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REMEDIAL ACTION WORK PLAN

North Sanitary Landfill Dayton, Ohio

Prepared by

*Geosyntec Consultants, Inc.
931 Chatham Lane, Suite 103
Columbus, Ohio 43221*

Project Number TR0881

February 2022



450 Montbrook Lane
Knoxville, TN 37919
(865) 691-5052
(865) 691-6485 FAX
(865) 691-9835 ACCT. FAX

Via Email (novak.dion@epa.gov)

March 16, 2022

Dion Novak
Remedial Project Manager
United States Environmental Protection Agency
Region 5 (SR-6)
77 West Jackson Boulevard
Chicago, Illinois
U.S.A. 60604

**Re: Approved Final (100%) Remedial Design (RD) Report and Remedial Action Work Plan (RAWP)
 North Sanitary (a.k.a. Valleycrest) Landfill, Dayton, Ohio**

Dear Mr. Novak:

On behalf of the Settling Work Parties, and in accordance with the RD/RA Consent Decree for the North Sanitary Landfill (Civil Action No. 3:18-cv-00054) and your February 22, 2022 approval comments which have been incorporated, please find enclosed the approved Final RD Report and RAWP for the North Sanitary Landfill in Dayton, Ohio.

Should you have any questions on the above, please do not hesitate to contact me at (865) 691-5052.

Sincerely,
de maximis, inc.

A handwritten signature in blue ink that reads "Michael H. Samples". The signature is fluid and cursive, with a long horizontal stroke at the end.

Michael H. Samples
Project Coordinator

Enclosure
cc (via email):

Scott Glum - Ohio EPA
Tim Christman - Ohio EPA
Brad Martin - Toeroek
Mike Miller - *de maximis*
John Buyers - Geosyntec
Steve Siegel - The Siegel Law Firm
VLSG Technical Committee

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LIST OF ACRONYMS AND ABBREVIATIONS

%	percent
AMDCP	Air Monitoring and Dust Control Plan
AST	above ground storage tank
BMPs	best management practices
CD	Consent Decree
City	City of Dayton
CO	carbon monoxide
COCs	contaminants of concern
CRA	Conestoga-Rovers & Associates
CQA/QCP	Construction Quality Assurance/Quality Control Plan
DA	Disposal Area
ERP	Emergency Response Plan
FML	flexible membrane liner
FS	Feasibility Study
GCL	geosynthetic clay liner
Geosyntec	Geosyntec Consultants, Incorporated
HASP	Health and Safety Plan
ICIAP	Institutional Controls Implementation and Assurance Plan
ICs	institutional controls
KAP	Keystone Affected Property
LEL	lower explosive limit
LFG	landfill gas
LGAS	landfill gas abatement system
NAAQS	National Ambient Air Quality Standards
NAPL	non-aqueous phase liquid
NFPA	National Fire Protection Association
NPDES	National Pollutant Discharge Elimination System
OAC	Ohio Administrative Code
O&M	Operation and Maintenance
Ohio EPA	Ohio Environmental Protection Agency
OPBWA	Off-Property Buried Waste Area
PDI	Pre-Design Investigation
PID	photoionization detector
PPE	Personal Protective Equipment
RA	Remedial Action

RAWP	Remedial Action Work Plan
RD	Remedial Design
RD/RA	Remedial Design/Remedial Action
RFB	Request for Bid
RI	Remedial Investigation
ROD	Record of Decision
Site	North Sanitary (a.k.a., Valleycrest) Landfill
SSHO	Site Safety & Health Officer
SOW	Statement of Work
SPCCP	Spill Prevention, Control and Countermeasures Plan
SWPPP	Stormwater Pollution Prevention Plan
SWPs	Settling Work Parties
USEPA	United States Environmental Protection Agency
VOCs	volatile organic compounds

SECTION 1

INTRODUCTION

This Remedial Action Work Plan (RAWP) presents the Remedial Action (RA) requirements for the North Sanitary (a.k.a. Valleycrest) Landfill in Dayton, Ohio (Site). The remedial design and remedial action (RD/RA) are being conducted in accordance with the Record of Decision (ROD) (USEPA, 2013). Specifically, this RAWP was prepared in accordance with the requirements within Statement of Work (SOW) Section 4.1, contained in Appendix B of the RD/RA Consent Decree (CD) for the Site (Civil Action No. 3:18-cv-00054). This document has been prepared by Geosyntec Consultants (Geosyntec) on behalf of the Settling Work Parties (SWPs).

This RAWP addresses the following:

- Section 2: Project Information
- Section 3: Description of the Work to be Completed
- Section 4: Remedial Action Construction Work Plan
- Section 5: Responsibility, Authority, and Key Personnel
- Section 6: Health and Safety Plan (HASP)
- Section 7: Waste Management Plan
- Section 8: Traffic Control Plan
- Section 9: Air Monitoring and Dust Control Plan (AMDCP)
- Section 10: Decontamination Plan
- Section 11: Emergency Response Plan (ERP)
- Section 12: Landfill Gas Transition Plan
- Section 13: RA Schedule
- Section 14: Construction Quality Assurance/Quality Control Plan (CQA/QCP)
- Section 15: References

SECTION 2

PROJECT INFORMATION

2.1 Site Description

The Site is located to the northeast of the City of Dayton (City), in Montgomery County, Ohio. The Site location is shown on **Figure 2-1** and existing Site conditions are shown on **Figure 2-2**. The Site is a former landfill currently owned by The Keystone Gravel Company, a cancelled company in the State of Ohio. The Site (approximately 102 acres in size) was originally operated as a sand and gravel quarry between approximately 1935 and the 1970s. Industrial and municipal wastes were deposited in the eastern two-thirds of the Site from about 1966 to 1975. Foundry sand and fly ash were deposited in the disposal areas located in the extreme western third of the Site from the early 1970s until 1991. The Site consists of five disposal areas and is bifurcated, roughly in half, by Valleycrest Drive (a section of which that adjoins, and is part of, the Site is currently closed).

2.2 Site Background

A Remedial Investigation/Feasibility Study (RI/FS) was completed at the Site. The Ohio Environmental Protection Agency (Ohio EPA) approved the RI Report (Conestoga-Rovers & Associates [CRA], 2008) in May 2008, and approved the FS Report (CRA, 2011) in March 2011. On July 30, 2012, the United States Environmental Protection Agency (USEPA) issued an Addendum to the FS Report (USEPA, 2012). The USEPA's decision on the RA to be implemented at the Site is embodied in the ROD (USEPA, 2013).

The United States of America and SWPs entered into a CD on October 30, 2018 (Civil Action No. 3:18-cv-00054) under which the SWPs will perform response actions at the Site. Appendix B (SOW for the RD/RA) of the CD states in Section 1.3 (Scope of the Remedy) that the following tasks are included within the scope of the remedy:

- Task 1: Excavation, Treatment, and Disposal of Contaminated Soils and Other Materials (Completed);
- Task 2: Consolidation and Capping of Site;
- Task 3: Actions to Address Non-Aqueous Phase Liquid (NAPL), Landfill Gas (LFG), and Leachate Contamination, as well as Stormwater; and
- Task 4: Institutional Controls, Groundwater Monitoring, and Post-Construction Operation and Maintenance (O&M).

The RAWP describes how the RA will be implemented, a preliminary schedule, the design process, management strategy, key personnel, anticipated problems, permitting requirements, and deliverables. This RAWP was approved by the USEPA on February 22, 2022.

SECTION 3

DESCRIPTION OF THE WORK TO BE COMPLETED

The RA construction work to be completed under this RAWP includes the following:

- Clearing, grubbing, and organic material management of the existing Site vegetation.
- Contracting with an earthworks contractor that has experience in excavating and stockpiling soil, excavating waste, constructing composite landfill covers, installing leachate and LFG collection systems, and working in solid waste landfills.
- Construction of a capping system.
- Construction of a stormwater basin and stormwater management features.
- Installation of a NAPL recovery system.
- Installation of leachate and LFG collection systems.
- Construction and reopening of Valleycrest Drive.
- LFG probe and groundwater well decommissioning and construction.

SECTION 4

REMEDIAL ACTION CONSTRUCTION WORK PLAN

4.1 Overview

The construction work activities are summarized in this section. Design details are provided in the RD Report.

Any proposed changes to approved design materials must be presented to the USEPA with an accompanying performance equivalency demonstration, for USEPA approval.

4.2 Contractor Selection

Request for bids (RFB) will be issued to at least three prequalified bidders and will include:

- Invitation to Bid
- Instructions to Bidders
- Description of the Work
- Bid Form
- Contract Agreement
- Measurement and Payment Specifications
- CD
- RAWP
- RD Report
- CQA/QCP
- Technical Specifications
- RD Drawings

Bids will be received and evaluated and the RA Contractor will be selected by the SWPs and approved by the USEPA.

A Stormwater Pollution Prevention Plan (SWPPP) and a Spill Prevention, Control, and Countermeasures Plan (SPCCP) will be submitted to the USEPA prior to the initiation of RA activities.

4.3 **Mobilization and Temporary Controls Setup**

Mobilization of personnel, equipment, and materials to the Site will begin once all required project plans have been completed and approved by the USEPA. As part of the mobilization and temporary controls setup, the following signs will be installed as per project specifications:

- Temporary Project Sign
- Temporary Project Safety Sign

Office trailers will be delivered and set up with power connection to the existing utility lines or generator. All office trailers will be tied down and securely anchored in accordance with the State of Ohio standards for mobile homes. Mobile phones and wireless hot spots will be used to provide phone and internet service. Parking areas will be established along with sanitary facilities (porta johns). Sanitation facilities will comply with State and local health authorities. Portable restrooms will be serviced as necessary. Stone materials will be imported as needed to provide a stable surface for the office trailer, staging, and parking areas. Bottled water service will provide potable water to the crew. Water dispensers will be placed in each office trailer. A dedicated equipment fueling station will be established. The associated on-Site fuel tank will be a double-walled tank (approximately 500 gallon), if available, otherwise a berm and liner will be placed under the fuel tank as secondary containment. A spill kit will be placed at the fueling station along with a large fire extinguisher (minimum 40-B:C rated within 50 feet of tank) and proper signage (NO SMOKING, MATCHES, or OPEN FLAME). A fuel delivery truck is expected to deliver fuel approximately every other day during operations.

Haul roads will be installed with a stabilized (i.e., designed/installed to minimize tracking of materials from the Site to adjacent roads, as shown on the RD Drawings) construction entrance at the locations of the Site entrance and exit for erosion and sediment control and to minimize tracking onto Brandt Pike. For equipment, a decontamination pad with a lined collection sump will be installed adjacent to the Site exit. During mobilization, the exact location of the decontamination pad will be assessed in the field based upon available space. High visibility fence will be installed around the trailers, parking areas, and fuel storage areas.

Storage of materials and equipment may be in mobile trailers, semi-truck trailers, or other shelters/equipment suitable to protect the equipment. Suitable equipment/shelters will be needed to protect materials in accordance with manufacturer's specifications and in accordance with specified project requirements. The RA Contractor shall choose the method of storage based on the following requirements unless otherwise approved by the SWPs or its designee:

- All materials shall be stored in accordance with manufacturer's storage requirements.
- Storage area(s) shall be easily accessible and shall not be located near any existing wetlands.
- Storage area(s) shall not be located on slopes steeper than 10 percent (%).

- Storage area(s) shall be clear of dual-phase extraction wells, components of the leachate collection and LFG systems, and shall not interfere with construction of the final cover system or stormwater management features.

4.4 Temporary Erosion and Sediment Control Features

The RA Contractor shall install temporary erosion and sediment control features in the relevant area(s) of construction. This may include one or more, or any combination of, installing silt fence, straw bales and/or wattles, temporary seeding, erosion control blankets, riprap, and fabric formed concrete, as needed. Appropriate erosion controls will be provided in accordance with the SWPPP. Additional erosion and sediment control measures will be completed prior to commencing grading activities. All erosion and sediment control features shall follow the RD Drawings and applicable regulatory standards, including the SWPPP to demonstrate permit equivalency with the National Pollutant Discharge Elimination System (NPDES) general construction permit.

During construction, the RA Contractor shall have a qualified person inspect the sediment and erosion control measures on a regular basis and immediately after storm events, at least once every 7 days and within 24 hours of the end of a storm that is 0.5 inches of rainfall or greater by the end of the following business or work day. Maintenance and repairs needed in response to the inspection will commence as soon as practical but no later than 7 days after identification of the need for maintenance or repair. Repairs that require immediate attention will commence corrective actions within 48 hours of identification.

Damaged silt fences will be repaired to their original conditions. Sediment is to be removed from the silt fences when it reaches one-half the height of the silt fence. Temporary measures will be removed as soon as permanent stabilization of slopes and permanent stormwater features have been accepted by the CQA Consultant.

4.5 Clearing and Grubbing

Clearing and grubbing shall be performed only in areas identified on the RD Drawings. All applicable erosion and sediment controls shall be in place before clearing. Grubbing will consist of removal of stumps (in waste excavation areas), roots, and surficial debris (i.e., organic material) from the waste disposal areas and soil borrow areas. Vegetation removed during grubbing shall be shredded, chipped, or otherwise reduced in size to a maximum dimension of 18 inches. Clearing and grubbing may be performed prior to selection of the RA Contractor; and therefore, may be performed by a different contractor than the RA Contractor.

Based on the preliminary estimates shown in **Table 4-1** below, 2,141 cubic yards (251 tons) of vegetative or organic matter is present at the Site. See **Appendix A** for the calculation estimating the quantity of organic material generated from clearing and grubbing activities during implementation of the RA.

Table 4-1
Estimated Disposal Weight of Organic Material

Type	Area (acres)	Tree Density (#/acre)	Ave. Tree Dia. (in)	Ave. Truck + Branch Weight (tons)	Total Trunk + Branch (tons)	Total Trunk + Branches (yd ³)
Bush	10.63	100	1	0.003	3	23
Light Wooded	26.20	20	4	0.029	15	129
Medium Wooded	33.12	75	4	0.029	72	613
Dense Wooded	37.15	150	4	0.029	162	1,376
TOTAL					251	2,141

The following are the anticipated management options for the shredded/chipped organic materials:

- Mixing/bulking for the fill and vegetated layers in the final cover system.
- Augmenting the topsoil placement in areas outside of the capped areas (i.e., stormwater basin or wetland mitigation areas).
- Existing vegetation (i.e., root balls, grasses, or shrubs) may be left in place and used as a base for temporary construction haul roads, or as a naturally-reinforced subgrade for direct placement of fill materials.
- Erosion control materials.
- Weed control during O&M period.
- Hauling to an off-Site permitted compost facility or licensed landscape materials company.
- Composting for reduction and then reuse as:
 - On Site to supplement vegetative placement
 - Reuse by either public/private entities or government agencies
- Fill in areas outside of the waste footprint.

USEPA approval will be required for any usage of mulch above the flexible membrane liner (FML).

Available space for organic materials storage piles (storage piles) will depend on construction sequencing to be determined based on RA Contractor input and construction seasons. For example, if Disposal Area 1 construction will happen in a later season than the other Disposal Areas, then it could be used as a large temporary storage pile area.

The following best management practices (BMPs) will be used during shredding or chipping and temporary storage of the organic materials:

- Stormwater runoff during shredding/chipping and temporary stockpiling will be managed through temporary erosion control BMPs or direct stormwater runoff to temporary stormwater basin(s).
- Temporary organic material stockpiles would be managed through the following practices as outlined in National Fire Protection Association (NFPA) 230 Standard for the Fire Protection of Storage (NFPA, 2003):
 - Storage piles will not exceed 60 feet in height and 300 feet in width or 500 feet in length.
 - Storage piles will be separated from one another to allow vehicle access between the piles.
 - If needed, low barriers or walls will be installed to define the perimeter of the pile and prevent creep or sloughing.
 - A minimum of 15 feet will be maintained between storage piles and structures (i.e., leachate storage tank or LFG flare), material storage areas, or equipment yards.
 - Heat sources such as steam lines, air lines, electric lines and motors, leachate and LFG lines, and mechanical drive equipment will have physical protection from becoming buried or heavily coated with organic materials.
 - An appropriate number of fire extinguishers suitable for Class A fires shall be provided in accordance with NFPA 10, standard for Portable Fire Extinguishers.
 - Monitoring of organic material storage pile temperatures on a routine basis (monthly during winter months and every 2 weeks during spring, summer and fall months).
- Composting BMPs (Ohio EPA, 2019) of organics from clearing and grubbing are listed below:
 - Composting methods will include windrow composting, in-vessel, aerated static pile, static pile or vermicomposting.
 - Composting area will be placed on flat or gentle sloping ground.
 - Materials placement area must have a slope of between 1 to 6% to control surface water drainage.

- Construction and turning frequency of the composting mix will enable controlled biological decomposition under predominantly aerobic conditions.
- Run-on and ponding and erosion will be prevented in the materials placement area through the use of compost blankets, geotextiles, hydro-mulch, straw bales, or similar method.
- Contact water (i.e., stormwater that touches composting areas) will be collected and contained within the boundary of the composting area and prevent run-off from discharging to off-Site areas through the use of a compost filter sock, silt fence, compost filter berm, or similar method.
- If deemed necessary, measures will be put in place to prevent dust, odors, fires, and the possible attraction, breeding, and emergence of insects, birds, rodents, and other vectors.

The RA Contractor will comply with applicable regulations in locating and providing clearance for all underground and aboveground utilities prior to beginning construction activities.

4.6 Excavation and Consolidation of off- and on-Site Waste Materials

These activities are discussed in the following sections:

Section 4.6.1 Excavation of Waste Materials

Section 4.6.2 Post-Excavation Sampling

Section 4.6.3 Backfilling and Consolidation

4.6.1 Excavation of Waste Materials

Excavation and consolidation of off- and on-Site waste materials will ensure that waste materials are within the Keystone Affected Property (KAP) boundary or property controlled by the SWPs and reduce the area requiring a cap. Material will be excavated from the Off-Property Buried Waste Area (OPBWA), City Lot 74625, and Disposal Area (DA) 4 to the minimum elevations provided in the RD Drawings and relocated to DA 1, 2, 3, and 5. The removal of all waste from the OPBWA, City Lot 74625, and DA 4 will be verified by visual inspection and the removal of a minimum of 6 inches of subbase material below excavated waste.

4.6.2 Post-Excavation Sampling

Post-excavation soil samples will be collected to quantify parameter concentrations in material that will remain. The scope of sampling at each area will be based on potential future exposure scenarios as discussed in the following sections:

Section 4.6.2.1 OPBWA

Section 4.6.2.2 DA 4 and City Lot 74625

4.6.2.1 OPBWA

The OPBWA is situated outside the KAP but within the current alignment of the Site fence in order to restrict access to the waste on City Lots 79198 and 74637 owned by others. The footprint of the OPBWA on City Lot 79198 is 125 ft² and on City Lot 74637 is 1,611 ft². Post-excavation sampling will be performed on each property, prior to backfilling, to determine the need for institutional controls (ICs) on those properties as they are returned to normal use outside the Site fence.

In the OPBWA, five post-excavation samples will be collected consistent with the Ohio EPA's December 2021 "Closure Plan Review Guidance for RCRA Facilities" which states on page 79 *Therefore, five samples should be viewed as the minimum number of samples necessary for confirmation of clean closure in an excavation.* Five discrete samples will be collected from the OPBWA to support clean closure, including three from the native material on the westward sloping face at the limit of excavation and two from the bottom.

As the OPBWA is at the eastern edge of DA 1, it is expected that the waste is very thin/shallow at the eastern edge of the OPBWA and becomes thicker/deeper westward into DA 1. During the Pre-Design Investigation (PDI), borehole BH-OPBWA-1 was installed in the middle of the OPBWA and found the bottom of waste to be 11 feet below ground surface. Accordingly, it is expected that excavation of waste in the OPBWA will leave a westward-sloping face of native material. Based on 95% of the OPBWA footprint being on Lot 74637, four of the five post-excavation samples will be collected from Lot 74637 and one from Lot 79198. The five samples will be collected from the native material on the westward sloping face (S) and bottom (B) as shown on **Figure 4-1** and include:

PE-79198-S
PE-74637-S1
PE-74637-S2
PE-74637-B1
PE-74637-B2

The samples will be analyzed for the parameters in the Ohio Voluntary Action Program Table I Residential Generic Direct Contact Soil Standards (see **Appendix B**).

4.6.2.2 DA 4 and City Lot 74625

DA 4 and City Lot 74625 are both situated within the Groundwater Point of Compliance. As discussed in the Institutional Controls Implementation and Assurance Plan (ICIAP), both properties will be subject to the same ICs. As also mentioned in the ICIAP, based on the projected long-term use of City Lot 74625 for remedial activities, and the fact that the Keystone Amended Environmental Controls and access rights will also be applied to City Lot 74625, the SWPs have

transferred City Lot 74625 to Keystone. Accordingly, in response to the USEPA's request, post-excavation sampling will be performed in DA 4 and City Lot 74625 to characterize the potential for any parameters in material that will remain to leach to groundwater.

During the PDI, DA 4 waste was characterized by advancing eight spatially distributed boreholes. DA 4 post-excavation sampling will be conducted at those same eight locations. Proposed sampling locations and survey coordinates are shown on **Figure 4-1**.

As the waste on the northwest and southwest corners of City Lot 74625 is at the edge of DA 2, it is expected that the depth of waste is very thin/shallow at the eastern edge of DA 2 and becomes thicker/deeper westward into DA 2. Accordingly, it is expected that excavation of waste on City Lot 74625 will leave northwestward- and southwestward-sloping faces of native material. One post-excavation sample will be collected from the native material face at each of the northwest and southwest corners of City Lot 74625 to represent sidewall/base conditions where waste will be excavated as shown on **Figure 4-1**.

The samples will be analyzed for the parameters in the Ohio EPA's October 2008 Voluntary Action Program Derived Leach-Based Soil Values (VAP Leach-Based Soil Values; Ohio EPA, 2008). The native soil type beneath DA 4 is expected to consist of sand and gravel, which corresponds to Soil Type I in the VAP Leach-Based Soil Values, and the footprint of DA 4 is 5.1 acres (i.e., greater than 0.5 acre). Accordingly, the samples will be analyzed for the parameters and compared to the generic leach-based soil values summarized below:

<i>Organics</i>		<i>Inorganics</i>	
<i>Parameter</i>	<i>mg/kg</i>	<i>Parameter</i>	<i>mg/kg</i>
Benzene	0.017	Antimony	3.6
Toluene	6.8	Arsenic	3
Ethylbenzene	12	Barium	56,000
Total xylenes	156	Beryllium	57
Styrene	0.46	Cadmium	21
Naphthalene	0.27	Chromium*	6,300
n-Hexane	121	Lead	89
Methyl ethyl ketone	1.8	Mercury	12
Phenol	1.1	Nickel	182
Carbon tetrachloride	0.25	Selenium	2.15
1,2-Dichloroethane	0.003	Silver	3,120
1,1,1-Trichloroethane	1.2	Thallium	1.5
Vinyl chloride	0.009	Vanadium	65
1,1-Dichloroethene	0.28	Zinc	44,000
cis-1,2-Dichloroethene	0.12		
trans-1,2-Dichloroethene	0.41		
Trichloroethene	0.036		
Tetrachloroethene	0.15		

*For chromium, the VAP Leach-Based Soil Values reflect a value of 56 mg/kg and states *Values calculated based on the assumption that chromium is all chromium (VI)*. However, as chromium (VI) has not been an issue at the Site, is not expected to be an issue, and is not a Site chemical of concern, the value shown in the table above (6,300 mg/kg) was calculated by Geosyntec for chromium (III) using the same methodology as the VAP Leach-Based Soil Values.

4.6.3 Backfilling and Consolidation

Stockpiling of excavated waste material on any part of the Site must occur within existing waste boundaries. Non-waste fill material may be stockpiled outside of existing waste boundaries. See the Waste Management Plan in Section 7 for more information.

Following excavation of DA 4, fill will be placed and graded to match the proposed design grades as part of the Site's stormwater basin as shown on the RD Drawings, and the area will be vegetated.

Following excavation of the OPBWA and City Lot 74625, fill will be placed and graded to match existing grades, and the areas will be vegetated.

Waste material relocated to DAs 1, 2, 3, and 5 will be graded with all non-waste fill materials to top of waste grades as shown on the RD Drawings.

4.7 Solid Waste Landfill Cap System and Stormwater Management

Final capping will require landfill grading and cap construction on the side slopes and top of the DAs and stormwater management development, including open channels, stormwater conveyance piping, culverts, and rip-rap downchutes.

Construction grading will include regrading in an inverted sawtooth configuration and placement of additional waste and/or soil materials for the subgrade (i.e., bottom of the engineered fill layer). Existing soil that needs to be removed for regrading will be stripped and stockpiled for reuse. As discussed in the RD Report, the RD is "soil neutral" (i.e., the amount of fill is equal to the amount of cut); however, imported soils may be needed if on-Site soils cannot meet the specifications for the vegetative layer. At this time, minimal imported soil material is anticipated to be needed. Imported soils, if needed, will be required to meet Ohio Voluntary Action Program Table I Residential Generic Direct Contact Soil Standards (see **Appendix B**). If imported soil material is needed, then each type of soil from each source will be sampled at a frequency of one sample per 1,000 cubic yards. Imported soil needs will be discussed during the Pre-Construction Meeting.

Stone and gravel materials imported for the office trailer, staging, parking areas, and roads will not be sampled.

DA 1, 2, 3, and 5 will be covered with a solid waste composite final cover/cap system which includes (from top to bottom): 6-inch vegetated layer, 6-inch common fill, 12-inch sand drainage

layer with a minimum permeability of 1×10^{-3} centimeters per second (cm/sec) (totaling a 24-inch cap protection layer), 40-mil FML, geosynthetic clay liner (GCL), and 6-inch engineered subbase. The fill layer thicknesses will be verified and stabilized prior to placement of an additional layer.

Appropriate specifications for all materials for each cap layer component are provided in Ohio Administrative Code (OAC) 3745-27-08(D)(21) through (26). Material thickness and hydraulic conductivity specifications are minimum values.

The RA Contractor is to perform regrading and capping in conjunction with the construction of stormwater management features to reduce the potential for discharge of sediment and/or sediment-laden runoff. The potential for discharge of sediment-laden runoff is very low since the RD incorporates a zero-discharge stormwater basin (i.e., retention/infiltration basin). The proposed final landform incorporates interior stormwater management features including slopes, open channels, stormwater conveyance piping, and inlet structures as discussed in Section 4.8.

4.8 Stormwater Management Features Construction

Stormwater will be directed to the existing borrow area in the southwest area of the Site, which will be converted to a stormwater basin and serve as a retention/infiltration area for collected stormwater. Stormwater management features consist of inlet devices, ditches, channels, culverts, conveyance piping, and basins. The RD drawings depict the location of these stormwater management features.

The RA Contractor will construct the stormwater management features in conjunction with the regrading and capping to reduce the potential for discharge of sediment and/or sediment-laden runoff. The stormwater management system will be initiated with construction of the stormwater basin and progress upstream. Construction of the basin involves excavation of material. Inlet piping, for drainage of DA 1, will be constructed following basin construction. The inverse sawtooth grading will direct stormwater to ditches, channels, and culverts and the inlet piping will discharge stormwater to the basin.

Stormwater gravity pipes and ditching will be installed between DA 3 and DA 5, along DA 1, and under DA 2 via directional drilling. The pipe will be below the existing bottom of waste in DA 2. Trench excavation shall start downstream and progress upstream. The RA Contractor is responsible for trenching stability. The trench will be backfilled and compacted with specified materials as listed in the Construction Specifications. The RA Contractor will build all features based on dimensions provided on the RD Drawings.

4.9 NAPL Removal

The goal of NAPL monitoring/removal/off-Site disposal is continued removal and treatment of “hot spot” principal threat waste (NAPL). As part of these efforts, leachate wells NSL-55L and NSL-54L will be preserved. If preservation is not feasible or deemed necessary during construction, then leachate wells NSL-55L and NSL-54L will be replaced during cap construction. Also, if replacement becomes necessary, then triple-phase extraction wells may be considered.

An initial NAPL removal event will be conducted before cap construction, by bailing from NSL-54L and NSL-55L.

4.10 Leachate and LFG Extraction System

Vertical extraction wells (dual-phase LFG-leachate wells) will be installed within the waste boundary. This includes down-hole pumps, leachate conveyance piping, a lift station, LFG flare skid, an above-ground storage tank (AST) and leachate load-out pad. The AST has been designed and will be constructed in accordance with OAC 3745-27-08. The leachate and LFG collection system will be constructed along an alignment defined by control points provided in the RD Drawings.

The AST may be installed first, followed by construction of the leachate and LFG conveyance piping. The conveyance piping system will include LFG header and forcemain piping. The conveyance piping trench system will be located in the 12-inch sand drainage layer of the final cover. Trench backfill will meet the specifications in the RD. Trench construction will start at the lowest discharge points and progress upstream to drainage high points. In the unlikely event that leachate is found in the trench during construction, it will be collected and stored in the AST. The RA Contractor will perform the leachate and LFG extraction system construction in conjunction with the capping and stormwater management construction. The leachate and LFG extraction system piping will be constructed along the alignment and in accordance with the details provided in the RD.

The proposed method of leachate disposal is periodic characterization and removal of leachate from the proposed AST, via tanker trucks, and transportation and disposal to an off-Site commercial treatment facility.

4.11 Well Decommissioning

All wells within the areas to be capped (other than NSL-54L and NSL-55L) will be decommissioned in accordance with OAC 3745-9-10 (Abandoned Well Sealing), including the following 33 locations:

<i>Leachate Wells (13)</i>	<i>NAPL Piezometers (9)</i>	<i><u>Monitoring Wells</u></i>	
		<i>Upper Aquifer (5)</i>	<i>Main Aquifer (6)</i>
EPA-12	PZ-50L-A	EPA-6	NSL-11D
NSL-49L	PZ-54L-A	EPA-7	NSL-11DR
NSL-50L	PZ-54L-B	EPA-10	NSL-17D
NSL-51L	PZ-54L-C	NSL-62S	NSL-33D
NSL-52L	PZ-55L-A	NSL-64S	NSL-38D
NSL-53L	PZ-55L-B		NSL-41S

NSL-92L	PZ-55L-C
NSL-93L	PZ-55L-D
NSL-94L	PZ-55L-E
NSL-95L	
NSL-96L	
NSL-98L	
NSL-99L	

At this time, no other existing groundwater monitoring wells or perimeter LFG monitoring probes are proposed to be decommissioned. During RA construction, some of the existing wells/probes may ultimately require removal to complete RA construction. After RA completion, the existing wells/probes that are not part of the Site Wide Monitoring Program will be evaluated for potential decommissioning. Any decommissioning will be subject to USEPA approval and will follow all state and local requirements.

4.12 Former Production Well Decommissioning

Based on reconnaissance conducted during 2021, two large-diameter former water production wells, associated with the historical gravel mining activities, were identified in the existing borrow area (proposed stormwater basin) including a 26-inch diameter well that may be 60 feet deep¹, and another approximately 10-inch diameter well. It is possible that a third former production well may be present based on anecdotal information. During the reconnaissance, it was noted that the well casings are filled with soil or debris material; therefore, the depth and construction could not be measured. A 4-inch riser containing debris and an electrical conduit was also identified in the same area; however, it is unknown if it is associated with a former well or is the remnants of a former electrical pole.

These former production wells will be decommissioned in accordance with OAC 3745-9-10, with the specific procedures to be assessed after an Ohio-licensed driller has been retained and examined the wells. The specific procedures to decommission the production wells will be submitted to the USEPA for approval prior to initiating decommissioning activities.

