried conduits and structures using the technologies appropriate to the anticipated utilities such as electromagnetic detector; ground penetrating radar; acoustic plastic pipe locator; probe, beacon, or trace wire; or cesium magnetometer. A table summarizing applicability of technologies for detecting various utilities is presented in Appendix B.

Because undocumented or inactive utilities can result in problems as severe as or more severe than documented utilities, utility location work must include, at minimum, ground penetrating radar as a screening tool to identify objects that may not be documented on utility record plans and other records.

The utility location/survey firm operators shall have at least 2 years of experience on industrial sites and preferably direct experience on the site under review. The utility survey firm shall be approved by the Lockheed Martin PL.

In addition to the utility survey, the state or other legally-mandated utility clearing organization ("Dig Safe," "U-Dig" or other such organization) having jurisdiction over the region in which the work is to occur, shall be notified within the time period required by that organization, state and local regulations. Even if all of the work is conducted entirely on Lockheed Martin or other private property, the utility clearing organization shall be contacted.

All aboveground indicators of subsurface and overhead utilities/services that may be leading to or from buildings and structures within the planned intrusive work area must be located and marked out in the field. Locations of utilities and structures detected by remote sensing equipment shall also be marked out in the field. Public utility mark-outs by for all exterior locations must be identified within required time period. Physical evidence of underground or overhead utilities may include, but is not limited to lights, signs, telephone systems, drains, electrical junction boxes, manhole covers, valve boxes, hand holes, pavement patching or other evidence of prior excavations, and natural gas meters.

The contractor shall make all efforts to avoid known or observed utilities in planning the work. If, however, subsurface structures are known or observed by geophysical survey within five feet of the work area and the work area cannot be moved, the performing contractor and/or its subcontractor shall carefully excavate to within two vertical feet of the expected top of the utility, then hand dig, air lance or otherwise gently remove the remaining soil to expose the utility. Additional precautions shall be described in the work plan if the intrusive work is to be performed in frozen soils.

The performing contractor must witness the utility clearance work to verify that the expected scope is performed and be available to work with the utility location contractor to answer questions and facilitate additional research or discussions with site facilities personnel.

The utility clearance contractor's report must include details concerning the methods used to locate utilities and documentation of how specific utilities were located in plan and depth, including a copy of instrument output when instruments producing output are used. It is not sufficient for the report to merely state that the utilities on the site plan were verified or that no utilities were found without providing supporting documentation.

Pre-Planning for Soil Fracturing and In Situ Injection Work

If subsurface disturbance activities such as soil fracturing or geophysical techniques that significantly alter the natural soil conditions are to be employed, the utility location survey shall be conducted at least one month prior to any chemical injection. Attention must be given not only to the locations of utilities and underground structures but also to the fact that utilities, structures and earth bedding can provide short-circuit pathways for the injected substance to travel significant distance to be intercepted by other utilities (sewers and drains), to be accumulated in undesirable locations (manholes or handholes) or to be discharged to surface waters.

Additionally, an aquifer assessment should be conducted to determine the nature of the aquifer receiving the chemical injections before and after any subsurface disturbance is conducted. Calculations and chemical injection volumes shall be determined as to what volume of chemical would be expected to fill the opened up pore space. An evaluation must be made of the quality and quantity of the data and assumptions that form the basis for design. Examples of typical data requirements that form the basis for design include aquifer

transmissivity, soil type, effective porosity, contaminated thickness, presence of confining layers, potentiometric surface configuration, and ambient groundwater flow velocity.

Upon completion of soil fracturing, the field data collected shall be thoroughly reviewed and assessed relative to the types and sizes of the resultant fractures and potential connection of fractures to short circuit migration pathways. Injection can proceed only after this review is completed and appropriate monitoring and contingency measures are in place to detect and prevent unwanted migration of injected medium.