4.13 Surveying

The RA Contractor shall be responsible for all surveying to construct all RD features. The final location of each RD feature (stormwater features, leachate collection and LFG extraction piping

¹ The 1966 United States Department of the Interior - Geological Survey Water-Supply Paper 1808 "Ground-Water Resources of the Dayton Area, Ohio" indicates on page 151 a well owned by Keystone Sand & Gravel Co that was 26-inch diameter installed in August 1948 at an elevation of 765 feet above sea level to a depth of 60 feet and equipped with a turbine pump. Although no map was found showing the location of that well, the diameter of the well mentioned in the document (26 inches) matches the size of the large well observed at the Site during 2021.

trenches, capping, etc.), will be established by land surveying methods and requirements in OAC 3745-27-08(D)(1).

4.14 Construction Completion Report

The RA construction will be summarized in a “Construction Completion Report” that will include the following:

- Summary of work
- Results of inspection, testing, and monitoring
- Description of deviations, if any, from the RAWP or RD
- Demonstration and documentation that construction is complete and operating as designed
- Plan drawings showing the as-built information
- Certification statements by a registered professional engineer and the SWPs’ Project Coordinator that the work was completed in accordance with the RAWP and ROD

Per SOW Section 4.7d, the Construction Completion Report will be completed in accordance with Chapter 2 of the USEPA’s closeout procedures for NPL sites guidance and will be accompanied by all certifications required by SOW Paragraph 6.5.

4.15 Permits

Section 300.400(e) of the National Hazardous Substance and Oil Contingency Plan states:

- 1) No federal, state, or local permits are required for on-site response actions conducted pursuant to CERCLA sections 104, 106, 120, 121, or 122. The term on-site means the areal extent of contamination and all suitable areas in very close proximity to the contamination necessary for implementation of the response action.*
- 2) Permits, if required, shall be obtained for all response activities conducted off-site.*

Accordingly, Federal, State, county, and local permits are not required to implement the remedial action, but the RD must meet substantive or equivalent permitting requirements. Examples of permit equivalency would be requirements related stormwater BMPs or the SPCCP during RA construction as required by National Pollutant Discharge Elimination System permit or other federal requirements.

It is anticipated that off-Site disposal quantities will not be significant; however, Section 7.2 provides additional information on how off-Site disposal of waste materials will be managed.

Long-term transportation of leachate for off-Site disposal, after completion of the RA, will consist of periodic (assume weekly) arrival and departure of a licensed liquid waste removal hauler to a

permitted disposal facility. A permit/licensing will be required for hauling of the leachate, but a separate permit is not anticipated for disposal since the leachate will be disposed of at a permitted facility.

SECTION 5

RESPONSIBILITY, AUTHORITY, AND KEY PERSONNEL

The roles for the key entities performing the RA (see **Table 5-1** and **Figure 5-1**) are as follows:

- **USEPA:** The USEPA is the lead governmental agency for the Site and will oversee all aspects of the RA. Mr. Dion Novak is the USEPA Remedial Project Manager. If deemed necessary, USEPA may engage an Oversight Contractor for assistance with oversight of the RA and other technical aspects of the project.
- **USEPA Oversight Contractor:** The USEPA Oversight Contractor assists the USEPA with technical aspects of the project. Mr. Brad Martin of Toeroek Associates, Inc. will serve in this role.
- **Ohio EPA:** The Ohio EPA is the support agency to the USEPA for the Site. The Ohio EPA will review and provide input or concurrence as needed during completion of the RA. Mr. Scott Glum is the Ohio EPA Project Manager.
- **SWPs:** The SWPs are responsible for performing the RA.
- **Project Coordinator:** The Project Coordinator will act as a liaison between the USEPA, Ohio EPA, SWPs, and RA contractors. The Project Coordinator will verify that the RA activities are performed in accordance with the CD. Mr. Mike Samples of de maximis, inc. is the Project Coordinator.
- **RA Contractor:** The RA Contractor will be the construction company that contracts with the SWPs to implement the RA construction phase of the project. The scope of the RA Contractor's activities is to construct and perform the work to satisfy the approved Final RD, as set forth in the Contract Documents (Drawings, specifications, Plans, Contract Terms and Conditions).
- **CQA Consultant:** The CQA Consultant will be an independent (from the RA Contractor) engineering firm that contracts with the SWPs to implement the CQA program described in this document. Specific responsibilities of the CQA Consultant are described in Section 1.4.5 of the CQA/QCP. Geosyntec Consultants is the CQA Consultant.
- **RD Consultant:** The RD Consultant will contract with the SWPs and be accessible to the SWP Project Coordinator and CQA Consultant for technical direction during RA construction. Geosyntec Consultants is the RD Consultant.

Prior to the Pre-Construction Meeting, key personnel will be identified for the various roles discussed above and submitted to the USEPA for review and approval.

**Table 5-1
RAWP Contact Table**

Key Personnel	Title	Organization	RA Role	Phone No.	E-mail
Dion Novak	USEPA Remedial Project Manager	USEPA, Region 5	Oversee all aspects of RA	(312) 886-4737	novak.dion@epa.gov
Brad Martin	USEPA Oversight Contractor	Toeroek	Assist USEPA with technical aspects	TBD	bmartin@toeroek.com
Scott Glum	Ohio EPA Project Manager	Ohio EPA	Review and provide input or concurrence as needed	(937) 285-6065	scott.glum@epa.ohio.gov
Michael H. Samples	SWP Project Coordinator	<i>de maximis, inc.</i>	Liaison between USEPA, Ohio EPA, SWPs, RA contractors. Verify that RA activities are performed in accordance with CD.	(865) 691-5052	mikes@demaximis.com
To Be Named	RA Contractor	To Be Named	Implement RA construction to satisfy Final RD	To Be Named	To Be Named
John Buyers, Jesse Varsho, Ian Richardson	CQA Consultant	Geosyntec	Implement the CQA program	(519) 514-2644 (630) 203-3349	jbuyers@geosyntec.com jvarsho@geosyntec.com
	RD Consultant		Provide technical direction during RA construction	(519) 514-2643	irichardson@geosyntec.com

SECTION 6

HEALTH AND SAFETY PLAN

The HASP for construction oversight and Site Wide Monitoring Plan activities is attached in **Appendix C**.

The RA Contractor and/or other contractors will be required to submit a HASP, not inconsistent with the Site HASP, prior to mobilization to the field.

SECTION 7

WASTE MANAGEMENT PLAN

7.1 Overview

The following waste streams are anticipated to be generated during the RA; and therefore, will need to be managed:

- Organic material from clearing and grubbing as discussed in Section 4.5
- Concrete and other construction demolition debris associated with the former gravel mining operations
- Materials generated during well and LFG probe decommissioning
- General trash & debris
- Used PPE
- Recyclable materials

Non-hazardous impacted soils will be excavated and placed into the DAs. Concrete foundations remain on Site from former structures. Concrete structures identified by the RA Contractor will be broken and transported to the DAs. The preferred method of waste management will be to relocate and place all materials into the DAs while minimizing any off-Site disposal activities.

7.2 Off-Site Disposal of Waste Materials

During excavation and consolidation activities, non-soil materials encountered will be visually inspected to determine whether they can be consolidated on Site or if they should be separated for potential off-Site disposal. The visual inspection will consider the following:

- Size and nature – the size and nature of non-soil materials will determine if they can potentially be placed in the DAs, or if they will require disposal off-Site at an appropriate facility. Materials that have sufficient integrity to avoid creation of “soft spots” may be incorporated in the fill. Some large debris items can be crushed so that they can be placed within the consolidation area.
- Potential recyclability – materials that have the potential to be recycled will be segregated, decontaminated and sent off-Site to an appropriate recycling facility.
- Physical condition – Putrescible or biodegradable solids might be encountered on the project and may be segregated and disposed off-Site at an appropriate disposal facility if these materials could lead to uneven settling of the cap. The preferred option would be to mix and blend with on-Site residues and to place them in the consolidation DAs.

Non-aqueous liquids and oily substances, if encountered, will be pumped out and contained in an appropriate container, solidified or absorbed as best deemed appropriate. The container will be labeled with “Waste Pending Analysis” and samples will be collected and tested for hazardous characteristics. Once characterized, the materials will be disposed of at an appropriate disposal facility. Facilities proposed for use will be subject to USEPA approval prior to off-Site shipment of any wastes.

If needed, 30-cubic yard roll-off boxes will be delivered to the Site to manage any larger quantities of non-hazardous materials deemed not suitable for placement into the DAs. Prior to disposal, it will be requested that the materials be sampled and analyzed. Analysis will include Toxicity Characteristic Leaching Procedure and any other parameters required by the disposal facility.

An eight-cubic yard roll-off will be provided near the trailer complex for the management of general trash and non-hazardous debris and used PPE on the project.

The USEPA must approve of any off-Site disposal, not including the general trash and non-hazardous debris and used PPE that accumulates in the roll-off near the trailer complex.

SECTION 8

TRAFFIC CONTROL PLAN

8.1 Overview

This Traffic Control Plan describes the means and methods to be employed to ensure the safety of employees and the community during heavy construction traffic tasks.

Traffic control is important to ensure a safe environment for workers, drivers, and pedestrians who may be using common or adjacent space. The proximity to residential and commercial areas as part of the project necessitates the implementation of a traffic control program to reduce the risk of injury to workers, drivers, pedestrians, and the transportation infrastructure.

The nature of the work associated with remediation activities will result in work tasks conducted in close proximity to or on adjacent roadways. Protective measures are necessary in situations where changed or unexpected traffic conditions could present a hazard to workers, drivers, or pedestrians.

8.2 Construction Entrance and Exits

A stabilized construction entrance will be constructed at the existing entrance located off Brandt Pike west of the Site. Construction signage will be placed on Brandt Pike to warn the public of potential construction traffic near the Site. Signs indicating trucks entering and exiting the roadway will be set up using temporary stands when truck traffic will be present at the Site.

The posted speed limit and/or anticipated operating speeds of traffic vehicles should be considered when delineating traffic control measure setup. **Table 8-1** provides the sight stopping distance which will be considered when determining placement of features. All signage shall meet United States Department of Transportation Federal Highway Administrations Manual of Uniform Traffic Control Devices. Additional care will be taken where trucks enter and exit onto Brandt Pike, as trucks entering or exiting can break pavement edges as they turn.

TABLE 8-1. SIGHT STOPPING DISTANCE

Speed (in MPH)	Distance (in feet)	Speed (in MPH)	Distance (in feet)
20	115	50	425
25	155	55	495
30	200	60	570
35	250	65	645
40	305	70	730
45	360	75	820

Notes: MPH = miles per hour

8.3 On-Site Temporary Access Roads and Route Delineation

Trucks and equipment moving throughout the Site will travel via the approved RA Contractor developed routing plan. Temporary haul routes for the off-road trucks will use existing ground surface as the trucks will be accessing different excavation locations daily. Haul routes will not exceed 20% grade, speed limit signs (maximum 25 MPH) will be posted along the haul route. The temporary haul route will be adjusted as the RA progresses. The temporary haul route will be the most direct route as possible, while avoiding damaged or impacted routes, in most instances. Any movement of waste or soil materials must remain entirely on Site during transportation.

The location of Site construction roads proposed by the RA Contractor will be transmitted to the Agencies as part of ongoing RA construction documentation. The locations of the access or haul roads for each substantial construction phase will be documented to the USEPA via email. The RA Contractor will ensure that all trucks do not deviate from the temporary haul routes.

8.4 Parking and Staging Areas

There will be sufficient parking area for personnel working on the Site as well as Site visitors. The locations for parking were determined to preclude interference with public traffic, access by emergency vehicles, or construction operations.

Staging area(s) will be identified during mobilization and constructed in the vicinity of the trailer and parking area based upon field conditions and available space. The area(s) will be graded to establish a clear level area.

8.5 Cross Sections & Drainage Facilities

Existing terrain features will be used to assist with erosion and runoff control. All access roads will be constructed in a manner as to not block Site drainage. Temporary culverts may be used for temporary access roads that transect drainage features. Site excavation and grading work will proceed in a manner to not interfere with drainage. Erosion controls such as silt fence and berms will be installed during the setup phase of the project.

8.6 Signage and Notices Required

Signs providing notification of personal protective equipment (PPE) required in this area, which may be combined with other non-traffic related safety items, will be posted to within 150 feet of the Site access point. Signs providing notification of nearby flammable materials will be posted at the on-Site fueling station as well as no smoking signs. One project sign and one project safety sign will be placed at the Site. Additional signage requirements are discussed in Sections 4.3, 8.2, and 8.3.

The details for perimeter signage are shown on detail 6/8 on RD Drawing 11. The perimeter signs will be installed at each access gate, and on the perimeter fence at an approximate spacing of 1,000 feet with a minimum of one sign on each perimeter side (i.e., north, south, east, and west) for each consolidated landfill unit (DA-1 and DA-2, 3, 5).

SECTION 9

AIR MONITORING AND DUST CONTROL PLAN

9.1 Introduction

This AMDCP describes the measures that will be taken to monitor and control airborne emissions during RA construction. Air monitoring results will dictate the need to upgrade or downgrade worker PPE and the need to implement engineering controls. Two types of air monitoring will be performed, including:

- Personnel air monitoring - responsibility of Site Safety and Health Officer (SSHO) (or their designee).
- Perimeter air monitoring - responsibility of CQA Consultant.

The SSHO will periodically collect information to judge the adequacy of ongoing fugitive emissions control efforts. Corrective actions will be taken as needed, resulting from the data collected. In all cases where ongoing Site activity must be modified, or delayed, to conduct work in a manner to limit or control fugitive emissions, the SSHO will have the authority to immediately take such actions or stop work.

9.2 Personnel Air Monitoring

Personnel air monitoring will be completed per the HASP and its action levels for the following parameters in sustained general work areas such as waste excavation, final capping, or dual-phase extraction well installation:

- Oxygen
- Lower explosive limit (LEL)
- Hydrogen sulfide (H₂S)
- Carbon monoxide (CO)
- Volatile organic compounds (VOCs) using a photoionization detector (PID)

9.3 Perimeter Air Monitoring

Perimeter air monitoring will be performed for VOCs, odors, and dust as summarized in **Table 9-1** at locations shown on **Figure 9-1**. The perimeter air monitoring locations were selected based on a southwest prevailing wind direction as shown on the wind rose for Dayton, OH (**Figure 9-2**). An on-Site weather station will be used to inform monitoring locations and emissions control measures.

Table 9-1
Perimeter Air Monitoring Summary

Parameter	Frequency	Sampling Locations (see Figure 9-1) ²	Action Level	Equipment
VOCs	Twice Daily ¹	DA-1: 14 DA-2,3,4,5: 17	5 ppm above background	PID or equivalent
Odors			Odor Level 3 (see Table 9-2)	Olfactory senses
Dust (PM _{2.5} and PM ₁₀)	Continuous	DA-1: 3 DA-2,3,4,5: 3	NAAQS ³ 24-hour averages for PM _{2.5} of 35 ug/m ³ and PM ₁₀ of 150 ug/m ³	Real-time particle monitor
Notes: 1. VOC and odor monitoring will occur only during waste excavation and placement, GCL and FML placement, or dual-phase extraction well installation. 2. Active disposal area (DA) is defined as the disposal area in which RA activities are occurring; for example, waste excavation from DA-4 and waste placement in DA-3 would have perimeter monitoring at DA-3 and DA-4. 3. National Ambient Air Quality Standards (NAAQS).				

Additional odor monitoring will also take place as soon as practical after receipt of an odor complaint.

9.4 Odor Monitoring and Control

Olfactory senses will be used to characterize the odor concentration and description. Odor concentration will be characterized based on a scale from 1 to 5 as shown in Table 9-2.

Table 9-2
Olfactory Odor Concentration

Numerical Value	Odor Level	Description
0	No odor	No detectable odor
1	Very Faint	Weak odors that the average person might detect if his/her attention were called to it
2	Faint	Weak odor strength that the average person would detect but may not be able to describe (i.e., smells like ...)
3	Distinct Easy to Detect	Moderate odor strength, odor can be easily described (i.e., smells like)
4	Strong	Strong odor strength that draws attention and makes the air very unpleasant
5	Very Strong	Very strong odor strength such that it is difficult to breathe

If Site personnel confirm that the Site is the source of an odor, then corrective actions will be implemented. Corrective actions implemented and timing of the actions to address the odor will depend on the source of the odor and the time of day. Potential odor control actions may include but are not limited to:

- Placement of additional cover materials.
- Minimize size or location of waste excavation and/or placement areas.
- Adjustments to the Site's LFG system, if applicable.
- Use of odor neutralizers.

Any odors detected at the perimeter of the landfill will be documented along with any incorporated corrective actions.

9.5 Dust Control

Dust control measures include, but are not limited to the following conventional methods:

- Adjacent paved areas and roads used for construction traffic will be maintained free of tracked soil or fill materials. At minimum, paved traffic areas and streets will be cleaned as needed by wet sweeping and/or washing. More frequent cleaning will be provided as necessary. Adjacent paved areas and roads will be left clean at the end of each day.
- Application of water mist to haul roads that service excavation operations and areas which may have airborne contaminants.
- Exposed excavations, disturbed ground surfaces, and unpaved traffic areas will be maintained in a moist condition.
- During non-working hours, the Site will be left in a condition that will prevent dust from being generated. At the end of each work day, disturbed areas will be wetted down and security fencing will be installed and or inspected to prevent access and additional disturbance.
- Provide temporary cover and daily maintenance for soil or fill stockpiles and keep active surfaces moist.
- A temporary decontamination pad and/or a stabilized construction entrance will be provided at active Site entrance locations to keep adjacent paved areas clean.
- Reducing vehicle speeds.
- Hauling materials in properly tarped truck beds.

Non-potable water for use in dust control, equipment decontamination, and street sweeping will be supplied by a 4,000-gallon water truck or equivalent used to transfer water from a nearby hydrant to the areas of use.

Multiple engineering control practices will be used to mitigate dust emissions. Engineering controls used will be adjusted when visible observations or air monitoring data indicate the need for additional corrective actions. Water, tarps, equipment travel speeds, and weather monitoring will be the primary controls used to minimize emissions. The following subsections further illustrate these practices.

If generation of visible dust plumes or concentrations in excess of established action levels continues after the additional dust mitigation measures have been implemented, then work will stop until conditions abate or additional measures are taken to reduce dust generation and airborne transport.

9.5.1 Watering

Water will be applied to Site work area surfaces and roads. The objective of watering is to raise the level of moisture in soils so that dust generation from these soils is minimal. Water is not intended to be added such that standing water or ponding results. Water will be applied via a 4,000-gallon water truck to both clean and impacted materials as needed. Equipment needed to apply water will be at the Site during all times that work activities are occurring and will be filled with

water during work hours. A properly trained employee will be available on Site at all times to transport and apply water for dust control as needed.

9.5.2 Control of Transportation Dust

The movement of vehicles across a job site represents the most common cause of airborne dust releases. The implementation of speed limits, haul road wetting and maintenance are the most common dust control measures to be implemented.

The RA Contractor will ensure that haul and access roads and pathways are properly maintained and constructed to enhance control of dust. Materials transport vehicles will be loaded in a manner to avoid spillage during transport. Any spillage of materials during transport will be immediately cleaned up and handled/used in the same manner as the original material.

Public roadways adjacent to the Site will be inspected daily for debris/dust; water and broom sweepers will be used to remove dust as necessary. The speed limits to be enforced on the Site will be no more than 25 MPH as to limit the generation of dust.

9.5.3 Materials Handling

Planning and scheduling of work activities will be done to minimize the number of times soil is handled or disturbed. Excavation, stockpile, and placement work areas will be planned to limit the amount of impacted soils or work area exposed. Truck loading and dumping activities will be conducted in a manner that reduces dust release. Drop heights will be minimized where possible to reduce dust generation during material handling.

9.5.4 Vegetation

Disturbance of vegetated areas will be avoided as long as possible to minimize the generation of dust and the limits of disturbance. Some areas of the Site may, as deemed necessary, receive temporary seeding depending on time of disturbance until final restoration. Vegetation will be replaced as soon as possible following complete Site restoration activities.

SECTION 10

DECONTAMINATION PLAN

This plan addresses the decontamination requirements and procedures for the excavation area, as well as the handling and storage of materials generated from decontamination. The primary method of decontamination in both areas will be dry brush decontamination to minimize the amount of contact water generated. However, other methods of decontamination, including flushing/power washing, will be used if dry brush decontamination procedures do not remove all materials from the equipment. Decontamination efforts will be observed by the SSHO and recorded.

10.1 Excavation Area Decontamination

The excavation area decontamination will include the decontamination of haul trucks, equipment, materials/tools, and personnel. Haul trucks will be inspected for material on the outside of the truck prior to leaving the excavation area. Materials on the outside of the truck will be removed using dry brush techniques prior to leaving the excavation area. Equipment and personnel will be decontaminated when they leave the work area or when switching from handling contaminated material to clean material.

Truck load-out will be conducted in a manner to minimize spillage and contact to the outside of the trucks. The excavator operator will inspect the outside of the haul trucks and a laborer will decontaminate the trucks using shovels, brushes, or other like tools, to remove bulk materials from the side rails before exiting the truck loading area if needed. In addition, spotters and truck drivers will monitor the haul roads for tracking or spillage. In the event that any debris is dropped along the haul road, it will be immediately removed and placed in the DAs to be capped.

Equipment that is exiting one work zone and moving to another or switching from handling contaminated material to clean material will be decontaminated using dry brush techniques to the extent necessary to perform the next operation. When equipment is switching from handling impacted materials to clean soils it will be decontaminated via pressure washing or other method.

10.2 Handling and Storage of Materials Generated from Decontamination Process

Residual impacted soils materials generated during the decontamination process will be collected and placed under the cap. Within the excavation area, materials will be loaded into haul trucks and transported to the DAs to be capped. All decontamination materials including PPE, plastic sheeting, and other non-soil materials used on Site will be containerized for off-Site disposal. Wash water from decontamination procedures will be collected and reused as dust suppression over contaminated soil in the DAs to be capped.

SECTION 11

EMERGENCY RESPONSE PLAN

The ERP (**Appendix D**) provides procedures to be used in the event of an accident or emergency at the Site. If any event occurs during construction that causes or threatens to cause a release of waste material on, at, or from the Site and that either constitutes an emergency situation or that may present an immediate threat to public health or welfare or the environment, the SWPs shall:

- 1) Immediately take all appropriate action to prevent, abate, or minimize such release or threat of release.
- 2) Immediately notify the authorized USEPA officer orally.
- 3) Take such actions in consultation with the authorized USEPA officer in accordance with all applicable provisions of the HASP, the ERP, and any other deliverable approved by the USEPA under the SOW.

The ERP provides an Emergency Information Sheet containing the hospital location, directions, government agency phone numbers, and emergency phone numbers in the event of a spill. The RA Contractor shall perform all activities in a manner that minimizes the potential for harmful impacts to surface water and groundwater. Measures for protection of water resources shall include providing temporary drainage facilities to prevent run-on and to control run-off from the Site. These drainage features shall be maintained throughout the period of construction. The RA Contractor shall not dispose of any materials in surface water or groundwater and shall install and maintain erosion and sediment controls (e.g., silt fences and straw bales) as needed throughout the work.

For any event or release that occurs, the SWPs will submit a written report to the USEPA within 14 days describing the actions or events that occurred and the measures taken, and to be taken, in response. The SWPs will also submit a written report to the USEPA describing all actions taken in response to such an event within 30 days after the conclusion of the event; this information may be reported in the next Monthly Progress Report.

An SPCCP will be prepared consistent with 40 CFR Part 112 (Oil Pollution Prevention), describing measures to prevent, and contingency plans for, spills and discharges to wetlands, surface waters, and groundwater. The following procedures will be used for various spills:

- 1) Small Spills – Spills or releases of hazardous chemicals in quantities that do not present immediate risk to personnel can be corrected and cleaned up by the RA Contractor or Site employee.
- 2) Large Spills – If the spill or release presents a hazard to either personnel or the environment, the immediate area shall be evacuated, and the RA Contractor contacted. Do not attempt to remediate the spill/release unless you have received specific Spill Response

Training. The RA Contractor will contact the appropriate HAZMAT response team for stopping the spill and performing cleanup.

The RA Contractor will prepare the SPCCP for submittal to the USEPA prior to the initiation of RA activities.

SECTION 12

LANDFILL GAS TRANSITION PLAN

The existing perimeter landfill gas abatement system (LGAS) will be replaced with an interior system. In accordance with the August 2, 2021 Proposed Supplemental Investigation memorandum, a temporary LGAS transition evaluation is currently in progress to aid in scoping the transition from the existing to final system. The evaluation involves shutting down the LGAS and performing perimeter LFG monitoring to determine if, where, and how long it takes for LFG migration to occur. This will aid in determining which portions of the existing LGAS are the most important to operate, and transitional infrastructure and operations can be planned accordingly.

The LGAS transition evaluation was initiated on August 11, 2021 and the 4-month study was completed on December 12, 2021 and the entire system returned to normal operation. The system was able to remain completely off for 15 consecutive weeks before the LEL of 5% methane by volume was reached at one probe location (TGP1b-C north of Disposal Area 1) triggering the system to be partially activated for the remaining 2 weeks of the 4-month evaluation period. Weekly data summary tables are provided in **Appendix E**.

The final results of the LGAS transition evaluation, and associated recommendations, will be submitted to the USEPA prior to the Pre-Construction Meeting.

SECTION 13

RA SCHEDULE

RA construction is preliminarily planned to begin in June 2022, break during winter 2022/2023, and be completed by the end of August 2023 (See **Figure 13-1**). The RA schedule is dependent upon receipt of comments and approvals from the USEPA, the schedule in the RA Contractor's bid, and potential COVID-related delays. The project schedule will be updated as necessary.

A summary of preliminary/estimated RA construction milestones is provided below:

- Receipt of USEPA Authorization to Proceed with RA - February 22, 2022
- Award RA Contract - April 23, 2022
- Pre-Construction Meeting - May 23, 2022
- Start of Construction - June 7, 2022
 - Site Clearing and Vegetative Grubbing - June to Aug 2022
 - 2022 June to August - Leachate AST, LFG Flare Transition, Decommission Existing Flare
 - 2022 June to December - DA-4 waste excavation and consolidation, DA-2, 3, 5 capping
 - 2023 February to August - DA-1 capping, installation of NAPL, LFG, leachate, and stormwater management systems
- Construction Inspection & Report - August to November 2023

SECTION 14

CONSTRUCTION QUALITY ASSURANCE/QUALITY CONTROL PLAN

The RD Report includes the CQA/QCP which addresses monitoring and testing activities that will be performed during construction and includes the following:

- (i) CQA personnel responsibilities and authorities.
- (ii) CQA meetings and documentation requirements.

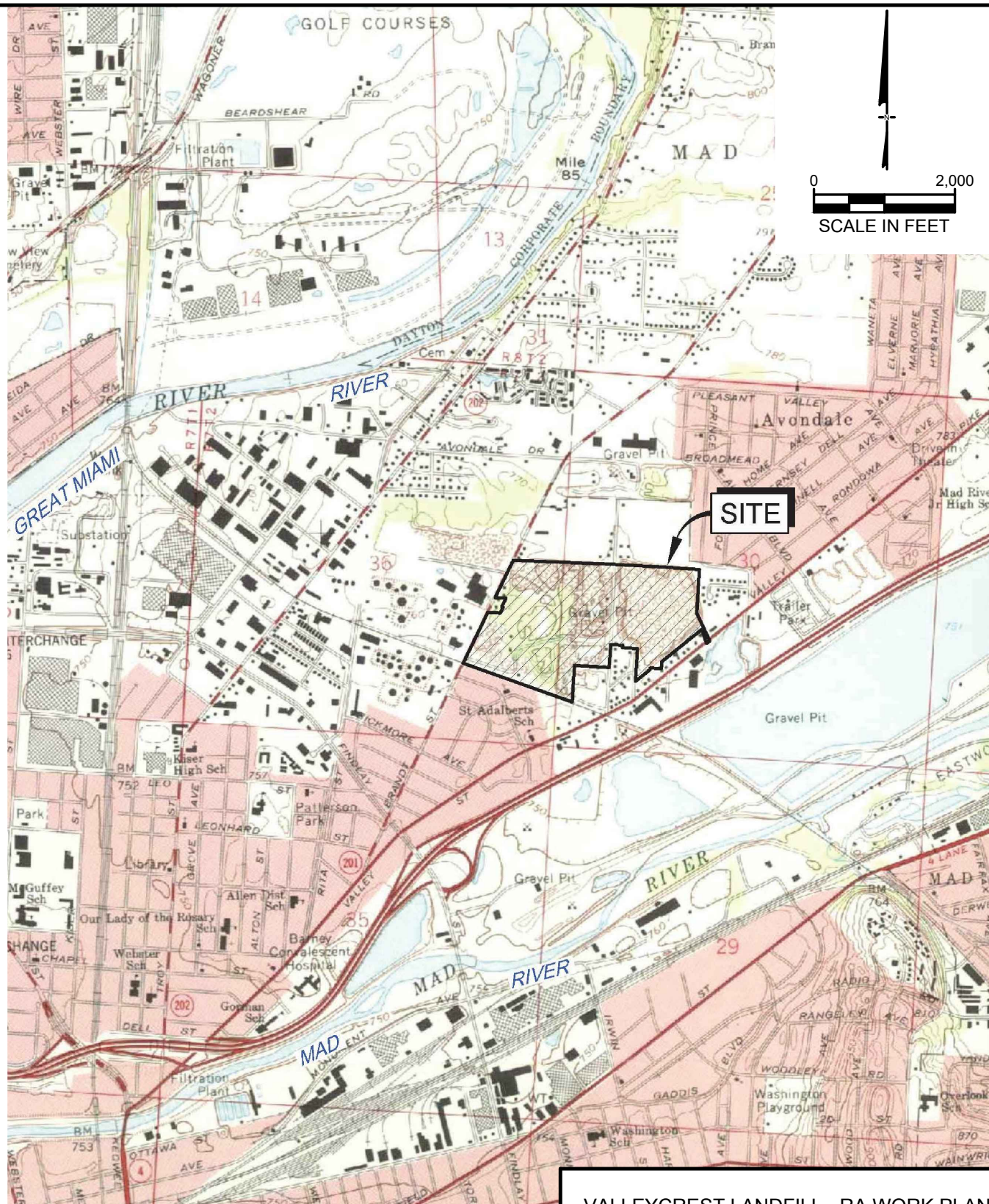
The CQA/QCP program shall be implemented by a third-party consultant, independent from the RA Contractor, to verify that the RA is constructed in accordance with the Final RD, and thus achieves the applicable performance standards. Construction monitoring and documentation will be performed for final remedial construction as described in the CQA/QCP.

SECTION 15

REFERENCES

- Conestoga-Rovers & Associates, May 2, 2008. Remedial Investigation Report for the North Sanitary Landfill, Dayton, Ohio.
- Conestoga-Rovers & Associates, March 21, 2011 with revised pages April 19, 2011. Feasibility Study Report for the North Sanitary Landfill, Dayton, Ohio.
- Geosyntec Consultants, February 2021. Remedial Design Work Plan, North Sanitary Landfill, Dayton, Ohio.
- GHD, May 20, 2019. Pre-Design Investigation Work Plan, North Sanitary Landfill, Dayton, Ohio.
- GHD, September 22, 2020. Pre-Design Investigation Evaluation Report, North Sanitary Landfill, Dayton, Ohio.
- National Fire Protection Association, 2003. Part 230 Standard for the Fire Protection of Storage.
- Ohio Environmental Protection Agency, September 14, 2004. Geotechnical and Stability Analyses for Ohio Waste Containment Facilities.
- Ohio Environmental Protection Agency, August 2019. Class IV Composting Facility Requirements.
- Ohio Environmental Protection Agency, December 2021. Closure Plan Review Guidance for RCRA Facilities.
- United States Environmental Protection Agency Region 5, July 30, 2012. Addendum to the Feasibility Study Report for the North Sanitary Landfill, a/k/a Valleycrest, Superfund Site, in North Dayton, Ohio EPA ID# OHD980611875.
- United States Environmental Protection Agency Region 5, August 16, 2013. Record of Decision, North Sanitary Landfill (Valleycrest) Site, Montgomery County, Dayton, Ohio.

Figures



SOURCE: USGS QUADRANGLE MAP;
DAYTON NORTH, OHIO



VALLEYCREST LANDFILL - RA WORK PLAN

SITE LOCATION

Geosyntec
consultants

PROJECT NO: TR0881

NOV. 2021

FIGURE
2-1

1. EXISTING SITE TOPOGRAPHIC CONDITIONS ARE BASED ON SITE TOPOGRAPHIC SURVEY, DATED MARCH 2019 AND REFERENCED AS "GHD UAV SURVEY, MARCH 2019." ON FIGURE 3.13 "TOPOGRAPHIC MAP" PREPARED BY GHD AS PART OF THE PDI EVALUATION REPORT, DATED SEPTEMBER 2020.
2. LOCATION OF DISPOSAL BOUNDARIES AND VALLEYCREST ROAD RIGHT OF WAY IS BASED ON GHD FIGURE 3.88 "PLAT OF SURVEY AND SITE DISPOSAL AREAS (LIMIT OF WASTE)", DATED SEPTEMBER 2020 AS PART OF THE PDI EVALUATION REPORT, DATED MARCH 2020.
3. CURRENT SITE CONDITIONS AND SITE TOPOGRAPHY MAY VARY FROM THAT DEPICTED ON DRAWING.
4. ALL SITE FEATURES ARE NOT SHOWN FOR CLARITY PURPOSES.

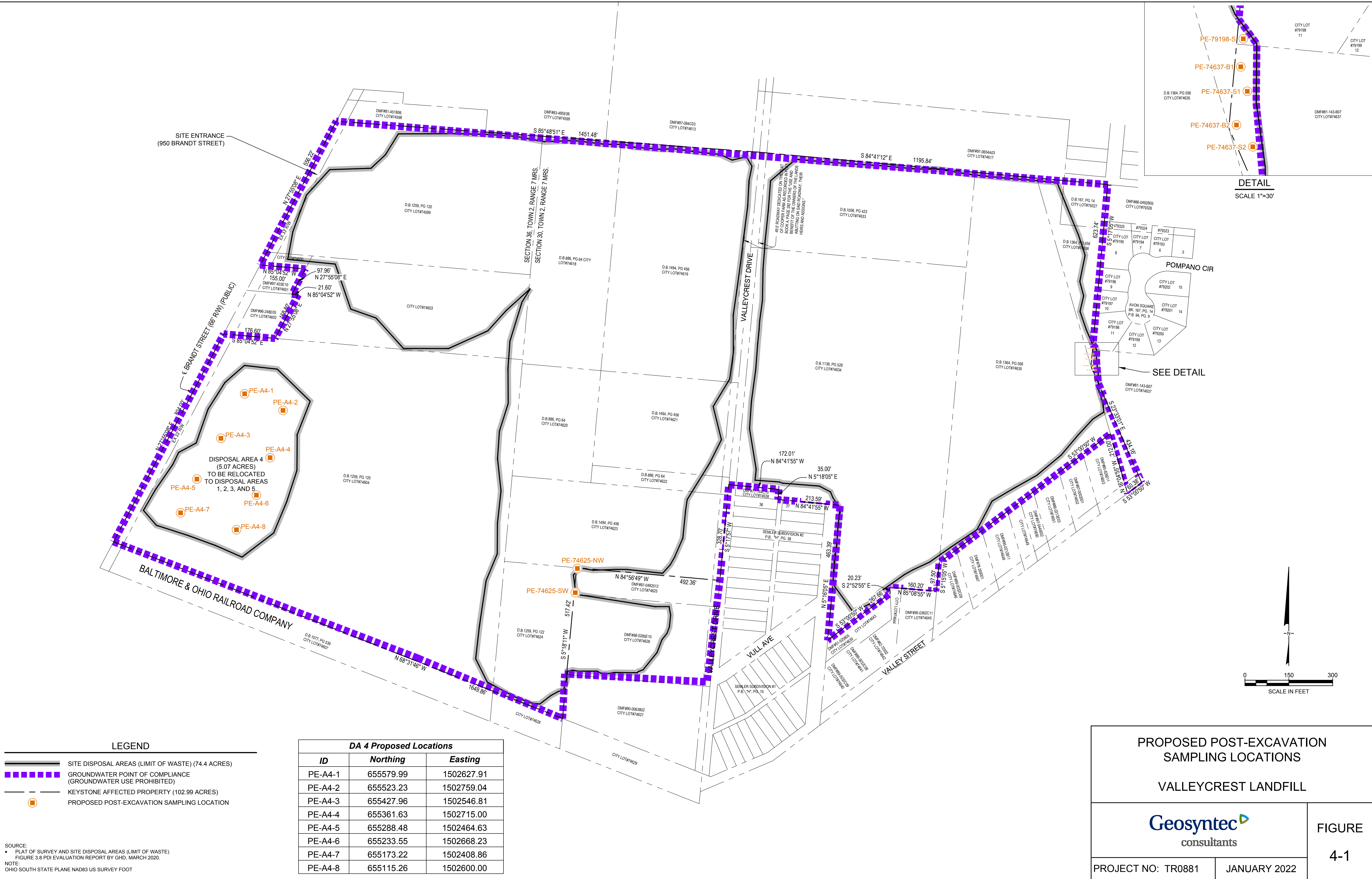
Geosyntec
consultants

FIGURE
2-2

PROJECT NO: TR0881

NOVEMBER 2021

W:\PROJECTS\TR0881 - VALLEYCREST LANDFILL\CAD\PROPOSAL\0881-PROPOSAL_G001 - Last Saved by: Marlene on 1/20/22



SOURCE:
• PLAT OF SURVEY AND SITE DISPOSAL AREAS (LIMIT OF WASTE)
FIGURE 3.8 PDI EVALUATION REPORT BY GHD, MARCH 2020.
NOTE:
OHIO SOUTH STATE PLANE NAD83 US SURVEY FOOT

**RA Construction Organization Chart
North Sanitary Landfill Site
Dayton, Ohio**

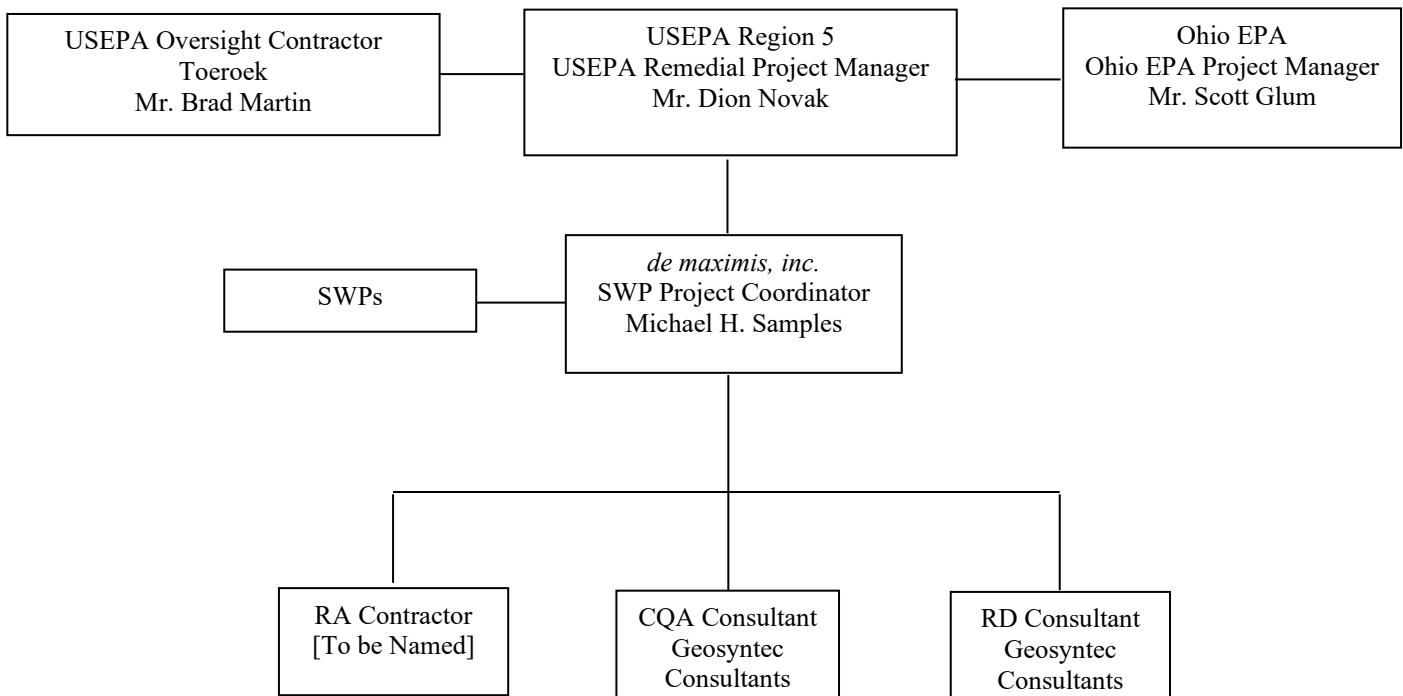
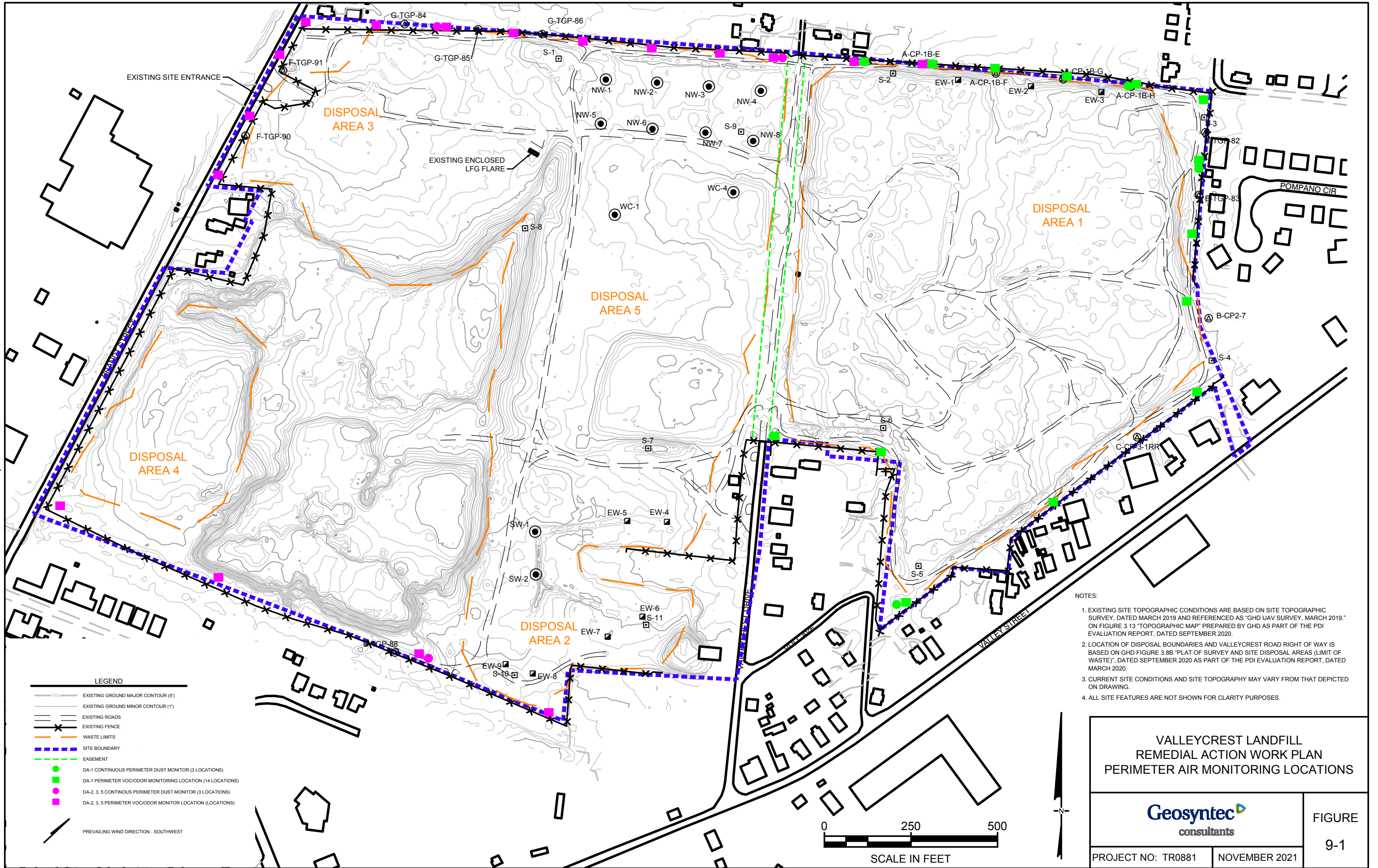


Figure 5-1 RA Construction Organization Chart

H:\VALLEYCREST - TR0881\DRAWINGS\95 % DESIGN\TR0881-002 EXISTING CONDITIONS - Last Saved by: JVarsho on 11/10/21



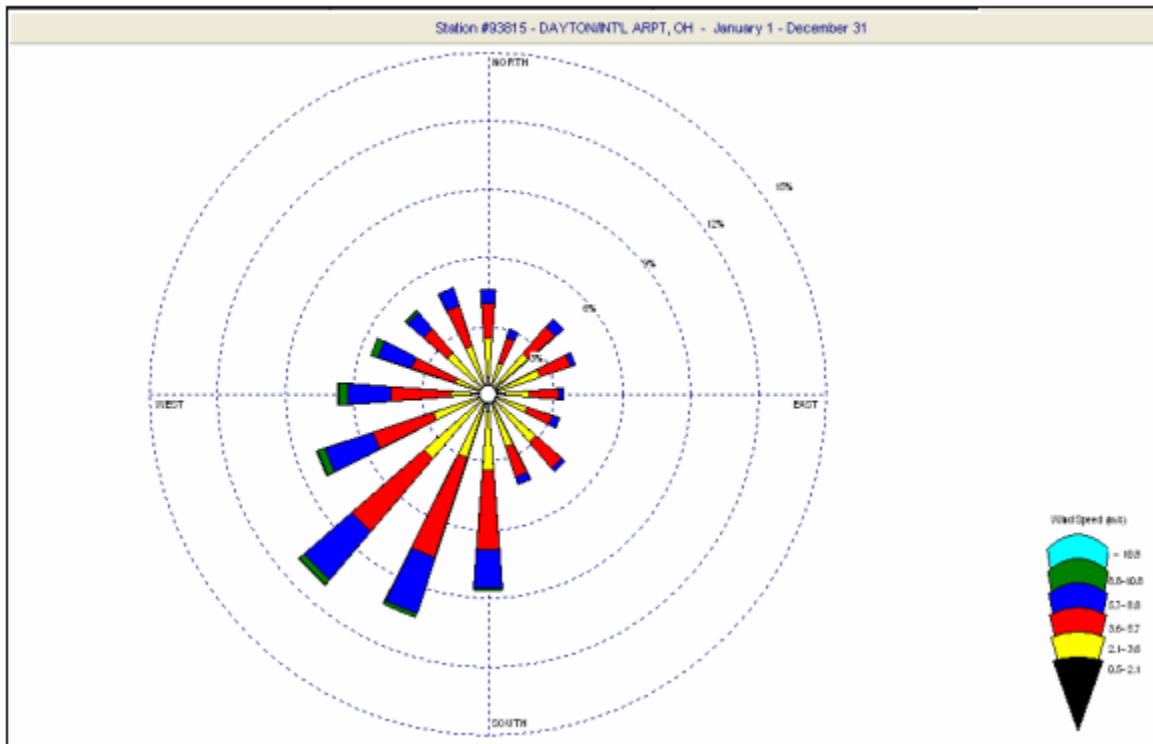
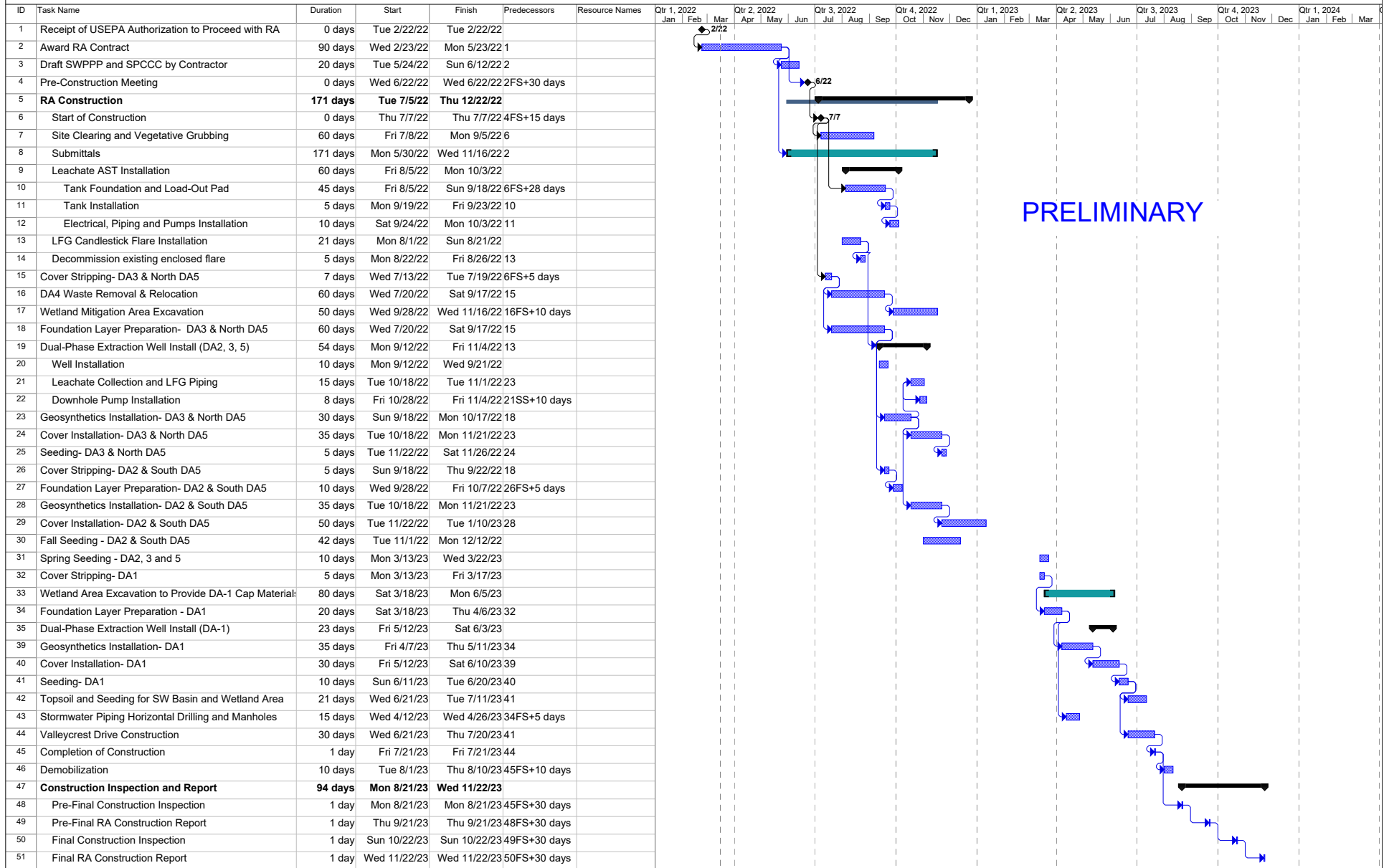


Figure 9-2 Wind Rose for Dayton, OH

FIGURE 13-1
REMEDIAL ACTION IMPLEMENTATION SCHEDULE
 North Sanitary Landfill (Valleycrest) Site
 Dayton, Ohio

Geosyntec Consultants
 Columbus, Ohio



The schedule of tasks is preliminary and will be revised in consultation with the RA Contractor.

Appendix A

Organic Materials Calculation

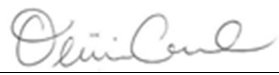
COMPUTATION COVER SHEET

Client: SWPs Project: Valleycrest Landfill Remedial Design Project/
Proposal No.: TR0881
Task No.

Title of Computations **Organic Material Calculations**

Computations by: Signature  8/10/21
Printed Name Alondra Soltero Date
Title Staff Professional

Assumptions and Procedures Checked by: Signature  8/10/21
(peer reviewer) Printed Name Olivia Covert Date
Title Professional

Computations Checked by: Signature  8/10/21
Printed Name Olivia Covert Date
Title Professional

Computations backchecked by: Signature  8/10/21
(originator) Printed Name Regan Welch Date
Title Project Engineer

Approved by: Signature  8/10/21
(pm or designate) Printed Name Regan Welch Date
Title Project Engineer

Approval notes: _____

Revisions (number and initial all revisions)

No.	Sheet	Date	By	Checked by	Approval
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

Written by: Alondra Soltero Date: 10 / 08 / 21 Reviewed by: RW Date: 10/08 /21
DD MM YY DD MM YY

Client: SWPs Project: Valleycrest LF Project/Prop No.: TR0881 Task No.: _____

TABLE OF CONTENTS

1. PURPOSE.....	4
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Organic Area Classification.....	4
Tree/Bush Weight Estimates	5
Total Quantities	5
5. CALCULATIONS AND RESULTS.....	5

Written by: Alondra Soltero Date: 10 / 08 / 21 Reviewed by: RW Date: 10/08 /21
DD MM YY DD MM YY
Client: SWPs Project: Valleycrest LF Project/Prop No.: TR0881 Task No.: _____

LIST OF APPENDICES

Appendix A Organic Waste Calculations Reference Document

Written by: Alondra Soltero Date: 10 / 08 / 21 Reviewed by: RW Date: 10/08 /21
DD MM YY DD MM YY

Client: SWPs Project: Valleycrest LF Project/Prop No.: TR0881 Task No.: _____

1. PURPOSE

The purpose of this calculation package is to estimate the quantity of organic material generated from clearing and grubbing activities during implementation of the Remedial Action (RA).

2. GIVEN

- Plant Branch 60% Draft Organic Waste Inventory Calculations (**Appendix A**)

3. ASSUMPTIONS

- The package classified the vegetation into five types: grass, bush, light wooded, medium wooded, and dense wooded.
- The quantities of organic waste were approximated for each vegetation type using the following equation:

$$\text{Weight} = \text{area} \times \text{weight per acre}$$

- Trees consist primarily of sugar maples, which grow approximately 0.2 inches in diameter per year.
- Trees are 20 years old, resulting in a tree diameter of four inches.
- Bush diameters are one inch.
- Trees and bushes are 20 feet tall.
- Density can be calculated from values provided in **Table 1**.

4. METHODOLOGY

Organic Area Classification

Areas of organic material in the landfill were determined using satellite imagery acquired via ArcGIS Online. The imagery was imported using ArcMap and areas delineated to estimate the total land use and vegetation type (**Figure 1**).

Written by: Alondra Soltero Date: 10 / 08 / 21 Reviewed by: RW Date: 10/08 /21
DD MM YY DD MM YY

Client: SWPs Project: Valleycrest LF Project/Prop No.: TR0881 Task No.: _____

Tree/Bush Weight Estimates

Tree and bush weights were based on the sum of estimated weights of the trunks, and branches. Alexander Clark et al. [1990] state that the weight of the trunk and the branch can be estimated using the tree diameter (**Table 1**).

Total Quantities

The maximum weight of material for offsite disposal was estimated as the sum of the collected trunk and branches.

5. CALCULATIONS AND RESULTS

Refer to **Table 2** for the estimated areas of organic waste in the landfill. The tree densities for the light wooded, medium wooded, and dense wooded areas were assumed to include 20 trees per acre, 75 trees per acre, and 150 trees per acre, respectively. The bush density was assumed to be 100 bushes per acre. An average tree diameter of four inches was selected considering an average tree age of 20 years and assuming sugar maples as the dominant tree species. Bush weight was assumed equivalent to that of a tree with a one-inch diameter trunk. The average trunk and branch weight per acre were estimated using the assumed diameters and the correlations presented in **Table 1**. **Table 3** shows the estimated weight for each vegetation type.

As shown in **Table 4**, the maximum disposal weight (the weight for disposal of trunks and branches) was estimated to be 2,141 yd³ (251 tons).

Tables

**Organic Material Calculations
Valleycrest Landfill
Dayton, Ohio**

Table 2: Estimated Areas of Organic Waste

Type	Area (ft ²)	Area (Acres)
1	Grass	130,271
2	Bush	463,176
3	Light Wooded	1,141,426
4	Medium Wooded	1,442,578
5	Dense Wooded	1,618,358

Table 3: Estimated Weight for Each Vegetation Type

Type	Tree Density (#/acre)	Average Tree Diameter (in)	Average Trunk + Branch Weight (tons)
1	Grass	NA	NA
2	Bush	100	1
3	Light Wooded	20	4
4	Medium Wooded	75	4
5	Dense Wooded	150	4

Table 4: Estimated Disposal Weight

Type	Area (acres)	Tree Density (#/acre)	Average Tree Diameter (in)	Average Trunk + Branch Weight (tons)	Total Trunk + Branches (tons)	Total Trunk + Branches (yd ³)
2	10.63	100	1	0.003	3	23
3	26.20	20	4	0.029	15	129
4	33.12	75	4	0.029	72	613
5	37.15	150	4	0.029	162	1,376
Total					251	2,141

Notes:

NA - Not Applicable

Formula:

1 lb = 0.0005 tons

Material density = 0.117 tons/cy

Assumptions:

Trees are 20 years old, resulting in a tree diameter of 4 inches

Bush diameters 1 inch

Trees and bushes are 20 feet tall

Density can be calculated from values provided in Table 1.

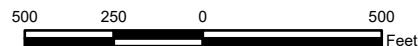
Trees consist primarily of sugar maples, which grow ~0.2 inches in diameter/year

Figures



Legend

-  Grass Area
-  Bush Area
-  Light Wooded Area
-  Medium Wooded Area
-  Dense Wooded Area



Notes

-

Vegetation Types

950 Brandt St
Dayton, OH 45404

Geosyntec
consultants

Ann Arbor, Michigan

2021/08/06

Figure

X

Appendix A

CALCULATION PACKAGE COVER SHEET

Client: Georgia Power Company **Project:** Plant Branch Ash Ponds B, C, D, E Closure by Removal and Construction of CCR Landfill **Project #:** GW7315

TITLE OF PACKAGE: ORGANIC WASTE INVENTORY - ASH PONDS B, C, D, AND E

PREPARATION	CALCULATION PREPARED BY: (Calculation Preparer, CP)	Signature _____ Name Qiwei Mao	10/12/2020 _____ Date
REVIEW	ASSUMPTIONS & PROCEDURES CHECKED BY: (Assumptions & Procedures Checker, APC)	Signature _____ Name Chris Jordan	10/12/2020 _____ Date
	COMPUTATIONS CHECKED BY: (Computation Checker, CC)	Signature _____ Name Chris Jordan	10/12/2020 _____ Date
BACK-CHECK	BACK-CHECKED BY: (Calculation Preparer, CP)	Signature _____ Name Qiwei Mao	10/12/2020 _____ Date
APPROVAL	APPROVED BY: (Calculation Approver, CA)	Signature _____ Name Victor Damasceno, PhD.	10/13/2020 _____ Date

REVISION HISTORY:

<u>NO.</u>	<u>DESCRIPTION</u>	<u>DATE</u>	<u>CP</u>	<u>APC</u>	<u>CC</u>	<u>CA</u>
A	Draft 60% Submittal to SCS/GPC	12/04/2020	QM	CJ	CJ	VD

CP: QM Date: 10/12/20 APC: CJ Date: 10/12/20 CC: CJ Date: 10/12/20
Client: GPC Project: Plant Branch Ash Pond Closure and Landfill Project No: GW7315

DRAFT ORGANIC WASTE INVENTORY - ASH PONDS B, C, D, AND E

PURPOSE

This calculation package (Package) was prepared in support of the Ash Ponds B, C, D, and E closures and construction of a coal combustion residuals (CCR) landfill at Georgia Power Company's (GPC) Plant Branch (site), located in Putnam County, Georgia. The Plant operated four coal-fired units that commenced power generation in the 1960s and were retired from service in 2015; the Plant was decommissioned in 2019. Over the course of power generation at the Plant, five CCR ponds, identified as Ash Ponds A, B, C, D, and E, were utilized. Ash Pond A, the first pond constructed at the facility, was taken out of service in the late 1960s and was closed in April 2016 by removal and relocation of its stored CCR to Ash Pond E. Ash Ponds B, C, D, and E are currently inactive and will be closed by removal, specifically, by relocation of the CCR stored in these ponds to the proposed CCR landfill to be located on the Plant property.

This Package presents the organic waste inventory calculation for Ash Ponds B, C, D and E, and the estimated quantities for both woody (e.g., trees) and non-woody (e.g., bushes, grasses) organic material waste expected from the ash ponds clearing and grubbing activities.

METHODOLOGY

This Package classified the vegetation into five types: grass, bush, light wooded, medium wooded, dense wooded. The weight of the trunk, branch and root ball were considered for woody vegetation. Grass may be scraped together with CCR to a specified depth, thus a unit weight for the grass-CCR mixture was selected based on Geosyntec Consultants, Inc. (Geosyntec) professional experience, as discussed in later subsections. The quantities of organic waste were approximated based on the area and estimated weight of each vegetation type per acre (Equation 1).

$$weight = area \times weight \text{ per acre} \quad (1)$$

CP: QM Date: 10/12/20 APC: CJ Date: 10/12/20 CC: CJ Date: 10/12/20
Client: GPC Project: Plant Branch Ash Pond Closure and Landfill Project No: GW7315

Organic Area Classification

Areas of organic material in the ash ponds were determined using aerial photos taken during the lidar survey performed by GPC on 1 August 2020. The photos were imported using AutoCAD Civil 3D 2020 and areas delineated to estimate the total land use and vegetation type within each ash pond (**Attachment A**).

Grass-CCR Mixture Weight Estimates

Commingled grass and CCR material (i.e., grass-CCR mixture) was assumed present on the top 12 inches (in.) of each ash pond footprint, to be removed during surficial CCR excavation. According to Summary of Geotechnical Design Parameters prepared by Geosyntec [2020], the in-situ unit weight of CCR is estimated as 90 pounds per cubic feet (pcf). When CCR mixed with grass during the scraping process, the unit weight could be further reduced. As a result, the unit weight of the grass-CCR mixture was selected as 80 pcf.

Tree/Bush Weight Estimates

Tree or bush weight was based on the sum of estimated weight of the trunks, branches, and the root balls. Alexander Clark et al. [1990] state that the weight of the trunk and the branch can be estimated based on diameter of the tree (**Table 1**). A chart compiled by the University of Tennessee [2009] indicates the weight of the root ball can also be estimated based on the tree diameter (**Table 2**). The data presented in **Tables 1** and **2** were plotted and extrapolated to develop the correlation between the diameter and tree/bush weight, as shown in **Figures 1** and **2**. The weight per acre for bush, light wooded, medium wooded, dense wooded areas were estimated considering different tree/bush densities and diameters.