A technical expert in the injection technique shall be employed and fully integrated in the project team. The PL will have responsibility for engaging the technical expert. This expert will be part of the managing contractor staff and shall have responsibilities including reviewing and approving the technical and functional requirements, the design, the work plan, and the injection procedures. This expert will engage with the PL to ensure that all potential failure modes and effects have been identified and mitigation strategies employed as necessary. The failure modes and mitigation strategies shall be documented and submitted to the PL for records retention.

Field Implementation Activities

All field personnel must review the approved work plan, subsurface utility location survey data, and related information prior to becoming involved in subsurface disturbance/intrusive activities. The field personnel must sign the authorization form in Appendix C indicating their review. This form shall be scanned and electronically submitted to the PL once all personnel have signed the form.

Change Management

Significant changes made during the field implementation should be avoided as much as possible. If such changes are required to the field work plan, the program should be temporarily suspended as long as is necessary so that effectiveness and unintended consequences can be thoroughly evaluated by the project manager, PL and performing contractors (including specialty subcontractors) and the necessary equipment and procedural changes can be developed, communicated, approved and implemented. The PL should be contacted immediately and the performing contractor overseeing the work shall be included in any decisions to modify the approved work plan.

In Situ Injection Implementation

If soil fracturing is required before chemical injection, injection can proceed only after review of the fracture patterns is completed, as stipulated in the "Pre-Planning" section and appropriate monitoring and contingency measures are in place to detect and prevent unwanted migration of injected medium. The contingency measure shall be outlined in the work plan. If monitoring shows that the injected compound is detected in unwanted locations (such as a storm drain or sewer), injection shall be halted and measures taken to prevent further unwanted migration.

The chemical injection method should be thoroughly defined in the work plan and followed during the field implementation program. If chemical daylighting (surface leaks from subsurface injections) or seeps are observed the injection should be immediately stopped. The surface leaks should then be properly contained to prevent runoff and allowed, if feasible, to percolate back into the subsurface. As a result of this condition, subsequent injection rates should be reduced by at least 20% or until chemical daylighting is no longer observed.

In most cases, low pressure methods should be employed whereby gravity or low flow recirculation systems are established to let the chemical slowly percolate into the subsurface. In no case should the injection pressures at or near the surface be greater than the available water table elevation distance to the ground surface unless approved by the PL or the PL's designated representative. Water table elevation changes as a result of chemical injections must be monitored and kept to a minimum as much as practicable.

Spill Prevention, Containment, Cleanup and Reporting

Chemicals stored onsite, including oil and fuels, reagents, injection medium, shall be placed in vessels within 110% volume secondary containment. Good housekeeping procedures must be practiced. Even benign reagents are contaminants if they migrate to a sensitive receptor. In no case should incidental spills or transfer leaks be tolerated on the site. All spills must be contained, cleaned and reported immediately to the site's spill response coordinator and the Lockheed Martin PL. Local storm drains should be temporarily plugged or booms or berms be placed to divert storm water flow from the storage area away from active storm drains.

DEVIATIONS

All deviations from this procedure must have prior approval by the Director of Environmental Remediation. The approval shall be documented and uploaded to the Lockheed Martin Document Management System.

APPENDIX A


EO-28


Dig Permit


Risk Handling Checklist

APPENDIX B


Utility / Underground Structure Clearance T

APPENDIX C


Invasive Fieldwork Authorization

Lockheed Martin Invasive Fieldwork

Project: _____
Fieldwork Description:
_____

By signing this form, you are indicting that you have reviewed the field work plan, utility location survey data, and Health and Safety Plan relevant to the project listed above.

	Name:	Date:
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		
16.		

This form shall be scanned and electronically submitted to the Lockheed Martin Project Lead.

NOTE: Each project may have unique conditions, therefore do not use this chart as the sole decision criteria for technology selection. Use the chart as a starting point to assess available technology(s) applicable.