Total Quantities

Organic waste that contains CCR will be mechanically screened to remove CCR, windrowed, or stockpiled for mulching prior to disposal at a permitted landfill. To account for the removal of CCR and moisture evaporation, a reduction factor of 0.3 was applied to both the root ball weight and the scraped CCR with grass, in other words, only 70 % of the results from Equation 1 will be accounted for.

CP: QM Date: 10/12/20 APC: CJ Date: 10/12/20 CC: CJ Date: 10/12/20
Client: GPC Project: Plant Branch Ash Pond Closure and Landfill Project No: GW7315

The total weight of organic waste (Equation 1) was estimated as the sum of the collected trunks, branches, root balls and the grass-CCR mixture. The weight of organic waste with CCR is the sum of the weight of root balls and the grass-CCR mixture.

CALCULATION

The area of each vegetation type is presented in **Table 3**. The tree densities for light wooded, medium wooded, and dense wooded areas were assumed to include 20 trees per acre, 75 trees per acre, and 150 trees per acre, respectively. The bush density was assumed to be 100 bushes per acre. An average tree diameter of 14 in. was selected sitewide considering an average tree age of 25 years and assuming southern pine as the dominant tree species. The average diameter was estimated based on the relationship between estimated age and diameter for southern pine [Bragg, 2012] as shown in **Figure 3**. Bush weight was assumed equivalent to that of a tree with a 3-in. diameter trunk. The average trunk and branch weight per acre and the average root ball weight were estimated based on the assumed diameters and the correlations presented in **Tables 1** and **2**. The estimated weight for each vegetation type was presented in **Table 4**.

The estimated total disposal weight, organic waste with ash, and combustible waste for each pond are presented in **Tables 5, 6, 7, and 8**. The combustible waste accounts for the total weight of the organic waste that could be burned at the Site, which includes tree trunks, branches, bushes and grass. Calculations were performed using Microsoft Excel®.

RESULTS

As presented in Tables 5 through 8, the total disposal weight (the weight for disposal of rootballs, branches and scraped material) for Ash Ponds B, C, D, and E were estimated to be approximately 52,022 tons, 72,632 tons, 59,970 tons, and 324,755 tons, respectively. The estimate of processed combustible weight is equal to the total disposal weight. The weight of organic waste with ash (i.e., waste in contact with ash such as rootballs and scraped vegetation) for Ash Ponds B, C, D, and E were estimated to be approximately 48,222 tons, 67,312 tons, 54,311 tons and 322,685 tons.

CP: QM Date: 10/12/20 APC: CJ Date: 10/12/20 CC: CJ Date: 10/12/20
Client: GPC Project: Plant Branch Ash Pond Closure and Landfill Project No: GW7315

REFERENCES

- Georgia Power Company (2020). Aerial Image for Plant Branch Ash Ponds B, C, D, and E Closure by Removal and CCR Landfill.
- Geosyntec (2020). Summary of Geotechnical Design Parameters, Plant Branch, Georgia Power Company, Putnam County, Georgia.
- Alexander Clark et al. (1990). Tables for Estimating Total-Tree Weights Stem Weights, and Volumes of Planted and Natural Southern Pines in the Southeast.
- University of Tennessee. (2009). Estimated Weight of Root Balls.
- Bragg, D. C. (2012). Age structure of a southern pine stand following 72 years of uneven-aged silviculture. In In: Butnor, John R., ed. 2012. Proceedings of the 16th biennial southern silvicultural research conference. e-Gen. Tech. Rep. SRS-156. Asheville, NC: US Department of Agriculture Forest Service, Southern Research Station. 29-30. (Vol. 156, pp. 29-30).

TABLES

Table 1. Tree Weight (Trunk and Branch) and Tree Diameter Correlation by Alexander Clark et al. [1990].

Table 10.--Predicted green weight of total tree (wood, bark, and foliage) for southern pine in the Piedmont, based on d.b.h. and total height ^{1/} ^{2/}

D.b.h. class (inches)	Total-tree height (feet)									
	20	30	40	50	60	70	80	90	100	110
	----- Pounds ^{3/} -----									
1	5	7	9	11						
2	16	24	31	38						
3	34	50	65	80	95					
4	58	85	111	136	161					
5		128	167	205	243	280				
6		188	245	301	357	411				
7		260	339	417	493	569	643			
8		345	450	553	654	754	852			
9		442	577	708	838	966	1093	1218		
10		552	720	884	1046	1206	1364	1521		
11			880	1081	1279	1475	1668	1859	2049	
12			1057	1299	1537	1772	2004	2234	2462	
13			1252	1538	1819	2097	2372	2644	2914	3182
14			1463	1797	2127	2452	2773	3091	3407	3720
15			1692	2079	2460	2835	3207	3575	3940	4302
16			1939	2382	2818	3248	3674	4096	4514	4929
17				2706	3202	3691	4175	4654	5129	5600
18				3053	3612	4164	4710	5250	5786	6318
19				3421	4048	4666	5278	5884	6484	7080
20				3812	4510	5199	5881	6555	7225	7888
21				4225	4999	5762	6518	7265	8007	8743
22				4660	5514	6356	7189	8014	8832	9643
23				5118	6055	6980	7895	8801	9699	10591
24				5598	6623	7635	8636	9627	10610	11585

^{1/} Blocked-in area indicates range of data.

^{2/} Includes 0.5-foot stump allowance.

^{3/} Trees < 5.0 inches d.b.h. $Y = 0.28557 (D^{2Th})^{0.92236}$

Trees $\geq$ 5.0 inches d.b.h. $Y = 0.18703 (D^2)^{1.05385} (Th)^{0.92236}$

Table 2. Root Ball Weight and Tree Diameter Correlation by University of Tennessee [2009].

Trunk Diameter (in.)	Ball Diameter (in.)	Ball Depth (in.)	Weight of Tree and Rootball (ton)
5	50	29	1.6
6	60	32	2.4
7	70	34	3.5
8	80	36	4.8
9	90	38	6.4
10	100	40	8.4
12	120	40	12.2
14	140	42	17.2
16	160	42	22.5

Table 3. Estimated Area of Each Vegetation Type

Area of Organic Waste (acres)	Type		Pond B	Pond C	Pond D	Pond E
	1	Grass	14.34	19.9	6.99	250.78
	2	Bush		4.49	6.57	15.87
	3	Light Wooded	9.59	5.06		
	4	Medium Wooded		5.61	4.28	21.05
	5	Dense Wooded	18.47	24.11	27.18	

*

Table 4. Estimated Weight for Each Vegetation Type

Type		Tree Density (per acre)	Average Tree Diameter (in)	Average Trunk + Branch Weight (tons)	Average Root Ball Weight (tons)	Scraped Soil Ash Removal Depth (in)	Scraped Soil Ash Removal Weight (tons/acre)
1	Grass	N/A	N/A	N/A	N/A	12.00	1,742
2	Bush	100	3	0.03	0.4	N/A	N/A
3	Light Wooded	20	14	1.28	15.3	N/A	N/A
4	Medium Wooded	75	14	1.28	15.3	N/A	N/A
5	Dense Wooded	150	14	1.28	15.3	N/A	N/A

FIGURES

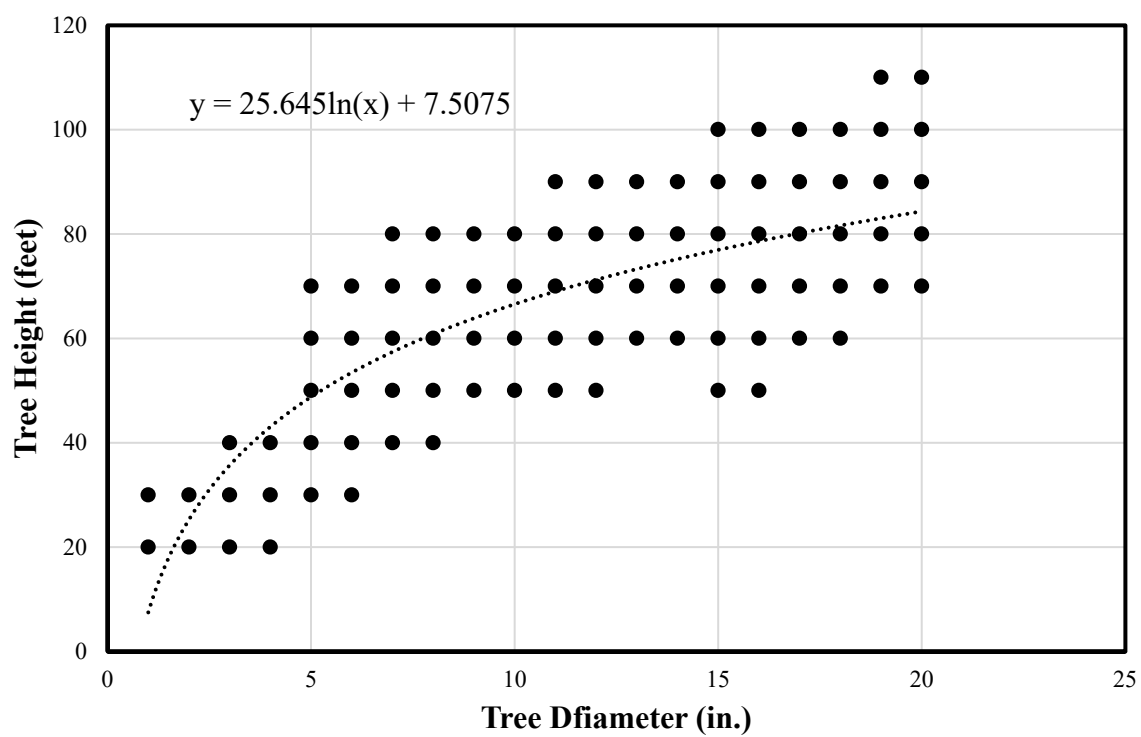


Figure 1. Interpolated Tree Weight (Trunk and Branch) and Tree Diameter Correlation.

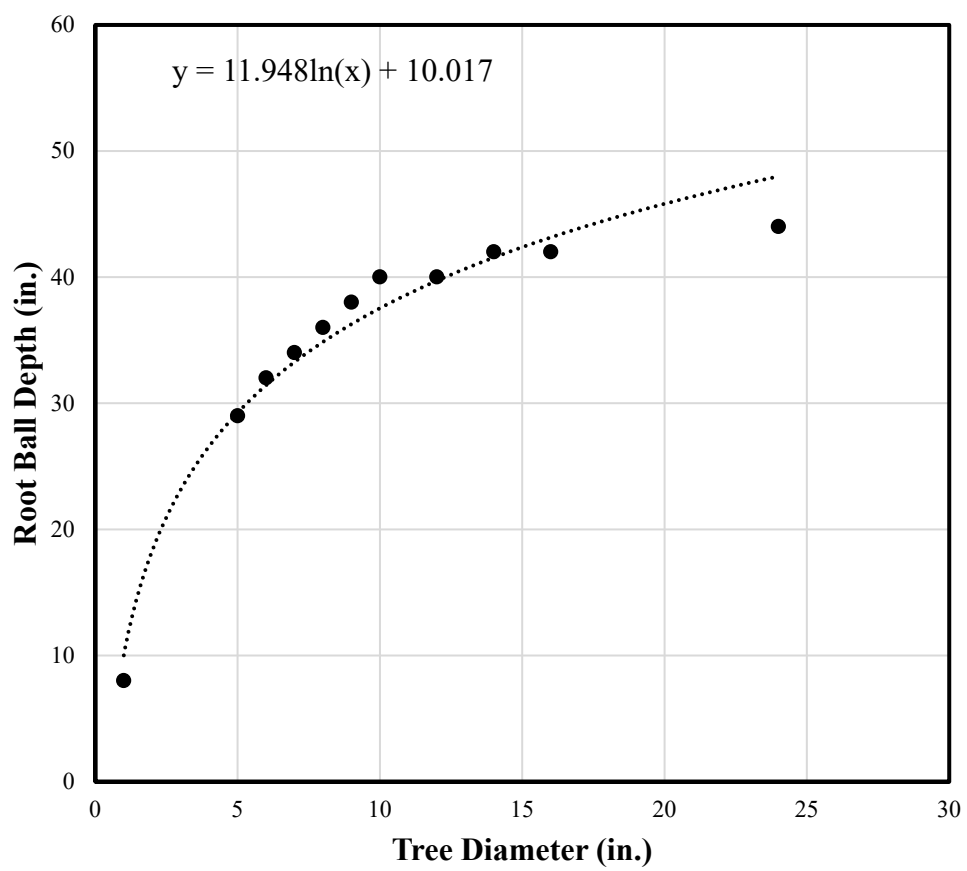


Figure 2. Interpolated Root Ball Depth and Tree Diameter Correlation.

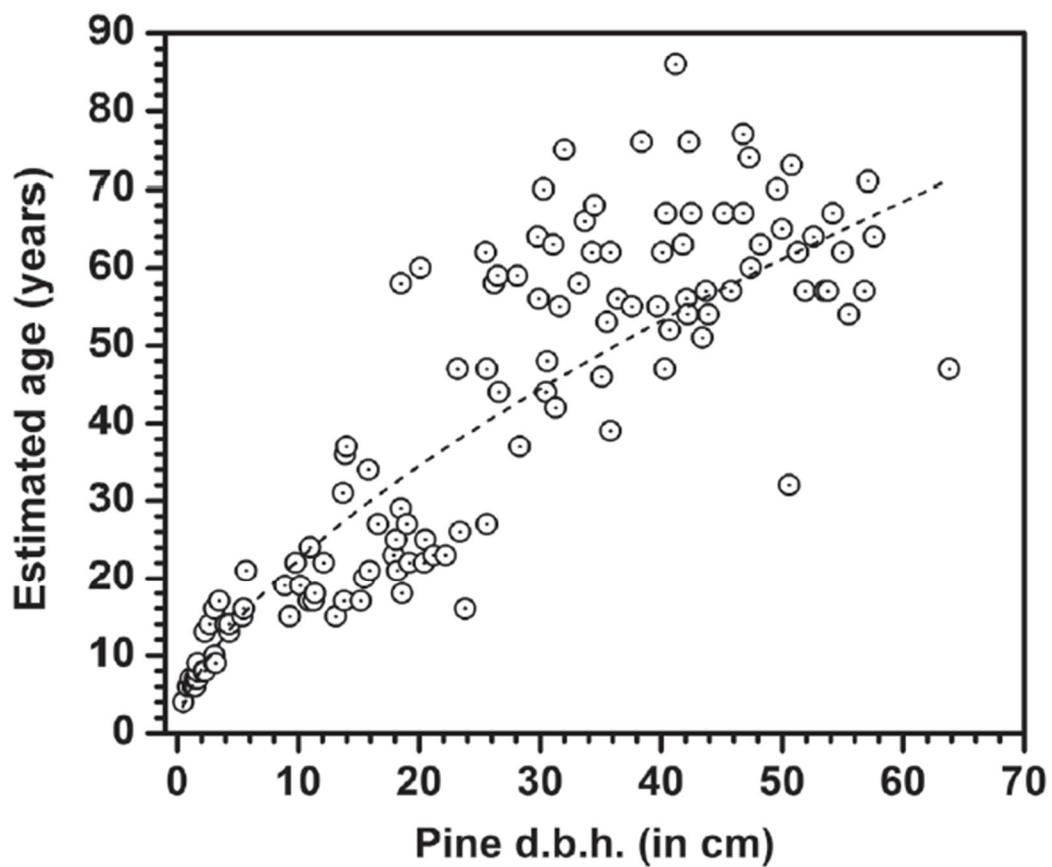


Figure 3. Relationship Between Estimated Age and Diameter of Southern Pine by Bragg [2012].

ATTACHMENT A

Appendix B

Ohio Voluntary Action Program Table I Residential Generic Direct Contact Soil

[Comment: For dates of non-regulatory government publications, publications of recognized organizations and associations, federal rules, and federal statutory provisions referenced in this rule, see paragraph (B) of rule 3745-300-01 of the Administrative Code titled "Incorporation by reference."]

(A) Generic numerical standards.

(1) Applicability.

- (a) Generic numerical standards listed in this rule for hazardous substances and petroleum may be used to demonstrate compliance with applicable standards provided the exposure scenario for the property comports with land use and activity patterns used to derive the generic numerical standard. Generic numerical standards are provided for complete exposure pathways to petroleum releases (paragraph (B) of this rule), direct contact with hazardous substances in soil to human receptors (paragraph (C) of this rule), unrestricted potable use for hazardous substances in ground water (paragraph (D) of this rule), and complete exposure pathways to human and ecological receptors from surface water and sediment (paragraphs (F), (G) and (H) of this rule).
- (b) If complete exposure pathways exist on a property that are not considered in the development of a generic numerical standard listed in this rule or if a generic numerical standard is not listed for chemicals of concern on a property, applicable standards must be derived in accordance with rule 3745-300-09 of the Administrative Code. Demonstration of compliance with applicable standards at a property may be made using a combination of generic numerical standards in accordance with this rule and standards developed through a property-specific risk assessment in accordance with rule 3745-300-09 of the Administrative Code.
- (c) If radioactive materials are identified at a property, the property may be subject to the Atomic Energy Act and regulations adopted thereunder and Chapters 3701. and 3747. of the Revised Code and rules adopted thereunder. If radionuclides or radioactive materials are present at a property, the cleanup of the radionuclides or radioactive material shall be conducted in compliance with requirements of the Ohio department of health. Remedy approval by the Ohio department of health shall be considered sufficient to meet applicable standards for radionuclides or radioactive materials for the voluntary action and may be considered a generic numerical standard.
- (d) If polychlorinated biphenyls are identified at a property, the property may be subject to cleanup levels or other provisions of the Toxic Substances Control Act and regulations adopted thereunder. Polychlorinated biphenyls shall be addressed within the voluntary action as a hazardous substance and meet either generic numerical standards in accordance with this rule or property-specific standards in accordance with rule 3745-300-09 of the Administrative Code.

(2) Assumptions.

- (a) Summation of risk and hazard across complete exposure pathways.

If more than one complete exposure pathway exists to each receptor population, the incremental cancer risk and hazard indices determined for each exposure pathway must be summed to calculate a cumulative cancer risk and hazard index to each receptor population. All final cumulative human health carcinogenic risk and non-carcinogenic hazard levels are based on one significant figure.

- (b) If the generic numerical standards of this rule are applied to one or more exposure units or identified areas of the property and applicable standards, as determined in accordance with rule 3745-300-09 of the Administrative Code, are applied to one or more other areas of the property, then the volunteer must ensure that the risk and hazard levels for each receptor on the property do not exceed:

(i) One excess cancer in a population of 100,000 (1×10^{-5}); and

(ii) A hazard index of 1.

All final cumulative human health carcinogenic risk and non-carcinogenic hazard levels are based on one significant figure.

- (c) Points of compliance. The volunteer must comply with the applicable standards at all points of compliance at the property, for each environmental media and complete exposure pathway, in accordance with paragraph (I) of rule 3745-300-07 of the Administrative Code.

- (3) A property-specific risk assessment must be conducted in accordance with the procedures established in rule 3745-300-09 of the Administrative Code to determine applicable standards instead of or in addition to using the generic numerical standards from this rule, if any of the following apply to the property:

- (a) The complete exposure pathways as identified in accordance with paragraph (F)(1) of rule 3745-300-07 of the Administrative Code, include exposure pathways that are not considered in the development of standards listed in this rule. Such exposure pathways include, but are not limited to, volatilization of contaminants to indoor air or non-potable use of ground water;
- (b) The exposure factors for the receptors identified in paragraph (E)(6) of rule 3745-300-07 of the Administrative Code are not considered in the development of standards listed in this rule;
- (c) The chemicals of concern on the property consist of hazardous substances or petroleum that do not have generic numerical standards included in this rule. If only some of the chemicals of concern identified have a generic numerical standard listed in this rule, a

volunteer may use the applicable generic numerical standards for the chemicals of concern having listed standards and conduct a property-specific risk assessment in accordance with rule 3745-300-09 of the Administrative Code. When using a combination of generic numerical standards and applicable standards determined by a property-specific risk assessment conducted in accordance with rule 3745-300-09 of the Administrative Code, the volunteer must adjust the concentrations of the applicable standards to meet the human health risk and hazard levels described in paragraph (A)(2)(b) of this rule;

- (d) Concentrations of chemicals of concern in surface water or sediment exceed applicable standards determined in accordance with this rule;
- (e) Complete exposure pathways to important ecological resources other than sediment or surface water exist; or
- (f) It is determined that chemicals of concern on or emanating from the property are persistent, bioaccumulative, and toxic in animal tissue and the development of the generic standards, other than Ohio-specific sediment reference values contained in attachment H of Ohio EPA's "Guidance for Conducting Ecological Risk Assessments," do not consider bioaccumulative effects.

(B) Generic numerical standards for petroleum.

(1) Applicability.

- (a) The generic numerical standards referenced in paragraph (B)(3) of this rule apply to all petroleum releases regardless of the source or how the petroleum was released. After eligibility requirements in accordance with rule 3745-300-02 of the Administrative Code have been met, applicable standards for all petroleum releases on the property must be achieved in accordance with this chapter.
- (b) The generic numerical standards referenced in paragraph (B)(3) of this rule apply to the exposure pathways for which rules adopted under division (B) of section 3737.882 of the Revised Code have numerical clean-up standards. If an exposure pathway is not addressed by a generic numerical standard under division (B) of section 3737.882 of the Revised Code, then the exposure pathway must be evaluated in accordance with rule 3745-300-09 of the Administrative Code.

(2) Assumptions.

- (a) The points of compliance for generic petroleum standards are those identified in paragraph (I)(1) for rule 3745-300-07 of the Administrative Code. For example, exposure pathways that are encompassed within the generic direct-contact soil standard shall use the points of compliance indicated in paragraph (I)(1)(a)(i) of rule 3745-300-07

of the Administrative Code. The volunteer must comply with the applicable standards at all points of compliance at the property, for each environmental medium and complete exposure pathway, in accordance with paragraph (I) of rule 3745-300-07 of the Administrative Code.

- (b) Cumulative adjustment for multiple chemicals and summation of risk across complete exposure pathways that are required for chemicals of concern on the property in order to comply with paragraphs (A)(2)(a) and (E) of this rule may not necessarily apply for generic petroleum standards referenced in paragraph (B)(3) of this rule. Cumulative adjustment for multiple chemicals and summation of risk across complete exposure pathways to meet generic petroleum standards are required only when required by rules adopted under division (B) of section 3737.882 of the Revised Code.
- (c) When ground water exceeds unrestricted potable use standards, ground water response requirements in accordance with rule 3745-300-10 of the Administrative Code must be met. Properties with free product exceed applicable standards for unrestricted potable use of ground water.
- (d) Commercial and industrial land use categories (as described in paragraph (C)(2)(c) of this rule) require implementation of institutional controls in accordance with paragraph (C)(3) of rule 3745-300-11 of the Administrative Code.

(3) Generic numerical clean-up standards for petroleum.

The generic numerical standards for petroleum at residential, commercial, or industrial properties are the standards established in rules adopted under division (B) of section 3737.882 of the Revised Code, as provided in division (B)(1) of section 3746.04 of the Revised Code. The state fire marshal's bureau of underground storage tank regulations administers the rules adopted under division (B) of section 3737.882 of the Revised Code. Property-specific standards for petroleum may be developed using rule 3745-300-09 of the Administrative Code.

(C) Generic direct-contact soil standards for hazardous substances.

(1) Applicability.

- (a) When applying generic direct-contact standards to soils on a property, a volunteer must select the generic land use or activity category which is consistent with the exposure factors for the generic land use or activity category contained in paragraph (C)(2)(c) of this rule. The exposure factor distributions used in the development of generic numerical standards are contained in Ohio EPA's "Support Document For the Development of Generic Numerical Standards and Risk Assessment Procedures." Generic direct-contact soil standards for commercial and industrial land uses are equal unless paragraph (B)(1)(b) of rule 3745-300-09 of the Administrative Code applies.

- (b) A property-specific risk assessment must be conducted in accordance with the procedures established in rule 3745-300-09 of the Administrative Code, to determine applicable standards instead of or in addition to using the generic direct-contact soil standards, if any conditions of paragraph (A)(3) of this rule apply.
- (c) Generic numerical standards for petroleum releases are identified in paragraph (B)(3) of this rule. The standards listed in paragraph (C)(3) of this rule apply to releases of hazardous substances.

(2) Assumptions.

(a) Single chemical.

The generic direct-contact soil standards presented in paragraph (C) of this rule assume a single chemical of concern is present within an identified area or exposure unit.

- (i) The single chemical generic direct-contact soil standards set forth in this rule are based on the following risk and hazard levels.
 - (a) For hazardous substances having carcinogenic effects, the chemical-specific carcinogenic risk must not exceed one excess cancer in a population of 100,000 (i.e., 1×10^{-5}); and
 - (b) For hazardous substances having non-carcinogenic effects, the chemical-specific risk must not exceed a hazard index of 1.
- (ii) The concentration of a chemical of concern, as determined in accordance with paragraph (F)(5) of rule 3745-300-07 of the Administrative Code, must not exceed the single chemical generic direct-contact soil standard for that chemical.

(b) Cumulative adjustment for multiple chemicals.

When more than one chemical of concern is present within an identified area or exposure unit and an applicable generic direct-contact soil standard for each of the chemicals of concern is contained in paragraphs (C)(3)(b), (C)(3)(c) or (C)(3)(d) of this rule, the standard for each chemical of concern must be adjusted for the presence of multiple chemicals in order to meet the risk and hazard levels described in paragraph (C)(2)(a) of this rule. A cumulative adjustment for multiple chemicals must also be made when using a combination of generic direct-contact soil standards and applicable standards determined by a property-specific risk assessment in accordance with rule 3745-300-09 of the Administrative Code. The incremental risk and hazard from direct contact to soils must be added to the incremental risk and hazard from other complete exposure pathways to the same receptor population, in accordance with (A)(2)(a) of this rule. All

final cumulative human health carcinogenic risk and non-carcinogenic hazard levels are based on one significant figure.

(c) Land use and activity categories.

The generic direct-contact soil standards established in this rule are based upon the intended use of the property after the completion of a voluntary action. Standards applied to commercial and industrial land use categories require implementation of institutional controls in accordance with paragraph (C)(3) of rule 3745-300-11 of the Administrative Code. Land use and activity categories must be determined as follows:

(i) Residential land use category.

Residential land use is land use with a high frequency of potential exposure of adults and children to dermal contact with soil, inhalation of vapors and particles from soil and ingestion of soil. Residential land use is considered protective for, and may be applied to, any and all categories of land use, without further restriction. Examples of residential land uses include, but are not limited to residences; day care facilities; schools, colleges and other educational institutions; nursing homes, elder care and other long-term health care facilities; and correctional facilities.

(ii) Commercial land use category.

Commercial land use is land use with potential exposure of adult workers during a business day and potential exposures of adults and children who are customers, patrons or visitors to commercial facilities during the business day. Commercial land use has potential exposure of adults to dermal contact with soil, inhalation of vapors and particles from soil and ingestion of soil. Examples of commercial land uses include, but are not limited to warehouses; retail gasoline stations; retail establishments; professional offices; hospitals and clinics; religious institutions; hotels; motels; and parking facilities.

(iii) Industrial land use category.

Industrial land use is land use with potential exposure of adult workers during a business day and potential exposures of adults and children who are visitors to industrial facilities during the business day. Industrial land use has potential exposure of adults to dermal contact with soil, inhalation of vapors and particles from soil and ingestion of soil. Examples of industrial land uses include, but are not limited to: lumberyards; power plants; manufacturing facilities such as metal-working shops, plating shops, blast furnaces, coke plants, oil refineries, brick factories, chemical plants and plastics plants; assembly plants; non-public airport areas; limited access highways; railroad switching yards; and marine port facilities.

(iv) Construction or excavation activities.

Construction or excavation activities include invasive activities that result in potential exposure of adult workers during the business day for a portion of one year. Exposures during construction or excavation activities are of greater intensity and shorter duration than those for the commercial and industrial land use categories. Construction or excavation activities have potential exposures of adults to dermal contact with soil, inhalation of vapors and particles from soil, and ingestion of soil. Examples of construction or excavation activities include but are not limited to maintenance or installation of utilities; installation of building footers or foundations; grading; trenching; or laying utility lines or cables; and repair of engineering controls where there is significant exposure to soils.

(3) Generic numerical direct-contact soil standards.

- (a) The generic direct-contact soil standards for carcinogenic and non-carcinogenic chemicals of concern are derived considering only the following exposures; ingestion of soil, dermal contact with soil, inhalation of volatile compounds in outdoor air and the inhalation and ingestion of particulate emissions. Any and all applicable exposures not considered within the generic direct-contact soil standards shall be addressed in accordance with rule 3745-300-09 of the Administrative Code.

The soil saturation concentrations are calculated using the U.S. EPA recommended soil saturation equation specified in paragraph (C)(3)(e) of this rule. This equation is not recommended for compounds that are at solid phase at ambient soil temperatures; therefore, no generic soil saturation values were calculated for those chemicals whose melting point is greater than seventeen degrees Celsius. Further, soil saturation values were determined only for those chemicals whose physicochemical parameters used to derive the soil saturation concentrations could be verified. The volunteer may use the equation specified in paragraph (C)(3)(e) of this rule, along with property-specific information, to calculate a property-specific soil saturation concentration in lieu of the generic soil saturation concentrations listed in tables I through III in paragraphs (C)(3)(b) through (C)(3)(d) of this rule.

- (b) Table I: generic direct-contact soil standards for carcinogenic and non-carcinogenic chemicals of concern - residential land use category (values are in mg/kg).

Chemical Abstract Service Number (CAS #)	Chemical of Concern	Standard for Single Chemical Noncarcinogen	Standard for Single Chemical Carcinogen	Soil Saturation	Generic Direct Contact Soil Standard for a Single Chemical (mg/kg)
Volatile Organic Chemicals					
67-64-1	Acetone	64,000	NA	100,000	64,000
71-43-2	Benzene	94	64	920	64

Chemical Abstract Service Number (CAS #)	Chemical of Concern	Standard for Single Chemical Noncarcinogen	Standard for Single Chemical Carcinogen	Soil Saturation	Generic Direct Contact Soil Standard for a Single Chemical (mg/kg)
75-15-0	Carbon Disulfide	1,400	NA	1,400	1,400
56-23-5	Carbon Tetrachloride	5.5	6.6	1,400	5.5
108-90-7	Chlorobenzene	410	NA	740	410
75-00-3	Chloroethane	10,000	3,700	2,200	2,200
67-66-3	Chloroform	300	6.6	3,400	6.6
124-48-1	Dibromochloromethane	1,500	130	1,600	130
75-71-8	Dichlorodifluoromethane	380	NA	1,400	380
75-34-3	Dichloroethane, 1,1-	2,000	NA	2,300	2,000
107-06-2	Dichloroethane, 1,2-	1,400	8.7	2,900	8.7
75-35-4	Dichloroethene, 1,1-	410	NA	1,700	410
156-59-2	Dichloroethene, <i>cis</i> -1,2-	760	NA	2,200	760
156-60-5	Dichloroethene, <i>trans</i> -1,2-	180	NA	1,800	180
78-87-5	Dichloropropane, 1,2 -	23	19	1,100	19
542-75-6	Dichloropropene, 1,3 -	92	35	810	35
123-91-1	Dioxane, 1,4-	7,400	260	270,000	260
60-29-7	Ethyl Ether	15,000	NA	33,000	15,000
100-41-4	Ethylbenzene	3,600	NA	230	230
50-00-0	Formaldehyde	1,900	560	130,000	560
64-18-6	Formic acid	1,200	NA	170,000	1,200
110-54-3	Hexane, <i>n</i> -	530	NA	190	190
78-83-1	Isobutyl Alcohol	23,000	NA	40,000	23,000
67-56-1	Methanol	33,000	NA	110,000	33,000
78-93-3	Methyl Ethyl Ketone (MEK)	37,000	NA	100,000	37,000
108-10-1	Methyl Isobutyl Ketone (MIBK)	5,800	NA	16,000	5,800
1634-04-4	Methyl <i>tert</i> -Butyl Ether (MTBE)	21,000	850	6,700	850
75-09-2	Methylene Chloride	2,200	250	2,300	250
100-42-5	Styrene	9,500	NA	1,700	1,700
630-20-6	Tetrachloroethane, 1,1,1,2-	2,300	37	750	37
79-34-5	Tetrachloroethane, 1,1,2,2-	4,500	11	1,700	11
127-18-4	Tetrachloroethene	510	17	380	17
108-88-3	Toluene	5,100	NA	520	520
71-55-6	Trichloroethane, 1,1,1-	6,100	NA	1,300	1,300
79-00-5	Trichloroethane, 1,1,2-	300	25	2,600	25
79-01-6	Trichloroethene	2,300	65	950	65
75-69-4	Trichlorofluoromethane	1,200	NA	1,600	1,200
96-18-4	Trichloropropane, 1,2,3-	450	1.5	1,100	1.5
75-01-4	Vinyl Chloride	98	4.6	1,100	4.6
1330-20-7	Xylenes, Total	1,000	NA	370	370
Semi-Volatile Organic Chemicals					
83-32-9	Acenaphthene	3,500	NA	NA	3,500
98-86-2	Acetophenone	6,300	NA	NA	6,300

Chemical Abstract Service Number (CAS #)	Chemical of Concern	Standard for Single Chemical Noncarcinogen	Standard for Single Chemical Carcinogen	Soil Saturation	Generic Direct Contact Soil Standard for a Single Chemical (mg/kg)
107-13-1	Acrylonitrile	35	6.6	22,000	6.6
62-53-3	Aniline	220	1,500	62,000	220
120-12-7	Anthracene	18,000	NA	NA	18,000
92-87-5	Benzidine	190	0.04	NA	0.04
56-55-3	Benzo(a)anthracene	NA	11	NA	11
50-32-8	Benzo(a)pyrene	NA	1.1	NA	1.1
205-99-2	Benzo(b)fluoranthene	NA	11	NA	11
207-08-9	Benzo(k)fluoranthene	NA	110	NA	110
117-81-7	Bis (2-ethylhexyl) Phthalate (BEHP & DEHP)	1,300	620	190	190
85-68-7	Butyl Benzyl Phthalate	13,000	620	58	58
86-74-8	Carbazole	NA	430	NA	430
57-74-9	Chlordane	34	28	NA	28
218-01-9	Chrysene	NA	1,100	NA	1,100
53-70-3	Dibenz(a,h)anthracene	NA	1.1	NA	1.1
95-50-1	Dichlorobenzene, 1,2- (o)	2,300	NA	370	370
106-46-7	Dichlorobenzene, 1,4- (p)	3,500	60	NA	60
91-94-1	Dichlorobenzidine, 3,3-	NA	19	NA	19
72-54-8	Dichlorodiphenyldichloroethane (DDD)	140	42	NA	42
72-55-9	Dichlorodiphenyldichloroethane (DDE)	NA	29	NA	29
50-29-3	Dichlorodiphenyltrichloroethane (DDT)	36	30	NA	30
94-75-7	Dichlorophenoxyacetic acid, 2,4-	630	NA	NA	630
84-66-2	Diethyl Phthalate	50,000	NA	590	590
105-67-9	Dimethylphenol, 2,4-	1,300	NA	NA	1,300
84-74-2	Di-n-butyl Phthalate	6,300	NA	110	110
99-65-0	Dinitrobenzene, 1,3- (m)	6.3	NA	NA	6.3
528-29-0	Dinitrobenzene, 1,2-	6.3	NA	NA	6.3
121-14-2	Dinitrotoluene, 2,4-	120	13	NA	13
606-20-2	Dinitrotoluene, 2,6-	63	13	NA	13
72-20-8	Endrin	19	NA	NA	19
107-21-1	Ethylene Glycol	110,000	NA	110,000	110,000
206-44-0	Fluoranthene	2,400	NA	NA	2,400
86-73-7	Fluorene	2,400	NA	NA	2,400
76-44-8	Heptachlor	31	1.8	NA	1.8
1024-57-3	Heptachlor Epoxide	0.81	0.95	NA	0.81
87-68-3	Hexachloro-1,3-Butadiene	13	83	1,000	13
118-74-1	Hexachlorobenzene	50	5.2	NA	5.2
67-72-1	Hexachloroethane	63	550	NA	63
193-39-5	Indeno(1,2,3-c,d)pyrene	NA	11	NA	11
78-59-1	Isophorone	12,000	9,100	4,600	4,600
98-82-8	Isopropylbenzene (Cumene)	2,700	NA	260	260

Chemical Abstract Service Number (CAS #)	Chemical of Concern	Standard for Single Chemical Noncarcinogen	Standard for Single Chemical Carcinogen	Soil Saturation	Generic Direct Contact Soil Standard for a Single Chemical (mg/kg)
58-89-9	Lindane	21	8.7	NA	8.7
108-39-4	m-cresol	3,100	NA	61,000	3,100
72-43-5	Methoxychlor	310	NA	NA	310
90-12-0	Methylnaphthalene, 1-	4,100	NA	360	360
91-20-3	Naphthalene	180	69	NA	69
98-95-3	Nitrobenzene	27	NA	1,500	27
86-30-6	Nitrosodiphenylamine, <i>n</i> -	1,300	1,700	NA	1,300
95-48-7	o-cresol	3,100	NA	NA	3,100
117-84-0	Octyl Phthalate, di- <i>n</i> -	2,500	NA	12	12
106-44-5	p-cresol	310	NA	NA	310
87-86-5	Pentachlorophenol	1,400	55	NA	55
108-95-2	Phenol	15,000	NA	NA	15,000
1336-36-3	Polychlorinated Biphenyls	1.2	4.0	NA	1.2
129-00-0	Pyrene	1,800	NA	NA	1,800
110-86-1	Pyridine	63	NA	400,000	63
93-72-1	Silvex	500	NA	NA	500
8001-35-2	Toxaphene	NA	7.8	NA	7.8
95-95-4	Trichlorophenol, 2,4,5-	6,300	NA	NA	6,300
88-06-2	Trichlorophenol, 2,4,6-	NA	770	NA	770
95-63-6	Trimethylbenzene, 1,2,4-	85	NA	250	85
108-67-8	Trimethylbenzene, 1,3,5-	69	NA	200	69
99-35-4	Trinitrobenzene, 1,3,5- (s)	1,900	NA	NA	1,900
108-05-4	Vinyl Acetate	1,400	NA	2,700	1,400
Inorganic Chemicals					
7440-36-0	Antimony	30	NA	NA	30
7440-38-2	Arsenic, Inorganic	21	6.7	NA	6.7
7440-39-3	Barium and Compounds	15,000	NA	NA	15,000
7440-41-7	Beryllium and Compounds	150	16,000	NA	150
7440-43-9	Cadmium	72	22,000	NA	72
16065-83-1	Chromium (III)	110,000	NA	NA	110,000
18540-29-9	Chromium (VI)	230	3,300	NA	230
7440-48-4	Cobalt	1,400	14,000	NA	1,400
57-12-5	Cyanide, Free	1,500	NA	NA	1,500
7782-41-4	Fluorine (soluble fluoride)	4,500	NA	NA	4,500
7439-97-6	Mercury	7.6	NA	NA	7.6
7440-02-0	Nickel (Soluble Salts)	1,500	NA	NA	1,500
7782-49-2	Selenium and Compounds	380	NA	NA	380
7440-22-4	Silver	380	NA	NA	380
7440-28-0	Thallium	6.1	NA	NA	6.1
7440-62-2	Vanadium	680	NA	NA	680
7440-66-6	Zinc and Compounds	23,000	NA	NA	23,000

Appendix C

Health and Safety Plan



engineers | scientists | innovators

HEALTH AND SAFETY PLAN

North Sanitary Landfill Dayton, OH

Prepared by

*Geosyntec Consultants, Inc.
931 Chatham Lane, Suite 103
Columbus, Ohio 43221*

Project Number TR0881

August 2021

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H&S INCIDENT RESPONSE PROCEDURES

H&S Incident Response Procedures

CHOOSE THE RIGHT PATH



For more Information:

All work-related injuries, illnesses, and near-miss situations, to include vehicle accidents and general liability claims, must be documented and reported to the Health and Safety (H&S) team

Visit the H&S team on the intranet:
<http://home.geosyntec.com/Corp/EHS/>.

Dale Prokopchak
804-349-8067

Joe Esseichick
734-417-0909
West Region

Ersin Yalcin
404-435-4722
Southern Region

Mark Malchik
781-392-5440
North Region

Jason Ford
519-822-2230
Canadian Region

Geosyntec[®]
consultants

ROUTE TO HOSPITAL



MIAMI VALLEY HOSPITAL

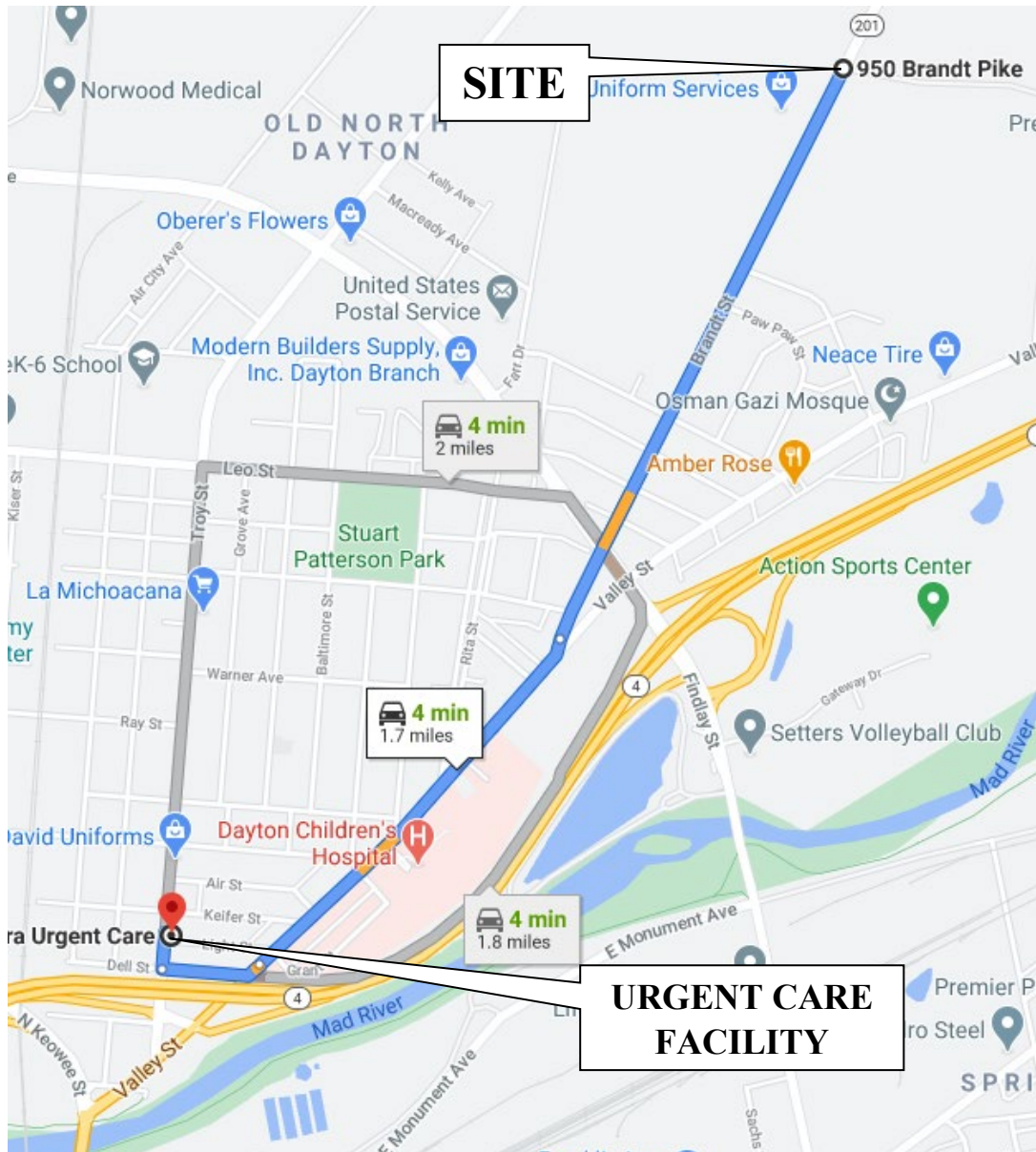
937-208-2048
1 Wyoming Street
Dayton, OH 45409

DIRECTIONS TO HOSPITAL FROM SITE

1. Head southwest on Brandt Pike
2. Continue onto Brandt St
3. Continue onto Valley St
4. Valley St. turns left and becomes N. Keowee St.
5. Turn left onto Wayne Ave
6. Turn right onto Wyoming St

Driving Time: 13 mins

Driving Distance: 4.2 miles



ROUTE TO URGENT CARE FACILITY

CONCENTRA URGENT CARE

937-228-8132
228 Troy Street
Dayton, OH 45404

DIRECTIONS TO URGENT CARE FACILITY FROM SITE

- | | | |
|----|--|--------|
| 1. | Head south on Brandt Pike | 0.9 mi |
| 2. | Turn right onto Valley Street | 0.6 mi |
| 3. | Turn right onto Dell Street | 0.1 mi |
| 4. | Turn right at the 1 st cross street onto Troy Street. | |
| | Destination will be on the right | 246 ft |

Driving Time: 4 mins

Driving Distance: 1.7 miles

1. INTRODUCTION

This Health and Safety Plan (HASP) for the North Sanitary (a.k.a. Valleycrest) Landfill (Site) in Dayton, Ohio was developed per Section 6.7d of Appendix B (Statement of Work [SOW] for Remedial Design and Remedial Action [RD/RA]) of the 2018 Consent Decree for the Site. Per SOW Section 6.7d:

The Health and Safety Plan (HASP) describes all activities to be performed to protect on-site personnel and area residents from physical, chemical and all other hazards posed by the Work. Settling Work Parties shall develop the HASP in accordance with EPA's Emergency Responder Health and Safety and OSHA requirements under 29 C.F.R. §§ 1910 and 1926. The HASP should cover RD activities and should be, as appropriate, updated to cover activities during the RA and updated to cover activities after RA completion. EPA does not approve the HASP, but will review it to ensure that all necessary elements are included, and that the plan provides for the protection of human health and the environment.

This HASP was prepared to address Site-specific hazards known or suspected to be present associated with the existing conditions and work to be performed at the Site. This HASP was prepared to meet the requirements specified in Occupational Safety and Health (OSHA) Hazardous Waste Operations Emergency and Response (HAZWOPER) program. The RA Contractor and/or other contractors will be required to develop their own HASP, that is not inconsistent with this Site HASP, prior to mobilization to the field. This HASP will need to be updated to reflect any further refinement of the RA activities, specific equipment that is installed, and long-term operation and maintenance (O&M) procedures.

2. SIGNATURES

2.1 Preparers and Reviewers

This HASP must be maintained on Site when field work is being performed. The Site Health and Safety Officer (SHSO) can change or amend this document, in agreement with the Health and Safety Coordinator (HSC) or Project Manager (PM). Amendments (e.g., changes in personal protective equipment, addition of tasks, etc.) must be documented in Section 19 and in Appendix A. This HASP must be reviewed, and if appropriate amended, on an annual basis for projects lasting more than 1 year.

Prepared by:



SHSO

March 7, 2022

Date

Reviewed by:


HSC

March 3, 2022

Date

Approved by:



Project Manager

Feb 28, 2022

Date

This HASP has been given to the following H&S approved subcontractor(s).

_____ Subcontractor	_____ Representative	_____ Date
_____ Subcontractor	_____ Representative	_____ Date
_____ Subcontractor	_____ Representative	_____ Date

2.2 Site Workers

This HASP must be reviewed by personnel prior to Site work. Workers not in attendance at the initial meeting must be trained by the SHSO on the information covered in the pre-entry briefing. After reading the HASP and attending a pre-entry briefing, parties covered under this HASP must sign the following acknowledgment statement.

“I have read, understand, and will perform my work in accordance with the information set forth in this HASP.”

Signature	Printed Name	Date

3. EMERGENCY CONTACT INFORMATION

Contact	Telephone Numbers	
	Office	Alternate (Type)
Fire Department	(937) 333-4500	911
Police Department	(937) 333-1290	911
Site Emergency Response (if applicable)	TBD	TBD
Hospital – Miami Valley Hospital	(937) 208-2048	
Director of H&S – Bob Poll*	(804) 332-6376	(804) 349-8067 (Cell)
H&S Regional Manager – Jim Bannantine*	(262) 834-0227	(414) 339-5630
Project Manager – Megan Martz*	(317) 343-4793	(317) 345-1552
Site Health & Safety Officer – Greg Lewis*		(513) 882-8832
H&S Coordinator – Jim Bannantine*	(262) 834-0227	(414) 339-5630
Principal- or Associate-in-Charge –Jesse Varsho*	(630) 203-3349	(630) 803-2659
Utility Emergencies –	811	
EthicsPoint –	(844) 231-3371	
WorkCare –	(888) 449-7787	(714) 978-7488
Facility Contact	TBD	TBD
Client Contact – Michael Samples	(865) 691-5052	(865) 548-1875
Subcontractor	TBD	TBD
Other		

*Geosyntec staff are shown for the purpose of this document; however, the actual entities and personnel that will be present on the Site during RA and O&M are to be determined.

4. APPLICABILITY OF THIS HASP

The RA Contractor and/or other contractors will be required to develop a HASP, that is not inconsistent with this Site HASP, prior to mobilization to the field. Subcontractors, at a minimum, shall ensure that their employees, and those of its lower tier subcontractors, comply with these procedures and other health, safety and security provisions in the Subcontract. Compliance with this HASP shall represent the minimum requirements to be met by subcontractors, who shall be responsible for examining all requirements and determining whether additional or more stringent health, safety and security provisions are appropriate for their portion of the work and implementing them accordingly. Therefore, for firms executing all or any portion of the work, this document and its contents should not be used without a thorough peer review by their health and safety managers. Prior to commencing work, such firms are responsible for reviewing and supplementing the HASP to add appropriate procedures specific to their portion of the work.

5. SITE/TASK/HAZARD DESCRIPTION

5.1 Site Background

The following is a brief description of the Site, including information as to the location, approximate size, previous usage, and current usage. A description of the tasks to be performed is also presented.

Site Location:	<u>950 Brandt Pike, Dayton, Ohio 45404</u>
Approximate Size of Site:	<u>100 acres</u>
Previous Site Usage:	<u>Mixed waste landfill</u>
Current Site Usage:	<u>Closed landfill</u>

Description of Surrounding Property/Population:

North:	<u>Residential</u>	East:	<u>Residential</u>
South:	<u>Residential</u>	West:	<u>Industrial</u>

Summary of Previous Site Investigations (if available/applicable):

Site investigations have been ongoing since approximately 1990. Table 1 provides a summary of the soil and groundwater COCs. The exposure routes and regulatory time weighted average (TWA) exposure levels for these chemicals are also presented in Table 1. These levels are set to protect the health of workers.

5.2 Task Descriptions

Task 1: Site Walk

A Site walk will be conducted prior to remedial tasks. During this task, staff must be aware of their surroundings. Hazards which personnel must be cautious of are (but not limited to) the following: Slips, trips, and falls, through traffic, animals or insects, interaction with waste, and interaction with other workers or trespassers.

Task 2: Construction Oversight

Construction oversight will be conducted during the remedial tasks. During this task, staff will be providing oversight related to waste excavation and relocation, landfill capping, construction of landfill gas and leachate management systems. Potential hazards related to heavy equipment, earthwork, construction of conveyance and storage systems will be assessed.

Task 3: Long-term Monitoring

Long-term monitoring will be conducted during the post-closure care period. Monitoring tasks include routine sampling of groundwater and perimeter landfill gas.

Task 4: Well and Probe Install / Decommission

As a part of the long-term monitoring plan, groundwater wells and landfill gas probes may need to be installed and/or decommissioned.

Task Hazard Analyses (THAs) associated with these tasks are presented in Appendix B.

5.3 Chemical Hazards

The classes of chemicals that are known or suspected to be present that may be encountered while performing Site work are included in **Table 1**.

Controls for these hazards are presented in the THAs included in Appendix B. A summary of these chemical hazards is presented in Appendix C.

5.4 Physical Hazards

The following physical hazards have been identified associated with the Pre-Final RD work scope and the Site conditions.

- Cold stress
- Hand/Foot injury
- Heat stress
- Slips, trips, and falls
- Thoroughfares/Traffic
- Remote urban environments

Controls for these hazards are presented in the THAs included in Appendix B.

5.5 Biological Hazards

The following biological hazards have been identified associated with the work to be performed and the Site conditions.

- Poisonous plants (which may cause allergic reaction)
- Biting/mauling animals (racoons, dogs, possums, cats etc.)
- Biting/stinging insects
- Ticks and mosquitos
- Lyme disease
- Rats/vermin
- Snakes
- Bird guano
- Mold
- Other: Potential exposure to the Corona Virus (COVID-19)

Controls for these hazards are presented in the THAs included in Appendix B.

6. GENERAL SAFE WORK PRACTICES

The following general safe work practices must be adhered to while performing Site work:

- Basic personal protective equipment (PPE) shall be worn, including hard hats, safety glasses, hard-toed boots, and high-visibility vests. If conditions allow, the requirement for hard hats and hard-toed boots may be reduced with approval of the SHSO and PM.
- Minimize contact with impacted materials. Do not place equipment on the ground. Do not sit or kneel on potentially contaminated surfaces.
- Smoking, eating, or drinking after entering the work zone and before personal decontamination is not allowed. Employees who are suspected of being under the influence of illegal drugs or alcohol will be removed from the Site. Workers taking prescribed medication that may cause drowsiness shall not operate heavy equipment and are prohibited from performing tasks where Level C or B PPE is required.
- Practice good housekeeping.
- The following conditions must be observed when operating a motor vehicle:
 - Wearing of seat belts is mandatory.
 - Use of handheld devices (cell phone, 2-way radio, etc.) is prohibited.
 - The use of headlights is mandatory during periods of rain, fog, or other adverse weather or low-light conditions.
 - A backup warning system or use of vehicle horn is mandatory when the vehicle is engaged in a backward motion.
 - Posted traffic signs and directions from flagmen must be observed.
 - Equipment and/or samples transported in vehicles must be secured from movement.
 - The use of vehicles by non-company personnel is prohibited.
- Be observant of your immediate surroundings and the surroundings of others. It is a team effort to notice and warn of dangerous situations. Withdrawal from a hazardous situation to reassess procedures is the preferred course of action.
- Conflicting situations may arise concerning safety requirements and working conditions. These must be addressed and resolved rapidly by the SHSO and PM to relieve motivations or pressures to circumvent established safety policies.
- Unauthorized breaches of specified safety protocol are not allowed. Workers unwilling or unable to comply with established procedures will be asked to leave the Site.

7. EMERGENCY RESPONSE

This section discusses emergency response procedures and response equipment to be maintained on Site. A table presenting a list of contacts and telephone numbers for the applicable local and off-Site emergency responders is provided inside the front cover of this HASP (after figures).

7.1 Injury and Emergency Response Procedures

In the event of an **injury** to an employee, the instructions for injury response and reporting, located in the front of this HASP, must be implemented immediately. In the event that an **emergency** develops, the following procedures are to be implemented:

- The SHSO, or designated alternate, should be immediately notified via the on-Site communication system. The SHSO assumes control of the emergency response.
- If applicable, the SHSO must immediately notify off-Site emergency responders (e.g., fire department, hospital, police department, etc.) and must inform the response team of the nature and location of the emergency on Site.
- If applicable, the SHSO may call for evacuation of the Site. Site workers should move to their respective refuge stations using the evacuation routes provided on the Site Map.
- For small fires, flames should be extinguished using the appropriate type of fire extinguisher. Large fires should be handled by the local fire department.
- If a worker is injured, the procedures presented in “Instructions for Injury Response”, located in the front of this HASP, must be implemented immediately.
- After an incident has stabilized, the procedures presented in “Instructions for Incident Reporting”, located in the front of this HASP, must be followed.

7.2 Emergency Response Equipment

Emergency response equipment will be maintained in the work area as necessary for this project. Examples of emergency response equipment include first aid kits, fire extinguishers (Type ABC), and eyewash bottles. Anyone may use a fire extinguisher in an emergency; however, any designated on-Site fire response personnel will require training in fire extinguisher use.

8. KEY PERSONNEL AND HEALTH AND SAFETY RESPONSIBILITIES

Project personnel and their responsibilities in regard to health and safety concerns on this project are as follows:

Project Manager (PM)

- Approve this HASP and amendments, if any.
- Monitor the field logbooks for health and safety work practices employed.

- Coordinate with SHSO so that emergency response procedures are implemented.
- Check that corrective actions are implemented.
- Check and document that qualified personnel receive this plan and are aware of its provisions and potential hazards associated with Site operations, and that they are instructed in safe work practices and familiar with emergency response procedures.
- Provide for appropriate monitoring, PPE, and decontamination materials.

Site Health and Safety Officer (SHSO)

- Prepare and implement project HASP and amendments, if any, and report to the PM for action if deviations from the anticipated conditions exist and authorize the cessation of work if necessary.
- Check that Site personnel meet the training and medical requirements.
- Conduct pre-entry briefing and daily tailgate safety meetings.
- Check that monitoring equipment and PPE are operating correctly according to manufacturer's instructions and such equipment is utilized by on-Site personnel. Calibrate or check calibration of monitoring equipment and record results.
- Check that decontamination procedures are being implemented.
- Implement Site emergency response and follow-up procedures.
- Notify the HSC in the event an emergency occurs.
- Perform and document weekly inspections.

Health and Safety Coordinator

- Review and audit HASP and amendments.
- Notify Director of H&S when an emergency occurs.
- Assist with the implementation of the corporate health and safety program.
- Consult with staff on health and safety issues.

Site Workers

- Provide verification of required health and safety training and medical surveillance prior to arriving at the Site.
- Notify supervisors of workplace accommodation requirements as the result of physical limitations or medical conditions.
- Attend pre-entry briefings and daily tailgate safety meetings.
- Immediately report accidents and/or unsafe conditions to the SHSO.

- Be familiar with and abide by the HASP.
- Be ultimately responsible for his or her own safety.

9. WORKER TRAINING AND MEDICAL SURVEILLANCE

Personnel involved in field activities subject to OSHA HAZWOPER 29 Code of Federal Regulations (CFR) 1910.120 will be required to participate in both a health and safety training program that complies with criteria primarily set forth by the OSHA HAZWOPER in 29 CFR 1910.120(e) and a medical surveillance program covered under 29 CFR 1910.120(f), or equivalent regulations.

9.1 Pre-Assignment and Annual Refresher Training

Prior to arrival on Site, personnel must meet the requirements of pre-assignment training (40/24 hours). In addition, personnel must be able to document dates of attendance at an annual 8-hour refresher. Failure to provide this documentation will prohibit entry to the active work area(s) (i.e., Exclusion Zone).

9.2 Site Supervisor Training

Consistent with OSHA 29 CFR 1910.120 (e)(4), prior to arrival on Site, individuals designated as Site supervisors require an additional 8 hours of specialized training.

9.3 Initial Site Safety Orientation and HASP Review

In addition to complying with 29 CFR 1910(e), Site personnel will attend an initial safety orientation during which the HASP and applicable THAs will be reviewed prior to initiating field activities. This review will include the following:

- Understanding the lines of authority regarding health and safety and Site personnel roles and responsibilities.
- Information of specific hazard agents related to the Site and Site operations will be discussed, such as health hazards of Site chemicals and specific safety hazards of processes, tools, and equipment.
- Training in the proper use, maintenance, and decon protocol of PPE and Level(s) of Protection.
- Appropriate work practices and engineering controls to reduce/eliminate exposures to Site hazards will be reviewed.
- Personnel will be informed of means for normal Site and emergency communication(s).
- Air monitoring strategies will be discussed to include the frequency/types, action levels, sampling techniques, pre/post calibration techniques.

- Unique/Site-specific medical surveillance requirements that need to be considered based on Site contaminants.
- Understanding Site control measures, work zones, and proper decontamination procedures for personnel/tools/vehicles, etc. to reduce the potential for both on-/off-Site contamination.
- Personnel will be trained to respond quickly and properly in the event of an emergency.
- Personnel involved in specific hazardous activities, such as confined space entry, drum handling, sampling unknowns, etc. will receive specialized training in the appropriate techniques to employ prior to commencing these operations.

9.4 Baseline Medical Surveillance Exam

The baseline medical examination is used to identify physical capabilities and certain medical limitations that may have an impact on the candidate's ability to perform in the position and/or job activity for which he/she is being considered, as well as to establish certain baseline medical parameters. The initial test results can then be compared against future periodic or project-specific monitoring results.

9.5 Periodic/Annual/Biennial Medical Exam

The periodic medical examination is used to evaluate an employee's continued fitness for duty and to assess possible impact(s) occupational exposures may have had on their health status. The periodic examination includes an update to the medical and work history, results of previous occupational exposure assessments, and a detailed medical exam tailored to the job description.

The frequency of periodic medical exams is based on regulatory requirements, the position/work activities of the employee, and the level of exposure to physical, chemical, and biological agents.

9.6 Exposure/Activity/Project-Specific Medical Testing

Exposure-specific medical tests and/or evaluation of biological indices may be conducted to establish a baseline for certain project-specific parameters, to monitor the effectiveness of hazard controls, and/or to assess the impact of occupational exposures associated with a particular work activity or project. An exposure-specific exam may be required or recommended when deemed appropriate based on knowledge of project hazards, occurrence of employee health symptoms, or an unexpected exposure event.

9.7 Exit Exam

An exit medical examination is offered when an employee leaves the medical surveillance program, either because of termination of employment or because of reassignment to a position not designated or identified to participate in the medical surveillance program. This optional exit examination may be used to assess potential changes in medical status that have occurred during

the course of employees' previous work activities, and to establish a medical baseline at the time of departure.

9.8 Exit/Termination

An exit medical examination is offered when an employee leaves the medical surveillance program, either because of termination of employment or because of reassignment to a position not designated or identified to participate in the medical surveillance program. This optional exit examination assesses potential adverse impacts occupational exposures may have contributed to the employee's health status.

10. MAPS AND SITE CONTROL

10.1 Routes to Hospital and Urgent Care Facility

A hospital and an urgent care facility near the Site have been identified. Maps to the hospital and urgent care are included after the Table of Contents of this HASP. Both figures also include the facility name and phone number.

10.2 Site Map

A Site map is located inside the cover of this HASP. The Site map is intended to show the location of the work zone(s), to provide on-Site orientation, and to delineate evacuation routes. Changes may be made to the Site map by the SHSO based on changing Site conditions. The Site map should be accessible in the work area.

10.3 Buddy System

The buddy system is required when work is performed in hazardous areas. The purpose of the buddy system is to provide rapid assistance to employees in the event of an emergency. The buddy system includes maintaining regular contact with one or more on-Site personnel, clients, and/or contractors to periodically check on the condition of Site workers such that each employee in the work group is observed by (or in verbal contact with) at least one other employee in the work group. For field visits with only one employee on Site, the buddy system shall be implemented via periodic telephone contact with off-Site personnel.