KEY	Description
Green	Generally and applicable technology
Yellow	May or may not be applicable
Red	Not generally applicable
*	Indicates best technology for given object. Site structures, rebar in concrete, etc. can significantly affect performance and reliability of any electromagnetic method.
□	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. US requires DOT, Office of Pipeline Safety Standards.
∇	Most sensitive to interpretation; the skill, training, and experience of the operator are critical.
≡	Emerging technology with limited availability.
+	Access: induce unique electronic signature, apply acoustical impulse, or insert probe/beacon/sonde.

Subsurface Mark-out Technology Application Chart

Technology → / Object ↓	Electro-Magnetic Detector	Ground Pentrating Radar (GPR) ∇	Acoustic Plastic Pile Locator	Probe, Beacon Sonde, or Trace Wire	Cesium Magnetometer ≡
Power/Instrument Line (Energized/Signaled □)	* G	Y	R	R	Y
Power Line (Non-energized)	Y	* Y	R	R	Y
Sewer/Water Line (Metalllic)	* G	> 12" diameter G < 12" diameter Y	Y	G	Y
Sewer/Water Line (Non-metallic)	R	> 12" diameter G < 12" diameter Y	G	* G	Y
Instrument/Telecomm Lines (non-energized)	R	R	R	R	R
Natural Gas Line (Pipeline) ♦	* G	> 12" diameter G < 12" diameter Y	R	R	G
Metallic/Non-metallic Line (w/ Tracer Wire)	* G	> 12" diameter G < 12" diameter Y	Y	Y	Y
Metallic/Non-metallic Line (w/o Tracer Wire)	R	> 12" * diameter G < 12" * diameter Y	Y	Y	R
Metal UST	* G	* G	R	R	G
Fiberglass UST	R	* G	R	R	Y

Additional Considerations

Technology → / Variable ↓	Electro-Magnetic Detector	Ground Pentrating Radar (GPR) ∇	Acoustic Plastic Pile Locator	Probe, Beacon Sonde, or Trace Wire	Cesium Magnetometer ≡
Moist Soil	G	Y	G	G	Y
Dry Soil	Y	G	Y	G	G
Clay	Y	R	G	G	Y
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	N/A
No Access to Line +	Y	G	R	R	G
Ferrous Metal	G	G	G	G	G
Non-Ferrous Metal	Y	G	G	G	Y

LOCKHEED MARTIN

Dig Permit

See Enterprise Operations Procedure EO-28, Digging Projects, for instructions.

Date	Project Manager
Building/Location	
Purpose of excavation	
Company/LM organization performing dig	

Planned dig date	Duration	Start time
Expected depth	Width	Length

Underground utilities identified?	Overhead utilities?	Electrical lines?	Gas lines?
☐ Yes ☐ No	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No	☐ Yes ☐ No
Sewer?	Water?	Telecommunications?	Other? Specify:
☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No

Site-specific or customer utility locating requirements completed?

☐ Yes ☐ No ☐ N/A

Sketch of dig project (or attach drawing)

Project Manager	Date	Customer	Date
Telecommunications	Date	Customer	Date
ESH	Date	Customer	Date
Building/Facility Manager			Date

Appendix G – Construction Schedule

Appendix G – SSDS Expansion Construction Schedule Summary

Task	Subtask	Details	Start	Finish
Mobilization	Construction Kickoff Meeting/ORR		8/30/2021	9/13/2021
	Mobilize to site for construction		9/14/2021	9/20/2021
Mechanical/Instrumentation/ Electrical Construction		Off Hours Work	9/21/2021	11/1/2021
Start-Up and Testing	Perform start up and testing, and operational training		10/19/2021	11/8/2021
General Conditions/Construction Management	Manage construction and complete construction completion report		9/21/2021	12/20/2021
Demobilization	Field demobilization and required construction deliverables including as-built drawings, warranties, equipment and OM&M manuals, spare parts, and recommendations for OM&M manual and SOP updates		11/2/2021	11/15/2021