10.4 Controlled Work Zones

APPLIES TO TASK: ☐ ① ☐ ② ☐ ③ ☐ ④ ☐ ⑤ ☐ ⑥ ☐ ⑦ ☐ ⑧ ☐ NOT APPLICABLE

Three controlled work zones, including an Exclusion Zone, a Contaminant Reduction Zone (CRZ), and a Support Zone, are required for the task(s) indicated above. Personnel must not be allowed into the CRZ or Exclusion Zone or the Work Zone until they have received the proper PPE and they have read, understand, and meet the requirements outlined in this HASP. The Exclusion Zone is defined as the area on Site where contamination is suspected and tasks are to be performed. The

CRZ is defined as the area where equipment and workers are to be decontaminated as they leave the Exclusion Zone. The Support Zone is defined as the command area and may serve as a staging and storage area for supplies. The location and extent of the work zones may be modified as necessary as Site investigation information becomes available. For Sites that do not require the three controlled work zones, the area(s) where work is to be performed shall be called the Work Zone.

Visitors to the Site may need to be continually escorted for safety purposes. Visitors must check in with the SHSO upon visiting the Site.

For the tasks identified above, the boundaries of the Exclusion Zone, CRZ, and Support Zone, or the Work Zone, shall be marked using appropriate methods, including but not limited to warning tape, signs, traffic cones, fencing, or other appropriate means.

10.5 Site Access

Certain sites require controlled access to the work area. Examples of access controls include sign in/sign out logs, checking in with guards, and donning identification badges, if applicable. Personnel will adhere to the Site-specific access requirements and monitor that subcontractors and other visitors abide by Site-specific access control requirements.

For the purposes of developing the RDWP, this level of Site Access control is not applicable. In the event that it does become necessary, the HASP will be updated accordingly.

10.6 Inspections

☒ APPLICABLE ☐ NOT APPLICABLE

Based on the hazards identified for the project, periodic health and safety inspections may be performed. The H&S Inspection Checklist records should be kept on file at the Site. The frequency for periodic inspections is:

☐ Weekly

☐ Monthly

☒ Other: Per request

11. TAILGATE MEETINGS

Tailgate meetings must be held daily prior to starting work to discuss important health and safety issues concerning tasks to be performed during that shift. Site workers should also communicate health and safety concerns associated with the tasks they will be performing. Topics discussed in the tailgate meetings must be documented.

12. STOP WORK AUTHORITY

Personnel have the authority and responsibility to issue a Stop Work Order if unsafe actions and/or conditions are identified. The Stop Work Authority (SWA) process involves a stop, notify, correct, and resume approach for resolving observed unsafe work actions or conditions. The person issuing the work stoppage will first notify workers engaged in or affected by the unsafe activity or condition and require that associated work be stopped. After this Stop Work Order is issued, the project manager and the supervisors for affected or concerned contractors will also be notified. The project manager will document the issuance of the Stop Work Order. Work will not resume until the issues and concerns of the Stop Work Order have been adequately addressed.

13. AIR MONITORING

APPLIES TO TASK: ☐① ☐② ☐③ ☐④ ☐⑤ ☐⑥ ☐⑦ ☐⑧ ☐ NOT APPLICABLE

Air monitoring will be performed to evaluate airborne chemical and/or dust exposure levels within the breathing zone of Site workers. Hazardous conditions may include concentrations that may cause acute or chronic illness, potential oxygen deficient environments, or potential explosive environments. Air monitoring may also be performed to evaluate the adequacy of engineering, administrative, and/or PPE controls. Air monitoring may be “real-time” (e.g., the instrument provides immediate results at the project), using multi-gas meters, photoionization detectors (PIDs), or colorimetric tubes. Personal 4-gas meters should be used in potentially explosive atmospheres. Personal monitoring may also be performed by collecting samples and forwarding to a laboratory for analysis and quantification.

The type(s) of air monitoring equipment required and associated action levels are outlined in Appendix D. Monitoring equipment must be calibrated based on the manufacturer’s requirements. Calibration results and air monitoring measurements must be documented. Based on the results noted and Site activities or scope of work changes, the frequency of air monitoring may be adjusted on Site by the SHSO with the consent of the Project Manager and communication with the HSC.

Please also refer to Remedial Action Work Plan Section 9 (RA Monitoring and Control Measures) for more information on air monitoring for protection of Site personnel and area residents.

14. PERSONAL PROTECTIVE EQUIPMENT

PPE required for each task include types of protective clothing and safety equipment consistent with OSHA Level D PPE: long pants, steel-toe boots, hard hat, safety glasses, high visibility vest, and gloves (as applicable). Hearing protection can be used as needed.

15. DECONTAMINATION

The SHSO and Project Manager will determine the type and level of decontamination procedures for both personnel and equipment based on evaluation of specific work activities in the controlled

work zones. Medical treatment will take precedence over decontamination in the event of a life threatening and/or serious injury/illness. Personnel will perform decontamination in designated and identified areas upon leaving “hot zones” where the potential exists for exposure to hazardous chemical, biological, or environmental conditions.

Decontamination of personnel in Level D (modified) will consist of proper containerization and disposal of coveralls, disposable boots, and gloves (if applicable).

Decontamination of personnel in Level C, if applicable, will consist, at a minimum, of:

- Removal and cleaning/disposal of boot covers, coveralls, and outer gloves.
- Removal, cleaning, and storage of respiratory protection.
- Washing of non-disposable PPE suspected of being contaminated using a soap solution followed by a water rinse.
- Removal and disposal of inner gloves.

Hand tools and sampling equipment shall be decontaminated as needed by washing in decontamination basins with appropriate solutions, or, if possible, by dry decontamination. Wash solutions and PPE may require disposal at a licensed waste facility.

16. SPILL CONTAINMENT

The task(s) for this project may involve the handling of drums and/or containers that contain stored chemicals, hazardous materials, and/or wastes. The drums and/or containers may have been spilled/dislodged during Site activities due to compromised construction of the drum/container, transportation accidents, improper packaging practices, and improper handling of hazardous materials during on/off loading. Containers shall be inspected and their integrity assured prior to being moved and/or handled. If the integrity of the container is in question, the container shall be over packed or its contents transferred. Operations shall be organized and coordinated to minimize movement of such containers. Where spills, leaks, or ruptures may potentially occur, a supply of sorbents shall be located in the immediate area. Additional preventative measures include:

- UN-approved 55-gallon drums, bins, and/or Baker tanks will be inspected for visible defects upon delivery to the Site.
- UN-approved 55-gallon drums will also be inspected to ensure each drum includes a resealable lid with a small resealable sampling port near the top, or on the side of the drum and that the enclosure is not deformed and/or distorted.
- Drums will not be completely filled to allow for possible expansion of liquid and will be set on wooden pallets to facilitate transport by forklift.
- The storage area will be inspected to check for leaks weekly while the containers are being filled and immediately after a relocation to a temporary on-Site storage area.

- Flat areas will be selected for temporary storage away from high-traffic work areas/zones and storm/sewer drains.

In the event of an unplanned release or spill of unknown or hazardous substances, the Site supervisor will designate personnel who will support the spill containment, control, and/or clean-up procedures. The team will request additional off-Site emergency response assistance if necessary based on the type of spill, volume, potential toxicity, etc.

The spill area will be isolated and restricted to only authorized personnel designated to assist with the containment, control, or clean-up activity. Authorized personnel will be trained to contain and clean spills from typical materials and quantities used at the project location. Physical barriers will be set up to warn unauthorized personnel to stay clear and evacuate the affected area. The spill, leak, or incident will be assessed by the team and characterized to determine the appropriate course(s) of action(s) to consider:

- Small spills (i.e., maximum volume of 55 gallons of a liquid or 100 pounds of a solid) may be remediated using absorbent materials by designated personnel.
- Large spills (i.e., liquid volumes greater than 55 gallons or solid weights greater than 100 pounds) and/or spills of highly toxic materials may require assistance by off-Site hazardous materials (HAZMAT) teams.
- Attempts shall be made to identify and stop the source(s) of spillage immediately while donning proper PPE (based on action levels and the air monitoring program) and performing air monitoring.
- The Site supervisor will direct spill-response operations and stay at the spill area until it has been cleaned, inspected, and cleared for re-entry.
- The Site supervisor will prepare a spill incident and clean-up report and will communicate findings to the Project and Branch Manager and H&S Department.

17. CONFINED SPACE ENTRY

☐ APPLICABLE ☐ NOT APPLICABLE

The task(s) for this project involve confined-space entry. Workers must abide by the company's Confined Space Entry Program (Procedure HS 118).

18. GLOBALLY-HARMONIZED SYSTEM FOR HAZARD COMMUNICATION

☐ APPLICABLE ☐ NOT APPLICABLE

The following procedures must be followed for chemicals brought onto the Site by personnel or by subcontractors (i.e., decontamination solution, sampling preservatives, KB-1[®] solution, sodium permanganate, etc.) while performing the tasks of this project:

- Labels on primary chemical containers must not be defaced.

- Chemicals must be stored in appropriate storage containers.
- Secondary containers and storage cabinets must be correctly and clearly labeled.
- Chemicals incompatible with each other must not be stored together.
- Workers must receive training on the chemical hazards.
- Safety Data Sheets (SDSs) must be added to Appendix F.

19. HASP AMENDMENTS

Over the course of this project, it is possible that the project-specific hazards and working conditions will change. This HASP may be reviewed and amended as necessary to effectively describe the changing working conditions and measures to mitigate the potential health and safety issues that may arise during the project. Amendments to the HASP should be briefly described in the following spaces provided. The full text of the amendments should be provided in Appendix A and/or additional THAs should be added to Appendix B.

Table

Table 1

Summary of Soil/Waste and Groundwater/Leachate Contaminants of Concern

Chemical/CAS #	Chemical Name (Synonyms)	Exposure Limits	Routes of Entry	Symptoms/Health Effects	Chemical Properties	Physical Characteristics	Concentration at Site
1,1-Dichloroethane CAS-75-34-3	1,1-Dichloroethane Ethylidene chloride CAS-75-34-3	TLV: 100 ppm PEL: 100 ppm STEL: NE IDLH: 3,000 ppm	Inhalation Ingestion Skin contact Eye contact	ACUTE: Central nervous system depression, irritation of skin. Exposure at high levels may result in unconsciousness. CHRONIC: Defatting of the skin. Liver and kidney damage.	(FP) 2°F (VP) 182 mm (IP) 11.06 eV (UEL) 11.4% (LEL) 5.4%	Colorless, oily liquid with a chloroform-like odor.	-- / 6.8 µg/L
1,2,4-Trimethylbenzene CAS-95-63-6	1,2,4-Trimethylbenzene; Asymmetrical trimethylbenzene CAS-95-63-6	TLV: 25 ppm [Mixed] PEL: N/A STEL: N/A IDLH: ND	Inhalation Ingestion Skin Contact Eye Contact	ACUTE: Irritation eyes, skin, nose, throat, respiratory system; bronchitis; headache, drowsiness, fatigue, dizziness, nausea, incoordination; vomiting, confusion; chemical pneumonitis (aspiration liquid) CHRONIC: hypochromic anemia	(FP) 112°F (VP) 1 mm (IP) 8.27 eV (UEL) 6.4% (LEL) 0.9%	Clear, colorless liquid with a distinctive, aromatic odor. Class II Flammable Liquid	76000 µg/kg / 250 µg/L
1,3,5-Trimethylbenzene CAS-108-67-8	1,3,5 Trimethylbenzene Mesitylene Trimethyl benzene (symmetrical) CAS-108-67-8	TLV: 25 ppm PEL: NE STEL: NE IDLH: NE	Inhalation Ingestion Skin contact Eye contact	ACUTE: Irritation to eyes and respiratory tract. Ingestion may cause chemical pneumonitis. Affects CNS. CHRONIC: Defatting of the skin, lung damage resulting in chronic bronchitis. Affects CNS and blood.	(FP) 122 °F (VP) 2 mm (IP) 8.39 eV (UEL) NE (LEL) NE	Clear, colorless liquid with a distinctive, aromatic odor.	18000 µg/kg / 40 µg/L

Table 1

Summary of Soil/Waste and Groundwater/Leachate Contaminants of Concern

Chemical/CAS #	Chemical Name (Synonyms)	Exposure Limits	Routes of Entry	Symptoms/Health Effects	Chemical Properties	Physical Characteristics	Concentration at Site
1,4-Dichlorobenzene CAS-106-46-7	1,4-Dichlorobenzene p-DCB para- Dichlorobenzene Dichlorocide CAS-106-46-7	TLV: 10 ppm PEL: 75 ppm STEL: NE IDLH: Ca [150 ppm]	Inhalation Ingestion Skin Contact Eye Contact	ACUTE: Eye irritation, swelling periorbital (situated around the eye); profuse rhinitis; headache, anorexia, nausea, vomiting CHRONIC: weight loss, jaundice, cirrhosis; in animals: liver, kidney injury; [potential occupational carcinogen].	(FP) 150°F (VP) 1.3 mm (IP) 8.98 eV (UEL) N/A (LEL) 2.5%	Colorless or white crystalline solid with a mothball-like odor. [insecticide]	3300 µg/kg / 15 µg/L
2-Butanone CAS-78-93-3	MEK 2-Butanone Methyl ethyl ketone Methyl acetone CAS-78-93-3	TLV: 200 ppm PEL: 200 ppm STEL: 300 ppm IDLH: 3,000 ppm	Inhalation Ingestion Skin contact Eye contact	ACUTE: Vapors are irritating to eyes, skin, nose and causes headaches. Ingestion causes dizziness and vomiting. May affect CNS. CHRONIC: Defatting of the skin.	(FP) 6°F (VP) 78 mm (IP) 9.54 eV (UEL) 1.4% (LEL) 1.4%	Colorless liquid with a moderately sharp, fragrant mint- or acetone-like odor.	-- / 640 µg/L
4-methyl-2-pentanone CAS-108-10-1	MIBK Methyl isobutyl ketone Hexone 4-methyl-2-pentanone CAS-108-10-1	TLV: 50 ppm PEL: 100 ppm STEL: 75 ppm IDLH: 500 ppm	Inhalation Ingestion Skin contact Eye contact	ACUTE: Irritation of eyes, skin and respiratory tract. Ingestion risks chemical pneumonitis. May effect CNS at high concentrations, resulting in narcosis. CHRONIC: Dermatitis.	(FP) 64°F (VP) 16 mm (IP) 9.30 eV (UEL) 8.0% (LEL) 1.2%	Colorless liquid with a pleasant odor.	-- / 1600 µg/L
4-Methylphenol CAS-106-44-5	4-Methylphenol 4-Cresol P-Cresol CAS-106-44-5	TLV: 20 mg/m ³ (IFV) [skin] PEL: 5 ppm STEL: NE IDLH: 250 ppm	Inhalation Absorption Ingestion Contact	ACUTE: Causes irritation of eyes, skin and mucous membranes. Affect CNS, causes confusion, respiratory failure, weak pulse, burns to skin and eyes. CHRONIC: Harmful to lung, liver kidneys and pancreas.	(FP) 187°F (VP) 0.11 mm (IP) 8.97 eV (UEL) NA (LEL) 1.1%	Crystalline solid with a sweet, tarry odor.	16000 µg/kg / 170 µg/L

Table 1
Summary of Soil/Waste and Groundwater/Leachate Contaminants of Concern

Chemical/CAS #	Chemical Name (Synonyms)	Exposure Limits	Routes of Entry	Symptoms/Health Effects	Chemical Properties	Physical Characteristics	Concentratio n at Site
Acetone CAS-67-64-1	Acetone 2-Propanone Methyl ketone Dimethyl ketone CAS-67-64-1	TLV: 500 ppm PEL:1,000 ppm STEL:750 ppm IDLH: 2,500 ppm	Inhalation Ingestion Skin contact Eye contact	ACUTE: Vapors irritating to eyes and respiratory tract. May cause headaches and dizziness, effects on CNS, liver, kidneys and gastrointestinal tract. CHRONIC: Prolonged contact causes defatting of the skin, possibly dermatitis. Substance may affect blood and bone marrow.	(FP) 0°F (VP) 180 mm (IP) 9.69 eV (UEL) 12.8% (LEL) 2.5%	Colorless liquid, with a fragrant mint-like odor.	-- / 540 µg/L
Aluminum metal CAS-7429-90-5	Aluminum metal Aluminum powder Elemental Aluminum CAS-7429-90-5	TLV: 1 mg/m ³ [R] PEL: 15 mg/m ³ (total) 5 mg/m ³ (resp) STEL: NE IDLH: NE	Inhalation Skin contact Eye contact	ACUTE: Irritation eyes, skin, respiratory system. CHRONIC: Eyes, skin, respiratory system.	(FP) NE (VP) NE (IP) NE (UEL) NE (LEL) NE	Silvery-white, malleable, ductile, odorless metal. Combustible Solid, finely divided dust is easily ignited; may cause explosions.	27000 mg/kg / 225 mg/L
Antimony Metal/Powder CAS-7440-36-0	Antimony Metal/Powder Stibium CAS-7440-36-0	TLV: 0.5 mg/m ³ PEL: 0.5 mg/m ³ STEL: NE IDLH: 50 mg/m ³	Inhalation Ingestion Skin Contact Eye Contact	ACUTE: Irritation eyes, skin, nose, throat, mouth; cough, dizziness, headache, nausea, vomiting, diarrhea, stomach cramps. CHRONIC: Insomnia, anorexia. Unable to smell properly.	(FP) NA (VP) 0 mm (IP) NA (UEL) NA (LEL) NA	Silver-white, lustrous, hard, brittle solid; scale-like crystals; or a dark- gray, lustrous powder.	-- / 0.01 mg/L
Aroclor 1242 CAS-53469-21-9	Polychlorinated Biphenyls PCB (42%) Chlorodiphenyl (42% chlorine) Aroclor 1242 CAS-53469- 21-9	TLV: 1 mg/m ³ [skin] PEL: 1 mg/m ³ [skin] STEL: NE IDLH: 5 mg/m ³	Inhalation Absorption (skin) Ingestion	ACUTE: Eye irritation. CHRONIC: Dermatitis, chloracne, liver damage.	(FP) NA (VP) 0.001 mm (IP) NE (UEL) NA (LEL) NA	Colorless to light colored viscous liquid with a mild hydrocarbon odor.	1700000 µg/kg / 210 µg/L

Table 1

Summary of Soil/Waste and Groundwater/Leachate Contaminants of Concern

Chemical/CAS #	Chemical Name (Synonyms)	Exposure Limits	Routes of Entry	Symptoms/Health Effects	Chemical Properties	Physical Characteristics	Concentration at Site
Aroclor 1254 CAS-11097-69-1	Polychlorinated Biphenyls PCB (54%) Chlorodiphenyl (54% chlorine) Aroclor 1254 CAS-11097-69-1	TLV: 0.5 mg/m ³ [skin] PEL: 0.5 mg/m ³ [skin] STEL: NE IDLH: 5 mg/m ³	Inhalation Absorption (skin) Ingestion	ACUTE: Eye irritation. CHRONIC: Dermatitis, chloracne, liver damage.	(FP) NA (VP) 0.00006 mm (IP) NA (UEL) NA (LEL) NA	Colorless to pale yellow viscous liquid or solid (<50°F) with a mild hydrocarbon odor.	190000 µg/kg / 300 µg/L
Aroclor-1260 CAS-11096-82-5	Aroclor-1260 CAS-11096-82-5	TLV: 0.5 µg/m ³ PEL: 0.5 mg/m ³ STEL: NE IDLH: 5 mg/m ³	Absorption Inhalation Ingestion	May cause skin lesions. Potential liver toxin which can be absorbed through skin in hazardous amounts. Potential carcinogen.	(FP) 50°F (VP) 41 mm (IP) NE (UEL) 6% (LEL) 1.1%	Yellow solid, odor not available.	78000 µg/kg / 1.2 µg/L
Arsenic CAS-7440-38-2	Arsenic CAS-7440-38-2	TLV: 0.01 mg/m ³ PEL: 0.010 mg/m ³ STEL: NE IDLH: 5 mg/m ³ (as As)	Inhalation Absorption Ingestion	ACUTE: Contact dermatitis, gastrointestinal disturbances, ulceration of the nasal septum, and respiratory irritation. CHRONIC: Hyperpigmentation of the skin and cancers of the skin, lungs, and lymphatic system.	(FP) NA (VP) 0 mm (approx.) (IP) NA (UEL) NA (LEL) NA	Silver-gray or tin-white, brittle, odorless, solid.	37.8 mg/kg / 0.56 mg/L
Barium CAS-7440-39-3	Barium and soluble compounds as BA (excluding barium sulfate) CAS-7440-39-3	TLV: 0.5 mg/m ³ PEL: 0.5 mg/m ³ STEL: NE IDLH: 50 mg/m ³	Inhalation Ingestion Skin/eye contact	ACUTE: Irritation to the eyes, skin, upper respiratory system; skin burns CHRONIC: Gastroenteritis; muscle spasms; slow pulse; extrasystoles; hypokalemia (low blood potassium)	(FP) NE (VP) 0 mm (IP) NE (UEL) NE (LEL) NE	Yellow-white, slightly lustrous solid.	11400 mg/kg / 30.1 mg/L

Table 1

Summary of Soil/Waste and Groundwater/Leachate Contaminants of Concern

Chemical/CAS #	Chemical Name (Synonyms)	Exposure Limits	Routes of Entry	Symptoms/Health Effects	Chemical Properties	Physical Characteristics	Concentration at Site
b-BHC 319-85-7	b-BHC b-Lindane 319-85-7	TLV: NE PEL: NE STEL: NE IDLH: NE OEL- MAK: 0.5 mg/m ³	Inhalation Skin Contact Eye Contact Ingestion	ACUTE: The substance may cause effects on the central nervous system. CHRONIC: The substance may have effect on the blood, liver, kidney. This substance is possibly carcinogenic to humans. Animal tests show that this substance possibly causes toxic effects upon human reproduction.	(FP) NE (VP) NE (IP) NE (UEL) NE (LEL) NE	Crystalline Powder, with characteristic odor.	-- / 0.45 µg/L
Benzene CAS-71-43-2	Benzene Benzol CAS-71-43-2	TLV: 0.5 ppm [skin] PEL: 1 ppm STEL: 2.5 ppm IDLH: 500 ppm	Inhalation Absorption (skin) Ingestion	ACUTE: Irritation to eyes, skin, respiratory tract; dizziness; headache; nausea; staggered gait; fatigue, abdominal pain. CHRONIC: Defatting of the skin, may have effects on bone marrow and immune system, decrease in blood cells. Carcinogenic to humans.	(FP) 12°F (VP) 75 mm (IP) 9.24 eV (UEL) 7.8% (LEL) 1.2%	Colorless to light-yellow liquid with an aromatic odor. Solid below 42°F.	41000 µg/kg / 120 µg/L
Beryllium (metal) CAS-7440-41-7	Beryllium (metal) CAS-7440-41-7	TLV: 0.00005 mg/m ³ (I) PEL: 0.002 mg/m ³ STEL: NE IDLH: 4 mg/m ³	Inhalation Skin Contact Eye Contact	ACUTE: Chest pain, cough, irritation of eyes; weight loss, lassitude (weakness, exhaustion). CHRONIC: Berylliosis, anorexia; clubbing of fingers, cyanosis, pulmonary insufficiency, dermatitis; (potential occupational carcinogen)	(FP) NA (VP) 0 mm (IP) NA (UEL) NA (LEL) NA	Hard, brittle, gray-white solid metal	27.8 mg/kg / 0.0087 mg/L

Table 1

Summary of Soil/Waste and Groundwater/Leachate Contaminants of Concern

Chemical/CAS #	Chemical Name (Synonyms)	Exposure Limits	Routes of Entry	Symptoms/Health Effects	Chemical Properties	Physical Characteristics	Concentration at Site
bis(2-Ethylhexyl)phthalate CAS-117-81-7	bis(2-Ethylhexyl)phthalate DEHP Octyl phthalate CAS-117-81-7	TLV: 5 mg/m ³ PEL: 5 mg/m ³ STEL: N/A IDLH: Ca 5000 mg/m ³	Inhalation Skin contact Eye contact	ACUTE: Irritation eyes, mucous membrane; in animals: liver damage; teratogenic effects; [potential occupational carcinogen]. CHRONIC: Effects: Eyes, respiratory system, central nervous system, liver, reproductive system, gastrointestinal tract.	(FP) 420°F (VP) <0.01 mm (IP) NE (UEL) 0.3% at 507F (LEL) 0.3% at 474F	Colorless, oily liquid with a slight odor. Class IIIB Combustible Liquid: Fl.P. at or above 200°F.	170000000 µg/kg / 500 µg/L
Butyl Benzyl Phthalate CAS-85-68-7	Butyl Benzyl Phthalate BBP Palatinol BB CAS-85-68-7	TLV: NE PEL: NE STEL: 5 mg/m ³ IDLH: NE	Inhalation Skin Contact Eye Contact Ingestion	ACUTE: The substance irritates the eyes, the skin and the respiratory tract. CHRONIC: The substance may have effect on the liver and kidneys, resulting impaired functions.	(FP) 390°F (VP) NE (IP) NE (UEL) NE (LEL) NE	Colorless oily liquid	660000 µg/kg / --
Cadmium (dust/metal) CAS- 7440-43-9	Cadmium (dust/metal) CAS- 7440- 43-9	TLV: 0.01 mg/m ³ PEL: 0.005 mg/m ³ STEL: NE IDLH: 9 mg/m ³	Inhalation Ingestion	ACUTE: Irritation to eyes and respiratory tract. Pulmonary edema, coughing, tightness in chest, headache, chills, muscle aches, nausea, mild anemia. CHRONIC: Damage to respiratory system and kidneys, resulting in proteinuria and kidney dysfunction. Potential occupational carcinogen	(FP) NA (VP) NA (IP) NA (UEL) NA (LEL) NA	Metal: silver-white, blue tinged, lustrous, odorless solid.	75.3 mg/kg / 0.17 mg/L

Table 1

Summary of Soil/Waste and Groundwater/Leachate Contaminants of Concern

Chemical/CAS #	Chemical Name (Synonyms)	Exposure Limits	Routes of Entry	Symptoms/Health Effects	Chemical Properties	Physical Characteristics	Concentration at Site
Chlorobenzene CAS-108-90-7	Chlorobenzene Benzene chloride Chlorobenzol Phenyl chloride CAS-108-90-7	TLV: 10 ppm PEL: 75 ppm STEL: NE IDLH: 1,000 ppm	Inhalation Ingestion Skin contact Eye contact	ACUTE: Irritation of the eyes, nose and skin; causes drowsiness and uncoordination. Chemical pneumonitis if swallowed. CNS depression CHRONIC: Defatting of the skin. May cause liver and kidney damage.	(FP) 82°F (VP) 9 mm (IP) 9.07 eV (UEL) 9.6% (LEL) 1.3%	Colorless liquid with an almond-like odor.	610000 µg/kg / 180 µg/L
Chloroethane CAS-75-00-3	Ethyl chloride Hydorchloric ether Monochloroethane Muriatic ether CAS-75-00-3	TLV: 100 ppm PEL: 1,000 ppm STEL: NE IDLH: 3,800 ppm	Inhalation Absorption (liquid) Ingestion (liquid) Skin/eye contact	ACUTE: Incoordination; inebriation; abdominal cramps CHRONIC: Cardiac arrhythmia; cardiac arrest; liver and kidney damage	(FP) NA (gas) -58 F (liquid) (VP) 1,000 mm (IP) 10.97 eV (UEL) 15.4% (LEL) 3.8%	Colorless gas or liquid (below 54 F) with a pungent, ether-like odor. Shipped as a liquefied compressed gas	-- / 520 µg/L
Chloroform CAS-67-66-3	Chloroform Methane trichloride Trichloromethane CAS-67-66-3	TLV: 10 ppm PEL: 50 ppm C STEL: NE IDLH: 500 ppm	Inhalation Ingestion Skin contact Absorption Eye contact	ACUTE: Irritation of the eyes and skin. Dizziness, headache, nausea and confusion. CHRONIC: Enlarged liver. Possible human carcinogen.	(FP) NE (VP) 160 mm (IP) 11.42 eV (UEL) NE (LEL) NE	Colorless liquid with a pleasant odor.	44 µg/kg / --
Chrysene CAS-65996-93-2 218-01-9	Chrysene CAS-65996-93-2 218-01-9	TLV: 0.2 mg/cm PEL: 0.2 mg/m ³ benzene - soluble fraction STEL: NE IDLH: 80 mg/m ³	Inhalation Skin contact Eye contact	ACUTE: Bronchitis. CHRONIC: Dermatitis, may cause damage to bladder, kidneys and lungs. Potential occupational carcinogen	(FP) Varies (VP) NE (IP) Varies (UEL) NE (LEL) NE	Black or dark brown amorphous residue. A polycyclic aromatic hydrocarbon (PAH). Pure chrysene is a colorless crystalline solid that is virtually insoluble in water. Animal Carcinogen.	260000 µg/kg / 100 µg/L

Table 1

Summary of Soil/Waste and Groundwater/Leachate Contaminants of Concern

Chemical/CAS #	Chemical Name (Synonyms)	Exposure Limits	Routes of Entry	Symptoms/Health Effects	Chemical Properties	Physical Characteristics	Concentration at Site
cis-1,2-Dichloroethene CAS-540-59-0	cis-1,2-Dichloroethene Acetylene dichloride 1,2-Dichloroethylene CAS-540-59-0	TLV: 200 ppm PEL: 200 ppm STEL: NE IDLH: 1000 ppm	Inhalation Ingestion Skin contact Eye contact	ACUTE: Irritation of the eyes and respiratory tract. CNS depression. Exposure could cause lowering of consciousness. CHRONIC: Defatting of the skin. May cause damage to liver.	(FP) 36-39°F (VP) 180-265 mm (IP) 9.65 eV (UEL) 12.8% (LEL) 5.6%	Colorless liquid (usually a mixture of the cis and trans isomers) with a slightly acrid, chloroform-like odor.	850000 µg/kg / 3700 µg/L
Cobalt metal (dust/fume) CAS-7440-48-4	Cobalt Metal dust, Cobalt metal fume CAS-7440-48-4	TLV: 0.02 mg/m ³ PEL: 0.1 mg/m ³ STEL: NE IDLH: 20 mg/m ³	Inhalation Ingestion Skin Contact Eye Contact	ACUTE: Cough, dyspnea (breathing difficulty), wheezing, decreased pulmonary function. CHRONIC: Weight loss, dermatitis, diffuse nodular fibrosis, respiratory hypersensitivity, asthma.	(FP) NA (VP) 0 mm (IP) NA (UEL) NA (LEL) NA	Odorless, silver-gray to black solid	-- / 0.15 mg/L
Copper (dust/mists/metal) CAS-7440-50-8	Copper (dust/mists/metal) CAS-7440-50-8	TLV: 1 mg/m ³ (dust & mist) TLV: 0.2 mg/m ³ (fume) PEL: 1 mg/m ³ STEL: NE IDLH: 100 mg/m ³	Inhalation Ingestion Skin contact Eye contact	ACUTE: Irritation to eyes, nose and pharynx, metallic taste and nasal perforation. CHRONIC: Skin sensitization, increased risk with Wilson's disease.	(FP) NA (VP) NA (IP) NA (UEL) NA (LEL) NA	Red powder, turns green on exposure to moist air.	4770 mg/kg / 10 mg/L
Cyclohexane CAS-110-82-7	Benzene hexahydride Hexahydrobenzene Hexamethylene Hexanaphthene CAS-110-82-7	TLV: 100 ppm STEL: NE PEL: 300 ppm IDLH: 1,300 ppm	Inhalation Ingestion Skin/eye contact	ACUTE: Irritation of the eyes and upper respiratory system; drowsiness; dermatitis CHRONIC: Narcosis; coma	(FP) 0 F (VP) 78 mm (IP) 9.88 eV (UEL) 8% (LEL) 1.3%	Colorless liquid with a sweet, chloroform-like odor	5200 µg/kg / --

Table 1
Summary of Soil/Waste and Groundwater/Leachate Contaminants of Concern

Chemical/CAS #	Chemical Name (Synonyms)	Exposure Limits	Routes of Entry	Symptoms/Health Effects	Chemical Properties	Physical Characteristics	Concentration at Site
Dieldrin CAS-60-57-1	Dieldrin HEOD CAS-60-57-1	TLV: 0.1 mg/m ³ (IFV) PEL: 0.25 mg/m ³ [skin] STEL: NE IDLH: 50 mg/m ³	Inhalation Skin absorption Ingestion Skin contact Eye contact	ACUTE: Headache, dizziness; nausea, vomiting, malaise (vague feeling of discomfort), sweating; myoclonic limb jerks; clonic, tonic convulsions. CHRONIC: coma; [potential occupational carcinogen]; in animals: liver, kidney damage.	(FP) NE (VP) 77°F (IP) NE (UEL) NE (LEL) NE	Colorless to light-tan crystals with a mild, chemical odor. [insecticide].	60 µg/kg / 11 µg/L
Ethylbenzene CAS-100-41-4	Ethylbenzene Ethylbenzol EB CAS- 100-41-4	TLV: 20 ppm PEL: 100 ppm STEL: NE IDLH: 800 ppm	Inhalation Ingestion Skin contact Eye contact	ACUTE: Causes irritation of the eyes, skin, mucous membranes, and respiratory tract. Effects on CNS. CHRONIC: Defatting of the skin, narcosis, and coma.	(FP) 55°F (VP) 7 mm (IP) 8.76 eV (UEL) 6.7% (LEL) 0.8%	Colorless liquid with an aromatic odor.	3700000 µg/kg / 1100 µg/L
Fluoranthene (PAH)	Fluoranthene (PAH)	TLV: 0.2 mg/m ³ PEL: 0.2 mg/m ³ STEL: NE IDLH: NE	Absorption Inhalation Ingestion	ACUTE: Dermatitis and bronchitis CHRONIC: Cancer of lungs, skin, bladder and kidneys. Skin carcinogen.	(FP) NE (VP) NE (IP) NE (UEL) NE (LEL) NE	Colored needles, light yellow, fine crystals.	870000 µg/kg / --
Iron CAS-1309-37-1	Iron Iron Oxide CAS-1309-37-1	TLV: 5 mg/m ³ (R) PEL: 5 mg/m [R] 15 mg/m ³ (total) STEL: NE IDLH: NE	Absorption Inhalation Ingestion	ACUTE: Dust irritates eyes and respiratory tract CHRONIC:	(FP) NE (VP) NE (IP) NE (UEL) NE (LEL) NE	Grey crystalline powder	240000 mg/kg / 512 mg/L

Table 1

Summary of Soil/Waste and Groundwater/Leachate Contaminants of Concern

Chemical/CAS #	Chemical Name (Synonyms)	Exposure Limits	Routes of Entry	Symptoms/Health Effects	Chemical Properties	Physical Characteristics	Concentration at Site
Lead (metal) CAS-7439-92-1	Lead (metal) CAS-7439-92-1	TLV: 0.05 mg/m ³ PEL: 0.05 mg/m ³ STEL: NE IDLH: 100 mg/m ³	Inhalation Ingestion Skin contact Eye contact	ACUTE: Lead is a cumulative poison, however, it may cause eye and skin irritation. CHRONIC: Effects blood, bone marrow, CNS, PNS and kidneys resulting in anemia, convulsions, peripheral nerve disease and kidney impairment. Toxicity to human reproduction or development.	(FP) NA (VP) NA (IP) NA (UEL) NA (LEL) NA	A heavy, ductile, soft, gray solid. Turns tarnished on exposure to air.	12000 mg/kg / 5.9 mg/L
Manganese CAS-7439-96-5	Mn (Metal) Colloidal manganese Manganese-55 CAS-7439-96-5	TLV: 0.2 mg/m ³ STEL: NE PEL (C): 5 mg/m ³ IDLH: 500 mg/m	Inhalation Ingestion	ACUTE: Dry throat; cough; chest tightness; dyspnea (difficulty breathing); mental confusion; rales, flu-like fever; low-back pain; vomiting; malaise (vague feeling of discomfort); lassitude (weakness, exhaustion) CHRONIC: Manganism; asthenia; metal fume fever; kidney damage	(FP) NE (VP) 0 mm (IP) NE (UEL) NE (LEL) NE	Metal: A lustrous, brittle, silvery solid.	5930 mg/kg / 8.6 mg/L
Mercury - Elemental and inorganic forms CAS-7439-97-6	Mercury (metal) Quicksilver Liquid silver CAS-7439-97-6	TLV: 0.025 mg/m ³ PEL: 0.1 mg/m ³ STEL: N/A IDLH: 10 mg/m ³	Inhalation Absorption (skin) Ingestion	ACUTE: Irritation to skin. Vapor inhalation may cause pneumonitis. May effect CNS and kidneys. CHRONIC: May effect CNS and kidneys, resulting in irritability, tremors, speech disorders, mental/memory disturbances. Inflammation/discoloration of gums. Danger of cumulative effects.	(FP) NA (VP) 0.0012 mm (IP) NE (UEL) NA (LEL) NA	Odorless, heavy and mobile silvery-white liquid metal	6.2 mg/kg / 0.0073 mg/L

Table 1

Summary of Soil/Waste and Groundwater/Leachate Contaminants of Concern

Chemical/CAS #	Chemical Name (Synonyms)	Exposure Limits	Routes of Entry	Symptoms/Health Effects	Chemical Properties	Physical Characteristics	Concentratio n at Site
Methylene Chloride CAS-75-09-2	Methylene Chloride DMC Dichloromethane CAS-75-09-2	TLV: 50 ppm PEL: 25 ppm STEL: NE IDLH: 2,300 ppm	Inhalation Ingestion Absorption	ACUTE: Irritation of the eyes, skin and respiratory tract. Exposure could cause lowering of consciousness and formation of carboxyhemoglobin, fatigue and unnatural drowsiness. CHRONIC: Dermatitis. May cause damage to CNS and liver. Possible human carcinogen.	(FP) NE (VP) 350 mm (IP) 11.32 eV (UEL) 23.0% (LEL) 13.0%	Colorless liquid with a chloroform-like odor. Gas above 104°F.	28000 µg/kg / 11 µg/L
Naphthalene CAS- 91-20-3	Naphthalene Naphthalin Coal tar White tar CAS-91-20-3	TLV: 10 ppm PEL: 10 ppm STEL: 15 ppm IDLH: 250 ppm	Inhalation Ingestion Skin contact Absorption Eye contact	ACUTE: Levels above 10 ppm may cause: Inhalation – Headache, nausea, excessive sweating and vomiting; Skin - May cause irritation and if hypersensitive to naphthalene then severe irritation may occur; Eyes - Irritation. Direct contact may cause blurring vision and damage to the cornea; Ingestion - Nausea, vomiting, abdominal pain, bladder irritation, and brown or black coloration of urine. CHRONIC: Clouding of the eyes. Chronic skin problems in cases of hypersensitivity. Liver and kidney damage.	(FP) 174°F (VP) 0.08 mm (IP) 8.12 eV (UEL) 5.9% (LEL) 0.9%	Colorless to brown solid with an odor of mothballs. Sometimes found as a crystalline white solid. Shipped as a molten solid.	110000 µg/kg / 170 µg/L

Table 1

Summary of Soil/Waste and Groundwater/Leachate Contaminants of Concern

Chemical/CAS #	Chemical Name (Synonyms)	Exposure Limits	Routes of Entry	Symptoms/Health Effects	Chemical Properties	Physical Characteristics	Concentration at Site
Nickel (metal) CAS-7440-02-0	Nickel (metal) CAS-7440-02-0	TLV: 1.5 mg/m ³ (I) PEL: 1 mg/m ³ STEL: NE IDLH: 10 mg/m ³	Inhalation Ingestion Skin contact Eye contact	ACUTE: May cause mechanical irritation, pneumonitis (fume inhalation). CHRONIC: Sensitization, asthma, damage to lungs. Possible human carcinogen.	(FP) NA (VP) 0 mm (IP) NA (UEL) NA (LEL) NA	Lustrous, silvery, odorless, solid.	485 mg/kg / 0.61 mg/L
p,p-DDT CAS-50-29-3	p,p-DDT Dichlorodiphenyltrichloroethane 1,1,1-Trichloro-2,2-bis(p-chlorophenyl)ethane CAS-50-29-3	TLV: 1 mg/m ³ [skin] PEL: 1 mg/m ³ [skin] STEL: NE IDLH: 500 mg/m ³ (ca)	Inhalation Ingestion Skin contact Absorption Eye contact	ACUTE: Inhalation - Nausea, drowsiness, loss of appetite, visual disturbances, and insomnia. Skin - See ingestion. Ingestion - Headaches, nausea, insomnia, profuse sweating, frothing at the mouth, convulsions, and lack of consciousness. CHRONIC: Dizziness, nausea, muscle twitch, convulsions, enlarged liver, and skin irritation. Suspected carcinogen.	(FP) 162-171°F (VP) 0.0000002 mm (IP) NE (UEL) NE (LEL) NE	White to yellow crystalline powder with a slight aromatic odor, (pesticide).	-- / 24 µg/L
Pentachlorophenol CAS-87-86-5	Pentachlorophenol PCP CAS-87-86-5	TLV: 0.5 mg/m ³ [skin] PEL: 0.5 mg/m ³ [skin] STEL: NE IDLH: 2.5 mg/m ³	Inhalation Ingestion Absorption (skin) Skin contact Eye contact	ACUTE: Irritation of the eyes, skin and respiratory tract. Coughing, weakness, nausea, dizziness. May effect cardiovascular system, resulting in cardiac disorders and heart failure. CHRONIC: May affect CNS, kidneys, liver, lungs, immune system, thyroid. Possible human carcinogen.	(FP) NE (VP) 0.0001mm @ 77°F (IP) NE (UEL) NE (LEL) NE	Colorless to white, crystalline solid with a benzene-like odor (fungicide).	-- / 1.8 µg/L

Table 1
Summary of Soil/Waste and Groundwater/Leachate Contaminants of Concern

Chemical/CAS #	Chemical Name (Synonyms)	Exposure Limits	Routes of Entry	Symptoms/Health Effects	Chemical Properties	Physical Characteristics	Concentration at Site
Phenanthrene CAS-65996-93-2	Phenanthrene Coal tar pitch volatile CAS-65996-93-2	TLV: 0.2 mg/m ³ PEL: 0.2 mg/m ³ STEL: NE IDLH: 80 mg/m ³	Inhalation Absorption Ingestion Skin/mucus membrane contact	ACUTE: Photosensitivity; nausea; headache; dizziness CHRONIC: Mutagen (may cause birth defects); eye damage. Potential occupational carcinogen.	(FP) 340 F (VP) 1 mm (IP) 7.8 eV (UEL) NE (LEL) NE	White crystalline solid with a faint aromatic odor	1000000 µg/kg / 240 µg/L
Pyrene (PAH) CAS-65996-93-2	Pyrene (PAH) CAS-65996-93-2	TLV: 0.2 mg/m ³ PEL: 0.2 mg/m ³ STEL: NE IDLH: NE	Absorption Inhalation	ACUTE: Dermatitis and bronchitis CHRONIC: Cancer of lungs, skin, bladder and kidneys. Skin carcinogen.	(FP) NE (VP) NE (IP) NE (UEL) NE (LEL) NE	Colorless to light yellow solid or off-white solid.	660000 µg/kg / 64 µg/L
Silver (metal) CAS-7440-22-4	Silver (metal) CAS-7440-22-4	TLV: 0.1 mg/m ³ PEL: 0.01 mg/m ³ STEL: NE IDLH: 10 mg/m ³	Inhalation Ingestion Skin contact Eye contact	ACUTE: Inhalation of large amounts of vapors may cause lung damage, pulmonary edema. CHRONIC: Grey-blue discoloration of eyes, nose, throat and skin (argyria/argyrosis)	(FP) NA (VP) NA (IP) NA (UEL) NA (LEL) NA	White, lustrous solid.	201 mg/kg / --
Tetrachloroethene CAS-127-18-4	Tetrachloroethene PCE Perchloroethylene Tetrachloroethylene CAS-127-18-4	TLV: 25 ppm PEL: 100 ppm STEL: 100 ppm IDLH: 150 ppm	Inhalation Ingestion Absorption	ACUTE: Irritation to skin, eyes and respiratory tract. Ingestion may cause chemical pneumonitis. Affects CNS. Unconsciousness at high level exposures. CHRONIC: Dermatitis. May cause liver and kidney damage. Probable human carcinogen.	(FP) NA (VP) 14 mm (IP) 9.32 eV (UEL) NA (LEL) NA	Colorless liquid with a mild, chloroform-like odor.	45000 µg/kg / 5.8 µg/L

Table 1

Summary of Soil/Waste and Groundwater/Leachate Contaminants of Concern

Chemical/CAS #	Chemical Name (Synonyms)	Exposure Limits	Routes of Entry	Symptoms/Health Effects	Chemical Properties	Physical Characteristics	Concentratio n at Site
Thallium (metal) CAS-7440-28-0	Thallium (metal) CAS-7440-28-0	TLV: 0.02 mg/m ³ [skin] PEL: 0.1 mg/m ³ [skin] STEL: NE IDLH: 15 mg/m ³	Inhalation Ingestion Skin contact Absorption Eye contact	ACUTE: May affect gastrointestinal tract, nervous system, kidneys and cardiovascular system. May cause hair loss and atrophy of nails. Ingestion may cause death. Effects may be delayed. CHRONIC: May affect nervous system, cardiovascular system and may cause hair loss.	(FP) NA (VP) NA (IP) NA (UEL) NA (LEL) NA	Bluish-white, very soft metal. Turns grey on exposure to air.	10 mg/kg / 0.023 mg/L
Toluene CAS-108-88-3	Toluene Methylbenzene Toluol CAS-108-88-3	TLV: 20 ppm PEL: 200 ppm STEL: NE IDLH: 500 ppm	Inhalation Ingestion Absorption	ACUTE: Irritation to eyes and respiratory tract. Ingestion may cause chemical pneumonitis. Affects CNS. Unconsciousness and cardiac dysrhythmia at high level exposures. CHRONIC: Defatting of the skin. Affects CNS. Enhanced hearing damage.	(FP) 40°F (VP) 21 mm (IP) 8.82 eV (UEL) 7.1% (LEL) 1.1%	Colorless liquid with a sweet, pungent, benzene-like odor.	2200000 µg/kg / 1800 µg/L
Trichloroethylene CAS-79-01-6	Trichloroethene TCE Trichloroethylene Ethylene trichloride CAS-79-01-6	TLV: 10 ppm PEL: 100 ppm STEL: 25 ppm IDLH: 1,000 ppm	Inhalation Ingestion Absorption	ACUTE: Irritation to eyes and skin. Ingestion may cause chemical pneumonitis. Affects CNS. Unconsciousness due to exposure. CHRONIC: Dermatitis. Affects CNS, loss of memory. May damage liver and kidneys. Probable human carcinogen.	(FP) NE (VP) 58 mm (IP) 9.45 eV (UEL) 10.5% @ 77°F (LEL) 8.0% @ 77°F	Colorless liquid with a chloroform-like odor. Sometimes dyed blue.	760000 µg/kg / 210 µg/L

Table 1

Summary of Soil/Waste and Groundwater/Leachate Contaminants of Concern

Chemical/CAS #	Chemical Name (Synonyms)	Exposure Limits	Routes of Entry	Symptoms/Health Effects	Chemical Properties	Physical Characteristics	Concentration at Site
Vanadium (oxide) dust CAS-1314-62-1	Vanadium (oxide) dust CAS-1314- 62-1	TLV: 0.05 mg/m ³ PEL: C 0.5 mg V ₂ O ₅ /m ³ (resp) STEL: NE IDLH: 35 mg/m ³	Inhalation Ingestion Skin Contact Eye Contact	ACUTE: Irritation eyes, throat; green tongue, metallic taste, cough, fine rales, wheezing CHRONIC: Bronchitis, dyspnea (breathing difficulty); eczema	(FP) NA (VP) 0 mm (IP) NA (UEL) NA (LEL) NA	Yellow-orange powder or dark-grey, odorless flakes dispersed in air	78.4 mg/kg / 0.5 mg/L
Vinyl Chloride CAS-75-01-4	Vinyl Chloride Chloroethene VCM Chloroethylene CAS-75-01-4	TLV: 1 ppm PEL: 1 ppm STEL: NE IDLH: NE	Inhalation Skin contact Eye contact	ACUTE: Irritation to eyes. Affects CNS. May cause unconsciousness. CHRONIC: Affects liver, spleen, blood and peripheral blood vessels, tissue and bones in fingers. Human carcinogen.	(FP) NA (gas) (VP) 3.3 atm (IP) 9.99 eV (UEL) 33.0% (LEL) 3.6%	Colorless gas or liquid (<7°F) with a pleasant odor at high concentrations.	170000 µg/kg / 660 µg/L
Xylene (o;m;p isomers) CAS-106-42-3	Xylene (o;m;p isomers) CAS-106- 42-3	TLV: 100 ppm PEL: 100 ppm STEL: 150 ppm IDLH: 900 ppm	Inhalation Absorption Ingestion	ACUTE: Irritation to eyes and respiratory tract. Ingestion may cause chemical pneumonitis. Affects CNS. CHRONIC: Defatting of the skin, lung damage resulting in chronic bronchitis. Affects CNS and blood.	(FP) 90/82/81°F (IP) 7/9/9 mm (IP) 8.56eV (UEL) 6.7% (LEL) 0.9%	Colorless liquid with an aromatic odor. (p-isomer solid <56°F).	14000000 ug/kg / 4400 µg/L
Zinc (metal) CAS-7440-66-6	Zinc (metal) Zinc Oxide CAS-7440- 66-6	TLV: 2 mg/m ³ [respirable] PEL: 5 mg/m ³ [respirable] STEL: 10 mg/m ³ [respirable] IDLH: 500 mg/m ³	Inhalation	ACUTE: Metal fume fever; muscle aches, nausea, fever, dry throat, weakness, and lassitude; metallic taste; headache; blurred vision; low back pain. Effects may be delayed. CHRONIC: Decreased pulmonary function. Tightness in chest.	(FP) NA (VP) NA (IP) NA (UEL) NA (LEL) NA	White, odorless solid. Slowly decomposed by water.	27600 mg/kg / 25.9 mg/L

Table 1

Summary of Soil/Waste and Groundwater/Leachate Contaminants of Concern

Chemical/CAS #	Chemical Name (Synonyms)	Exposure Limits	Routes of Entry	Symptoms/Health Effects	Chemical Properties	Physical Characteristics	Concentration at Site
trans-1,2-Dichloroethylene 156-60-5	trans-1,2-Dichloroethene trans-Acetylene dichloride trans-1,2-DCE	TLV: 200 ppm (TWA) PEL: 200 ppm IDLH: 1000 ppm	Inhalation, Absorption (skin), Ingestion	Acute: Eye, respiratory system irritation; CNS depression, light-headedness, dizziness, euphoria, nausea, vomiting, weakness, tremor, epigastric cramps; dermatitis. Chronic: The substance defats the skin, which may cause dryness or cracking. The substance may have effects on the liver.	FP: 6.0°C (42.8°F) - closed cup VP: No data available IP: 9.65 ev UEL: 12.8% (v) LEL: 9.7%(v)	Form: liquid, clear Colour: light yellow	-- / 13 µg/L
91-57-6	2-Methylnaphthalene	TLV: 0.5 ppm Skin PEL STEL IDLH	Ingestion, Inhalation, Dermal contact	Acute/Chronic: Harmful if swallowed. Prolonged skin contact may cause temporary irritation. Direct contact with eyes may cause temporary irritation. irritation	(FP) 206.6 °F (97.0°C) (VP) 0.01 kPa at 25°C (IP) (UEL)5.3 (LEL)0.8	Solid Colorless White crystalline	42000 µg/kg / 100 µg/L
Acetophenone/98-86-2	Methyl phenyl ketone; Acetylbenzene	TLV 10 ppm TWA PEL STEL IDLH	Ingestion, Injection, Absorption, Inhalation	Central Nervous System impairment Upper Respiratory Tract irritation Pregnancy loss	(FP)76°C (169°F) - closed cup (VP)1 hPa (1 mmHg) at 15°C (59 °F) (IP) (UEL) 5.2 % (V) (LEL) 1.4 %(V)	Colourless liquid	630 µg/kg / 3.9 µg/L

Table 1

Summary of Soil/Waste and Groundwater/Leachate Contaminants of Concern

Chemical/CAS #	Chemical Name (Synonyms)	Exposure Limits	Routes of Entry	Symptoms/Health Effects	Chemical Properties	Physical Characteristics	Concentration at Site
p,p-DDE/72-55-9	dichlorodiphenyldichloroethylene	MRL of 0.0005 mg/kg/day has been derived for intermediate-duration oral exposure to DDT (15–364 days)	Inhalation, ingestion or skin contact.	Suspected endocrine toxicant: May cause diseases such as hypothyroidism, diabetes mellitus, hypoglycemia, reproductive disorders, and cancer.	(FP)n/a (VP)41 mmHg (21°C) (IP) (UEL)6.0 (LEL)1.0	White crystalline solid or white powder	-- / 7.1 µg/L
205-99-2	Benzo[b]fluoranthene CAS 205-99- 2	TLV: 0.2 mg/cu m PEL NA STEL NA IDLH NA	Inhalation, Skin, Eye Contact, Ingestion	Acute: Skin contact may cause irritation or skin allergy, which is greatly aggravated by sunlight on contaminated skin. Eye contact or "fume" exposure may cause irritation and a reaction greatly aggravated by sunlight during or shortly following exposure. Direct contact or "fumes" can cause irritation of the nose, throat, and bronchial tubes; skin irritation, redness, and possible swelling. Chronic: May cause Cancer	(FP) NA (VP) 5.0X10-7 mm Hg at 20 deg C (IP) NA (UEL) NA (LEL) NA	Needles or yellow fluffy powder.	260000 µg/kg / 26 µg/L

Table 1

Summary of Soil/Waste and Groundwater/Leachate Contaminants of Concern

Chemical/CAS #	Chemical Name (Synonyms)	Exposure Limits	Routes of Entry	Symptoms/Health Effects	Chemical Properties	Physical Characteristics	Concentration at Site
50-32-8	1,3,4-Benzopyrene 2,3,4-Benzopyrene 3,3,4-Benzopyrene 4,3,4-Benzopyrene Benzo(a)pyrene	TLV: 0.2 mg/m ³ PEL STEL IDLH	Inhalation	Acute: May cause allergic skin reaction. Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest, pain, muscle pain or flushing Chronic exposure to the fumes and dust of this type of compound can cause discoloration of the cornea and epithelioma of the lid margin.	(FP) (VP) (IP) (UEL) (LEL)	Liquid pale yellow crystal	230000 µg/kg / 21 µg/L
191-24-2	1,1,12-Benzoperylene 2,1,12-Benzoperylene Benzo(ghi)perylene	TLV PEL STEL IDLH	Inhalation, Skin	Acute: Inhalation of material may be harmful. Contact may cause burns to skin and eyes. Inhalation of Asbestos dust may have a damaging effect on the lungs. Fire may produce irritating, corrosive and/or toxic gases. Some liquids produce vapors that may cause dizziness or suffocation.	(FP) NA (VP) 1.0X10 ⁻¹⁰ mm Hg at 25 deg C (IP) NA (UEL) NA (LEL) NA	Colorless to white crystalline solid. Water insoluble	110000 µg/kg / 10 µg/L
207-08-9	Benzo(k)fluoranthene	TLV: 0.2 mg/cu m PEL STEL IDLH	Inhalation, Skin, Eye, ingestion	ACUTE/CHRONIC HAZARDS: When heated to decomposition this compound emits acrid smoke and irritating fumes. Possible carcinogenicity to Humans.	(FP) 9.59e-11 mm Hg at 77°F (VP) NA (IP) NA (UEL) NA (LEL) NA	Odorless Pale yellow needles or yellow crystalline solid	120000 µg/kg / 10 µg/L

Table 1

Summary of Soil/Waste and Groundwater/Leachate Contaminants of Concern

Chemical/CAS #	Chemical Name (Synonyms)	Exposure Limits	Routes of Entry	Symptoms/Health Effects	Chemical Properties	Physical Characteristics	Concentration at Site
57-12-5	Cyanide Ion Cyanide (anion)	(FP) NA (VP) NA (IP) NA (UEL) NA (LEL) NA	Skin, Ingestion, Inhalation	Acute: irritates the eyes, nose and throat. High exposure can cause poisoning with headache, weakness, confusion, nausea, pounding of the heart, coma and even death. Chronic: Long term health effect can occur at some time after exposure to Cyanide and can last for months or years Acute: May cause eye, skin,	TLV PEL NA STEL NA IDLH NA	Aqueous solutions with a faint odor of bitter almonds	-- / --
58-89-9	Beta-HCH Gamma-HCH Gamma-BHC Hexachlorane Alpha-HCH Kwell Beta-BHC 1,2,3,4,5,6-Hexachlorocyclohexane Benzene hexachloride	(FP) 150 deg F (VP) 0.14 mm Hg at 104°F (IP) NA (UEL) NA (LEL) NA	Skin, Ingestion, Inhalation, Eye	or respiratory system irritation. Chronic: Material may be irritating to the mucous membranes and upper respiratory tract. May cause damage to {organs} through prolonged or repeated exposure.	TLV 0.5 mg/m ³ (skin) PEL 0.5 mg/m ³ STEL NA IDLH NA	Slightly musty odor	-- / 0.8 µg/L

Table 1

Summary of Soil/Waste and Groundwater/Leachate Contaminants of Concern

Chemical/CAS #	Chemical Name (Synonyms)	Exposure Limits	Routes of Entry	Symptoms/Health Effects	Chemical Properties	Physical Characteristics	Concentration at Site
8001-35-2	Campechlor Polychlorocamphene NCGC00091881-01 DSSTox_CID_1368	TLV 0.5 mg/m ³ PEL 0.5 mg/m ³ STEL 1 mg/m ³ IDLH 200 mg/m ³	Inhalation, skin absorption, ingestion, skin and/or eye contact	Acute oral exposure to toxaphene in humans results in CNS stimulation, with the major effect being convulsive Seizures, Dizziness, Nausea and Vomiting. Chronic (long-term) inhalation exposure to toxaphene in humans results in reversible respiratory toxicity, while chronic, oral exposure in animals has resulted in effects on the liver, kidney, spleen, adrenal and thyroid glands, CNS, and the immune system. EPA considers toxaphene to be a probable human carcinogen (cancer-causing agent) and has classified it as a Group B2 carcinogen.	(FP) 84° F (VP) 0.4 mmHg (IP) (UEL) 6.4 % (LEL) 1.1 %	TOXAPHENE is a yellow, waxy solid with a pleasant piney odor	-- / 200 µg/L
53-70-3	DIBENZ(A,H)ANTHRACENE Benzo[k]tetraphene 1,2:5,6- Dibenzanthracene Dibenzo[a,h]anthracene	TLV 0.2 mg/cu m PEL STEL IDLH	Inhalation, Ingestion, skin, Eyes	ACUTE/CHRONIC HAZARDS: This compound is harmful if swallowed or inhaled. It may cause irritation. When heated to decomposition it emits acrid smoke, irritating fumes and toxic fumes of carbon monoxide and carbon dioxide. Possible Human carcinogen.	(FP) 1e-10 mm Hg at 68° (VP) (IP) (UEL) (LEL)	White crystals or pale yellow solid	31000 µg/kg / --

Table 1

Summary of Soil/Waste and Groundwater/Leachate Contaminants of Concern

Chemical/CAS #	Chemical Name (Synonyms)	Exposure Limits	Routes of Entry	Symptoms/Health Effects	Chemical Properties	Physical Characteristics	Concentration at Site
132-64-9	Dibenzofuran	TLV NA PEL NA STEL NA IDLH NA	Inhalation, Ingestion, Eye, Skin	Acute: Inhalation of material may be harmful. Contact may cause burns to skin and eyes Chronic: Inhalation of Asbestos dust may have a damaging effect on the lungs	(FP) 130 °C / 266 °F (VP) 0.00248 mm Hg @ 25 deg C (IP) (UEL) (LEL)	Colorless white crystalline solid	140000 µg/kg / 41 µg/L
1024-57-3	Epoxyheptachlor; Velsicol 53-CS-17; ENT 25,584; CHEBI:34786	TLV PEL STEL IDLH	Absorption Ingestion	Carcinogen. Developmental (effects while organs are developing), Reproductive (Producing Children)	(FP) (VP) (IP) (UEL) (LEL)	HEPTACHLOR EPOXIDE is a degradation product of heptachlor that occurs in soil and in or on crops when treatments with heptachlor, an insecticide, have been made. Forms readily upon exposing heptachlor to air.	-- / 4.8 µg/L
193-39-5	INDENO(1,2,3-CD)PYRENE; OPhenylenepyrene; 1,10-(1,2-Phenylene)pyrene; 2,3-Phenylenepyrene	TLV 0.2 mg/cu m PEL STE IDLH	Inhalation	Upon heating, toxic fumes are formed. Decomposes on heating. Carcinogen	(FP) (VP) 1.25X10-10 mm Hg at 25 deg C (IP) (UEL) (LEL)	Yellow plates or needles (recrystallized from light petroleum solution) showing a greenish- yellow fluorescence.	110000 µg/kg / 9.8 µg/L
h	Diphenylnitrosamine; Vultrol; Nitrosodiphenylamine; Benzenamine,	TLV NA PEL NA STEL NA IDLH NA	Inhalation Absorption	When heated to decomposition this compound emits toxic fumes of nitrogen oxides. Effects from exposure include contact burns to the skin and eyes. Carcinogen.	(FP) NA (VP) NA (IP) NA (UEL) NA (LEL) NA	N-NITROSODIPHENYLAMINE is a yellow to brown or orange powder or flakes or a black solid. Insoluble in water and denser in water. Hence sinks in water.	19000 µg/kg / 27 µg/L

Table 1

Summary of Soil/Waste and Groundwater/Leachate Contaminants of Concern

Chemical/CAS #	Chemical Name (Synonyms)	Exposure Limits	Routes of Entry	Symptoms/Health Effects	Chemical Properties	Physical Characteristics	Concentration at Site
Fluorene 86-73-7	9H-fluorene Fluorene	TLV 0.2 mg/cu m PEL STEL IDLH	Inhalation, Ingestion, Skin, Eyes	Acute: Skin irritation, eye irritation Chronic: May cause specific respiratory irritation. Potential Occupational carcinogens	(FP) 151.0 deg C (303.8 deg F) - closed cup (VP) 10 mm Hg at 294.8°F (IP) (UEL) (LEL)	White leaflets fluorescent when impure	-- / 140 µg/L
5103-71-9	cis-Chlordane (alpha)	TLV NA PEL NA STEL NA IDLH NA	Inhalation, Absorption (Skin, Eyes) , Ingestion	Acute/Chronic: Irritant to skin and mucous membranes. Harmful if swallowed or if inhaled, causes skin irritation, causes serious eye irritation.	(FP) NA (VP) NA (IP) NA (UEL) NA (LEL) NA	Light yellow odorless liquid	-- / 0.3 µg/L
11141-16-5	PCB;PCB-1232;PCB- 1248;AROCOLOR 6070;AROCOLOR 6062;AROCOLOR 6040;AROCOLOR 5460;AROCOLOR 5442;AROCOLOR 5432;AROCOLOR 1268 Polychlorinated biphenyl (32% chlorine)	TLV 0.001 mg/m ³ PEL NA STEL NA IDLH NA	Inhalation, Skin contact, Eye Contact, Ingestion	ACUTE: Toxic irritant. Hazardous decomposition products. Harmful if swallowed. Toxic in contact with skin. Chronic: May cause cancer. May cause damage to organs through prolonged or repeated exposure	(FP) 146°C (VP) (IP) (UEL) (LEL)	Colorless Liquid	-- / 12 µg/L

Appendix A: HASP Amendments

AMENDMENT 1:

Date: _____ Project Manager: _____ HSC: _____

Brief Description of Amendment:

AMENDMENT 2:

Date: _____ Project Manager: _____ HSC: _____

Brief Description of Amendment:

AMENDMENT 3:

Date: _____ Project Manager: _____ HSC: _____

Brief Description of Amendment:

Appendix B: Task Hazard Analyses

Appendix B: Task Hazard Analyses

TASKS	
① Site Walk	⑤
② Construction Oversight	⑥
③ Long-term Monitoring	⑦
④ Well and Probe Install / Decommission	⑧

THAs for these tasks are presented in the following pages, as well as general landfill-related hazard analyses.

Part A – PROJECT/TASK INFORMATION

Project/Site Name:	North Sanitary Landfill (Valleycrest)		Project Number/Org:	TR0881
Site Address:	950 Brandt St, Dayton, OH 45404			
Task & Worksite Description:	Construction oversight.			
Geosyntec Personnel:	Name	Office Phone	Cell Phone	
Site Lead/H&S Officer	Greg Lewis	N/A	513-882-8832	
Project Manager	Megan Martz	317-343-4793	317-345-1552	
Project Director	Jesse Varsho	630-203-3349	630-803-2659	
H&S Coordinator	Jim Bannantine	262-834-0227	414-339-5630	
Regional H&S Manager	Jim Bannantine	262-834-0227	414-339-5630	
Corporate H&S Director	Bob Poll	813-379-4420	813-240-9231	
On-Site Subcontractor(s):	☐ Applicable; provide company name, work task and contact information for each Geosyntec subcontractor below:			
☒ Not Applicable	TBD			
Client Contact(s):	Mike Samples, <i>de maximis, inc.</i>	865-691-5052	865-548-1875	
ETHICS POINT HOTLINE	US & Canada: 844-231-3371 UK: 800-89-0011 or 800-89-0011		Australia: 800-551-155 or 800-811-011 Ireland: 800-222-55288 or 800-500-000	

Part B - EMERGENCY RESPONSE and FIRST AID

IMPORTANT: After initial emergency response actions and incident stabilization, contact appropriate project and H&S personnel listed in Part A

Site-Specific Notes, Clarifications: Consider relevant risk factors & response procedures (fire/explosion, medical, chemicals/spills, security, site factors, weather, communications), as well as client/regulatory requirements and available of onsite/offsite emergency services (and the possible need for emergency contact numbers other than 911):	
Temperature checks will be completed daily. Personnel will not be admitted to the site if they have an elevated temperature or appear visibly sick.	
Emergency Communication / Alerting	☒ Verbal ☒ Cell Phone ☐ Land Line ☐ 2-Way Radio ☐ Satellite Phone ☐ On-site alarm/signal system ☐ Other:
To Summon Police, Fire, Ambulance	☒ DIAL 911 , for external responders ☐ Other:
WorkCare (for non-emergency injuries)	24/7: 888-449-7787
Other Emergency Contacts (such as security, spill responder, utility-related):	Dayton Police at (937) 333-2677 Fire Department Station 8 at (937) 333-4500 Concentra Urgent Care 228 Troy Street, Dayton, OH 45404 937-228-8132
Nearest EMERGENCY ROOM Medical Services	Hospital Name: Miami Valley Hospital Address: 1 Wyoming St, Dayton, OH 45409 Phone #: (937) 208-2048 ☒ See Attached Directions
Emergency Evacuation - Route, Rally/Muster Point, Shelter Location(s)	In the event of lightning, Geosyntec personnel will wait in their vehicle until 30 minutes past the last lightning strike before resuming work. Notify the on-site Dynegy representative of any lightning delays.
EMERGENCY and FIRST AID EQUIPMENT required for this work task is listed in PART C.2. – SAFETY EQUIPMENT LIST	

PART C – TASK / HAZARD / CONTROL SUMMARY and EQUIPMENT LIST

C.1 SUMMARY OF TASKS, HAZARDS AND CONTROLS

1. TASKS / WORK ASPECTS	2. HAZARDS / RISKS	3. CONTROLS
Mobilization/Demobilization	- Routine work travel - Off road driving - COVID-19	See D.1. ROUTINE HAZARD PREPAREDNESS See D.2 SPECIAL DRIVING/TRAFFIC/TRANSPORTATION HAZARDS See D.13. INFECTIOUS / ALLERGENIC BIOHAZARDS Avoid cell phone use while driving

		- Obey all posted traffic signs and local laws - Demonstrate defensive driving - Plan route before beginning travel - Allow pedestrians the right-of-way - Familiarize with new area/site conditions - Follow COVID-19 prevention measures. - Check in with client contact every day prior and after work. See contact information above.
Construction Oversight	- Slips/trips/falls - Crowded/busy workspaces - COVID-19 - Off Road Driving	See C.2. SAFETY EQUIPMENT LIST See D.1. ROUTINE HAZARD PREPAREDNESS See D.13. INFECTIOUS / ALLERGENIC BIOHAZARDS - Pay close attention to foot placement; slow deliberate movement, especially around uneven/slippery surfaces. - Wear steel toed boots, hard hats with side protection, and safety glasses, if necessary - Stay hydrated and take short breaks - If entering a workspace/building; watch for overhead clearance. Ensure the site personnel/manager is aware of your presence. - Wear proper PPE when around the ponds and do not work alone. - Follow all plant specific safety rules and barriers. Do not enter restricted areas with out prior authorization.

C.2. SAFETY EQUIPMENT LIST (Gear to be brought to the worksite by Geosyntec personnel, or availability confirmed)

Site-Specific Notes & Clarifications: Hard hats, four-gas meter and level D PPE must be worn on site at all times.				
☒	WEATHER, CLIMATE, SEASONAL	☒ Project-provided drinking water ☒ Canopy for shade, weather protection ☐ Other:	☒ Sunscreen ☐ Ice creepers (boot attachments)	☐ Rock salt, traction sand ☐ Portable heater (electric or kerosene)
☒	HYGIENE PROVISIONS	☐ Hand washing equipment (soap & wash water) ☐ Other:	☒ Hand sanitizer, disinfectant supplies	☐ Sanitary facility, porta-toilet
☒	BASIC PPE	☒ Standard work clothes appropriate for task ☒ Hard-toed boots/shoes ☒ Hardhat	☒ Safety glasses ☒ Work gloves appropriate for task ☒ Noise/hearing protection	☒ High visibility/reflective vest/apparel ☐ Nuisance dust mask (voluntary use)
☒	BIOLOGICAL HAZARDS	☒ Insect control (DEET/picaridin repellent, wasp spray, other) ☒ Poison ivy protection (Ivy Block skin cream, Technu skin wash) ☒ Tick removal kit ☒ Pant-leg "blousing"/gaiters (tick safe) ☐ Snake chaps/gaiters ☐ Other:	☐ Animal warning device (for bears/cougars/wolves/large animals) ☒ Hand sanitizer (for general hygiene or COVID-19) ☒ Disinfectant supplies (for general hygiene or COVID-19) ☒ Face covers for COVID-19 prevention	
☐	SPECIAL HAZARD CONTROLS	☐ Portable GFCI(s) for shock protection ☐ Electrical-hazard-rated boots, gloves ☐ Arc-resistant (AR) protection PPE for arc flash ☐ Flame-resistant (FR) clothing ☐ Work-area delineation supplies ☐ Other:	☐ Lockout/tagout equipment ☐ Portable lighting ☐ Tripod/winch ☐ Ventilation equipment (fan, blower) ☐ Traffic control devices	☐ Personal fall protection apparatus ☐ Personal flotation device ☐ Ring buoy & rope ☐ Marine survival suit
☐	CHEMICAL PPE and CHEMICAL SAFETY GEAR	☐ Goggles and/or face shield ☐ Chemical protective gloves ☐ Coveralls (Tyvek, or other) ☐ Outer boots, boot covers ☐ Air monitoring equipment, worker exposure monitoring device(s): 4-gas multimeter to monitor potential methane gas in work area ☐ Other:	☐ Disposable N95 respirator ☐ Half-face respirator (APR), cartridges ☐ Full-face respirator (APR), cartridges ☐ Exclusion Zone delineation supplies	☐ Decon solution, related supplies ☐ Receptacle for disposable PPE ☐ Chemical hazard emergency gear – listed in "EMERGENCY EQUIPMENT" below
☒	EMERGENCY EQUIPMENT	☐ Air horn, alarm, alerting equipment ☐ 2-Way radios; other communication device ☒ First aid kit(s) – onsite and/or in vehicles ☒ Fire extinguisher – onsite and/or in vehicles ☐ Other:	☐ Eyewash bottle(s) ☐ 15-min. eyewash station ☐ Emergency deluge shower ☐ Chemical spill kit/supplies	Vehicle emergency preparedness: ☒ Fire extinguisher, first aid kit ☐ Flares, lights, reflective device ☐ Roadside assistance service

PART D – HAZARD ANALYSIS AND CONTROLS

D.1. ROUTINE HAZARD PREPAREDNESS (This section required for all Tasks)

Site-Specific Notes & Clarifications: General hazards include travel to and from site. Limited lighting is available on site.

Routine Driving Hazards

- ☒ **Routine work travel** – Use routine safe/defensive driving practices (seat belts, safe speeds, eyes ahead, no tailgating, limit distractions, safe cell phone use, no texting, clear windows, account for weather/road conditions, adequate sleep, other measures as appropriate).
- ☒ **Unfamiliar location** – Plan travel route before driving in roadway: view map, plot your route and/or enter destination and activate navigation device.
- ☒ **Fatigue** – Minimize fatigue during long drives: frequent rest breaks, eat light snacks-avoid heavy meals, stay hydrated, fresh air, no loud music, keep windshield clean; avoid/minimize long distance driving during your ordinary sleep hours; total *work time* and *drive time* should not exceed 14 hours per day.
- ☒ **Unfamiliar vehicle** – Become familiar with vehicle operational controls and handling characteristics before operating vehicle.

Geosyntec Procedures: HS-105-Driver and Vehicle Safety; HS-211-Fatigue Management Plan

General Safety

- ☒ **General site hazards** – Prevent slips/trips/falls (resulting from rough terrain, trip hazards, steep slope, slippery surfaces); maintain good housekeeping.
- ☒ **Musculoskeletal hazards** – Prevent strains/sprains from strenuous tasks, overexertion, repetitive motion/ergonomic/lifting (seek help/lift-aids over 49 lbs.).
- ☒ **Weather/climate-related hazards** – Prevent heat/cold-related illness, use sunscreen, monitor weather, i.d. shelter/refuge, use “30/30 rule” for lightning.
- ☒ **Plant/insect/animal hazards** – Use precautions: poison ivy blocker/wash; insect repellent; tick checks; wasp spray; animal precautions.
- ☒ **Common unsanitary/allergenic hazards** – Use routine hygienic measures/precautions; hand washing/sanitizer, food hygiene, PPE, disinfectant cleaning.
- ☒ **Infectious/Pathogenic** - For COVID-19, and other non-typical/potentially high-risk pathogenic hazards, see **D.13 “Infectious/Pathogenic Biohazards.”**
- ☒ **Worksite traffic hazards** – Implement measures to protect personnel (high-visibility/reflective clothing, on-person lighting, traffic control measures).
- ☐ **Hazardous energy** – Use caution near electrical equipment/wet locations, machinery/physical hazards, stay out of hazard zone/line-of-fire, don’t touch.
- ☐ **Illumination hazards/night work** – Illuminate work areas and/or access routes, use high-visibility and reflective clothing or on-person lighting, as appropriate.
- ☐ **Security, potential crime/violence, urban/industrial zones** – Complete the *Assessment for Specific Risk: Working in Urban and Industrial Zones*
- ☒ **Working alone** - Develop a project-specific plan/procedure on limitations for lone work, and specify a plan for periodic communication/contact.

Geosyntec Procedures: HS-124-Heat Stress, HS-125-Cold Stress, HS-127-Ticks, HS-207-Working Alone, HS-208-Housekeeping, HS-210-Walking and Working Surfaces, HS-401-Back Injury Prevention, HS-517-Traffic Safety, *Assessment for Specific Risk: Working in Urban and Industrial Zones*

Basic Personal Protection

- ☒ **Head protection from overhead hazards** – Wear hardhat or “bump cap” as appropriate for hazard.
- ☒ **Hand protection** – Wear protective work gloves appropriate for the hazard and work tasks.
- ☒ **Eye protection** – Wear safety glasses (with side shield or wrap around, either clear or shaded for sun protection), or other appropriate eye protection.
- ☒ **Foot protection, rough terrain** – Wear work boots/shoes with hard toes, ankle support, puncture resistance, traction, as appropriate for conditions.
- ☒ **Hearing protection** – use earplugs or earmuffs (or both) as appropriate for conditions; at a minimum where noise levels exceed 85 dBA.
- ☐ **Protective clothing/nuisance dust mask** – For general protection against dust, dirt, oily residues, unsanitary conditions, as needed.
- ☐ Other personal safety gear required for the task(s) covered in this THA is described above in Site-Specific Notes & Clarifications

Geosyntec Procedures: HS 113-Personal Protective Equipment

D.2. SPECIAL DRIVING / TRAFFIC / TRANSPORTATION HAZARDS

☒ **Applicable** ☐ **Not Applicable, Not Anticipated**

Site-Specific Notes & Clarifications: Absolutely no-self extraction of a vehicle if stuck. A tow truck must be used in ALL cases if a vehicle gets stuck.

☒ SPECIAL DRIVING HAZARDS Off-Road Driving or use of non-typical vehicle, heavy vehicle, van, UTV/ATV Hazards: Worker injury due to vehicle collision, rollover	☒ For off-road driving, do not exceed capability of vehicle, beware of wet conditions, keep speed low, avoid unsafe orientation on slopes. ☐ UTV/ATV-specific procedures for training, use roll-bar or helmet, operate per manufacturer’s instructions. ☐ Special Skills Required for Vehicle type – For vehicles requiring special skills (such as windowless van, heavy work vehicle, utility vehicle, similar) ensure operator is provided training and/or has appropriate operator skills through experience. Geosyntec Procedure(s): HS-510-All Terrain Vehicles
☐ ROADWAY TRAFFIC HAZARDS Where the worksite is located in/near vehicle thoroughfare (road, highway, parking lot, etc.). Hazards: Worker injury from being struck by vehicle traveling in thoroughfare.	☐ Prepare Management of Traffic (MOT) Plan (address location hazards / client and regulatory requirements). ☐ Wear DOT-approved reflective vests where exposed to traffic hazards. ☐ Where possible, park vehicles as protective shield from oncoming traffic. ☐ Configure work area and support vehicles to minimize worker exposure to traffic hazards. ☐ Use DOT signal devices and/or signage to re-route vehicles around work area, site entrances/exits. ☐ Use DOT-trained flaggers or police detail where appropriate or required. Geosyntec Procedure(s): HS-517-Traffic Safety
☐ TOWING/HAULING LOADS Hazards: Vehicle accident, occupant injury from shifting load, unsafe equipment, un-roadworthiness of trailer.	☐ Ensure load within vehicle is firmly secured (rope, straps, load configuration) to prevent shifting during travel. ☐ Slings, chains, strap, rope and related equipment used for towing, hauling, load-securing shall be appropriate for use, and used in a manner as to prevent an unsafe condition. ☐ For trailer use, verify tow-hitch components are compatible, hitch/safety chains secure, signal/braking lights operational, rear-view mirrors effective, tires inflated to proper pressure and tread acceptable.
☐ RAILROAD HAZARD Hazard: Worker injury from being struck by train in R.R. right-of-way	☐ Coordinate with rail company or on-site host facility and implement required safety and security measures. ☐ Site workers to receive safety training for railroad work. Geosyntec Procedure(s): HS-305-Rail Operations

☐	TRANSPORTATION BY WATER	☐ See D.3., "Water Hazards." Geosyntec Procedure(s): HS-312-Water Transportation Safety
☐	AIRPORT HAZARDS Worker injury when working on/near airport runway, or use of helicopter, light aircraft	☐ Coordinate safety requirements with airport personnel and implement required safety measures. ☐ Site workers to receive safety training for airport work. Geosyntec Procedure(s): HS-310-Helicopter Safety, HS 311-General Aviation (Small Aircraft) Safety
☐	TRAFFIC/VEHICLE HAZARDS RELATED TO HEAVY EQUIPMENT, CONSTRUCTION SITE ACTIVITIES	☐ See D.8., "Construction, Heavy Equipment, Lift Equipment"

D.3. WATER HAZARDS (Working Over/Near Water, Ash Ponds, Quicksand)

☐ Applicable ☒ Not Applicable, Not Anticipated

D.4. FALL HAZARDS (Falls to Lower Levels)

☐ Applicable ☒ Not Applicable, Not Anticipated

D.5. HAND TOOLS (Manual, Hand-Powered)

☒ Applicable ☐ Not Applicable, Not Anticipated

Site-Specific Notes & Clarifications:

☒	MANUAL HAND TOOLS ☐ Struck by ☒ Pinch points ☐ Puncture ☐ Cutting blade ☒ Repetitive motion, musculo-skeletal hazard ☐ Flying objects, eye hazards ☐ Other, describe above	☒ Proper tool for the job, maintain in good condition, use vise/clamp to hold work piece, proper follow through, stay clear of "line of fire," appropriate work gloves, keep blades sharp, use wrist strap when dropped tool poses a hazard. ☒ Utility/folding/collapsible knives and fixed open-bladed knives/cutting tools are <u>not</u> permitted, unless specifically authorized. Cutting tools with auto-retracting blades, or with enclosed/guarded blades are permitted. Use cut-resistant heavy work gloves, as applicable. ☒ For tools requiring high exertion (shovel, hand auger, sledgehammer, pickaxe, slide hammer, similar): do stretching exercises to prepare, clear hazard zone, use stable body position, take rest breaks, avoid overexertion. ☒ Ground surface penetration – requires utility clearance; see D.10. "Utility-Related Hazards" Geosyntec Procedures: HS-502-Manual Hand Tools
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D.6. POWERED TOOLS & EQUIPMENT (For Drilling & Heavy Equipment, see D.7 & D.8)

☐ Applicable ☒ Not Applicable, Not Anticipated

D.7. DRILLING (Test Boring, Direct Push, Construction Drilling)

☐ Applicable ☒ Not Applicable, Not Anticipated

D.8. CONSTRUCTION, HEAVY EQUIPMENT, LIFT EQUIPMENT

☐ Applicable ☒ Not Applicable, Not Anticipated

D.9. ELECTRICAL WORK TASKS

☐ Applicable ☒ Not Applicable, Not Anticipated

D.10. UTILITY-RELATED HAZARDS

☒ Applicable ☐ Not Applicable, Not Anticipated

Site-Specific Notes & Clarifications:

☒	OVERHEAD, ABOVE-GROUND UTILITIES	☐ Arrange for power company/utility owner to de-energize power line. ☐ Do not cross approach boundaries with personnel or equipment; employ other appropriate precautions for the conditions (specify above). ☐ Use additional controls, as applicable: shielding, flagging, observer/monitor. Geosyntec Procedure(s): HS 304-Overhead/Underground Utility Hazards
☒	UNDERGROUND UTILITIES	☒ Confirm appropriate underground utility clearance procedures have been completed prior to ground penetrations, and employ other utility clearance/locator practices, as appropriate for conditions. ☒ Hand digging/augering or vacuum post-holing within 3' of utility locations or other high-risk condition. Geosyntec Procedure(s): HS 304-Overhead/Underground Utility Hazards

D.11. CONFINED / ENCLOSED SPACES (Including Hazardous Indoor Spaces)

☐ Applicable ☒ Not Applicable, Not Anticipated

D.12. STORAGE OF BULK MATERIALS (for Chemical Storage, see D.14 & D.15)

☐ Applicable ☒ Not Applicable, Not Anticipated

D.13. INFECTIOUS / PATHOGENIC BIOHAZARDS

☒ Applicable ☐ Not Applicable, Not Anticipated

Site-Specific Notes & Clarifications: COVID-19 awareness and prevention of potential exposures. Follow both Geosyntec and IPGC preventive measures and use appropriate PPE. Daily temperature checks will be completed at the site entrance.

☒	HAZARD TYPE: ☒ COVID-19 ☐ Wastewater, sewer ☐ Bird guano ☐ Mold, fungi, valley fever ☐ Bloodborne pathogens	☒ Follow Field Work COVID 19 General Prevention Measures (as applicable); list project specific COVID interventions above, communicate/coordinate with project team prior to initiation of work. ☐ Use "Universal Precautions" as applicable for potential exposures to infectious/pathogenic hazards. ☒ Low hazard – use basic hygiene practices, protective gloves, provide for hand washing. ☐ More severe hazard – add protective clothing, respirator/dust mask, decon, as appropriate. ☐ For bloodborne human pathogens follow Bloodborne Pathogen Program.
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☐ Discarded syringes ☐ Medical waste ☐ Other (describe above)	☐ Arrange with Human Resources for project-specific immunization. ☐ Implement remedial actions (remove syringes, clean up guano, decon/disinfect surfaces, etc.) as appropriate for the scope/scale of work. Geosyntec Procedure(s): HS-133-Bloodborne Pathogens, COVID-19 Considerations and Mitigations for On-Going Business Operations, Field Work Covid-19 General Prevention Measures
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D.14. COMMERCIAL CHEMICAL PRODUCTS (per HAZCOM or WHMIS)

☐ Applicable ☒ Not Applicable, Not Anticipated

D.15. SITE CONTAMINANTS, CHEMICAL WASTES

☒ Applicable ☐ Not Applicable, Not Anticipated

Site-Specific Notes & Clarifications:		
CHECK ALL THAT APPLY. Provide site-specific notes/clarifications above.		
☒ Soil/groundwater contaminants (historical release) ☐ Recent release, known high concentrations ☐ Former chemical disposal site, landfill ☐ Urban fill, residual contaminants ☐ Containerized waste (drums, process equipment) ☐ Buried drums (known or potential) ☐ Large containers, potential for spills ☐ Contaminated building surfaces ☐ Unexploded ordnance ☐ Explosive dust	☐ Oxygen deficiency ☐ Chlorinated volatile organic compounds (VOCs) ☐ BTEX, petroleum derived VOCs ☐ Fuel oils, petroleum, waste oil, lubricants ☐ Metals, metal compounds, metal dusts ☐ Elemental mercury ☐ Polyaromatic hydrocarbons (PAHs) ☐ Polychlorinated biphenyls (PCBs) ☐ Potential for flammable vapors ☐ Potential for flammable gas (methane)	☐ Corrosive, acids/caustics, strong irritants ☐ Sulfides, hydrogen sulfide (H ₂ S) ☐ Cyanides, hydrogen cyanide (HCN) ☐ Asbestos ☐ Lead paint ☐ Pesticides, herbicides, fungicides ☐ Sensitizers ☐ Radioactive contaminants ☐ Controlled substances, drugs ☐ Other - describe above
☐ FOR WORK CONSISTING OF CLEANUP OPERATIONS, CORRECTIVE ACTIONS, PRELIMINARY INVESTIGATIONS at an "UNCONTROLLED HAZ. WASTE SITE" (per HAZWOPER, 29 CFR 1910.120 or equivalent), delineate procedures in "Site-Specific Notes and Clarifications" (or attachments) addressing the following, as applicable to the work: - Workers attend pre-work orientation on hazards, risks, onsite safety measures, emergency contingencies. - Implement site control plan - delineate Exclusion Zone(s), Contaminant Reduction Zone(s), Support Zone (aka EZ, CRZ, SZ). - Include site map/figure depicting work locations and other relevant site-specific information. - Site workers in EZ or CRZ to have 40-hour HAZWOPER training, current 8-hour refresher, 3 days supervised field experience. - Site supervisor(s) required to have 8-hour Supervisor training. - Site workers in EZ or CRZ to participate in medical monitoring program, as applicable. - Implement site-specific procedures for worker protection via engineering controls, work practices, personal protective equipment (PPE), air monitoring, decontamination procedures, spill containment, emergency preparedness and response. - Conduct air monitoring, as appropriate; see Part E, "Air Monitoring, Worker Exposure Monitoring." PPE program: Specify Levels of Protection and specific PPE to be used for applicable tasks; Level D: No respirator, no chemical protective clothing, standard work clothes, basic PPE; (COVID-19 face covers allowed) Modified Level D: No respirator, chemical protective clothing as appropriate; (COVID-19 face covers allowed) Level C: Air-purifying respirator, chemical protective clothing as appropriate; consult with Corp. H&S Dept. required. Level B: Air-supplied respirator, chemical protective clothing/suit as appropriate; consult with Corp. H&S Dept. required. Level A: Fully encapsulating suit, self-contained breathing apparatus (SCBA); Level A prohibited for Geosyntec personnel. Geosyntec Procedures: HS-301-HAZWOPER, HS-108-Medical Monitoring Surveillance, HS-111-Air Monitoring, HS-112-Respiratory Protection, HS-113-Personal Protective Equipment, HS-114-Safety Training Programs, HS-115-Hazard Communication, HS-405-Drum Sampling, Others as applicable		
☒ FOR SITE WITH CHEMICAL CONTAMINANTS OR WASTE BUT NOT REGULATED BY HAZWOPER - Workers to be knowledgeable/aware of chemical hazards thru safety training/orientation and availability of hazard information. - Implement controls to minimize worker exposure through engineering controls, work practices, PPE, decon, as appropriate. - Evaluate worker exposure via air monitoring/sampling, as applicable; see Part E, "Air Monitoring, Worker Exposure Monitoring." Geosyntec Procedures: HS-111-Air Monitoring, HS-112-Respiratory Protection, HS-113-Personal Protective Equipment, HS-114-Safety Training Programs, HS-115-Hazard Communication, Others as applicable		
☐ STORAGE/TRANSPORT OF IDW* Spill/Release Risk: ☐ Risk of incidental spill/release ☐ Risk of emergency spill/release <i>* Investigation-Derived Waste</i>	☐ Describe site-specific procedures above for spill containment, container handling, as applicable. ☐ For liquids, provide secondary containment during storage. ☐ Segregate incompatible chemicals during storage. ☐ Locate emergency gear (eyewash, fire extinguisher, spill kit, safety signage) near storage area, as applicable. ☐ For incidental spills; spill kit on-site for low-hazard releases (low-flammability/toxicity/quantity/volatility) ☐ For emergency spills: describe spill/release hazard and response plan/procedure above, and indicate Emergency response contact in Part B, "Emergency Response and First Aid." ☐ DOT/TDG/IATA-Regulated transport: see D.17. "Hazmat/Dangerous Goods Shipping/Transportation." Geosyntec Procedures: HS-406-Unknown Hazardous Waste Drum Handling	
☐ OFF-SITE MIGRATION OF AIRBORNE CONTAMINANTS	☐ Implement controls to minimize hazard migration (dust suppression, covers, foam, etc.). ☐ Community/perimeter air monitoring to be conducted per perimeter air monitoring plan; see E.3 "Fence Line/Perimeter Air Monitoring."	

PART E – AIR MONITORING, WORKER EXPOSURE MONITORING**E.1. AIR MONITORING**☒ Applicable ☐ Not Applicable, Not Anticipated**Site-Specific Notes, Clarifications:** Four Gas Personnel Meter**AIR-TESTING PARAMETERS - Select site-specific testing parameters; list associated equipment in Part C.2, Safety Equipment List.**

☒ VOCs ☒ Photoionization detector (PID): X eV ☐ Flame ionization detector (FID) ☐ Colorimetric indicator tubes – describe above			☐ Oxygen (O ₂) – oxygen meter ☒ Lower Explosive Level (LEL) – LEL meter ☒ Hydrogen sulfide (H ₂ S) – H ₂ S detector ☐ Carbon monoxide (CO) – CO detector	☐ Particulates - total dust meter ☐ % Methane – methane meter ☐ Calibration kit for each parameter ☐ Other:
SUBSTANCE-SPECIFIC (PRE-SET) ACTION LEVELS - Sustained breathing zone action levels (sustained general work-area levels for LEL).				
☒ O ₂ (Oxygen)	19.5-23%	Acceptable to continue work without O ₂ -focused respiratory protection.		
	<19.5%	STOP WORK, ventilate to raise O ₂ to >19.5% for re-entry. For persistent hazard, contact Corp. H&S Dept.		
	>23.0%	STOP WORK, ventilate to lower O ₂ to <23% for re-entry. For persistent hazard, contact Corp. H&S Dept.		
☒ LEL (Lower Explosive Limit)	IMPORTANT:	Confirm sufficient oxygen is present (min. 8-12%) to ensure accurate LEL readings.		
	<10% LEL	Acceptable to continue working in work area; continue to monitor LEL.		
	≥10% LEL	STOP WORK. Implement controls (reposition workers, ventilate, contain/eliminate source, etc.); resume work ONLY when LEL readings are <10%, sustained.		
☒ H ₂ S (Hydrogen Sulfide)	< 1 ppm	Acceptable to continue work without H ₂ S-focused respiratory protection.		
	1-10 ppm	Implement controls (reposition workers, ventilate, contain/eliminate source, scheduling, etc.) to limit exposures to <1ppm, or use APR* with VOC/acid-gas cartridges (yellow); do not exceed MUC* for respirator type; confirm acceptability of respirator usage with Corp. H&S Dept.		
	> 10 ppm	Implement controls (reposition workers, ventilate, contain/eliminate source, scheduling, etc.) to limit exposures to <10ppm (with respirator), or <1ppm (without respirator). For persistent levels >10 ppm, STOP WORK, contact Corp. H&S Dept.		
☒ CO (Carbon Monoxide)	< 25 ppm	Acceptable to continue work without CO-focused respiratory protection.		
	≥ 25 ppm	Implement controls (reposition workers, ventilate, contain/eliminate source, scheduling, etc.) to limit exposures to <25ppm. For persistent levels >25ppm, STOP WORK, contact Corp. H&S Dept.		
☐ WILDFIRE SMOKE (AQI for PM 2.5)	<150	In this Air Quality Index (AQI) range, it's acceptable to continue work without respiratory protection.		
	151-500	Voluntary use of N95 respirator is appropriate.		
	>500	STOP WORK, or use APR* with approval of Corp. H&S Dept.		
☐ <OTHER>	<0.5% v/v, sustained	Implement controls (reposition workers, ventilate, contain/eliminate source, scheduling, etc.) to limit exposures to <0.5% v/v. For persistent levels >0.5% v/v, STOP WORK, contact Corp. H&S Dept.		
SITE-DERIVED ACTION LEVELS – Sustained breathing zone action levels; derived based on site contaminants; REVIEW WITH CORP. H&S DEPT. REQUIRED.				
☒ VOCs (Volatile Organic Compounds)	< 5 ppm	Acceptable to continue work without VOC-focused respiratory protection.		
	> 5 ppm	Implement controls (reposition workers, ventilation, containment, eliminate source, etc.) to lower VOC exposures to less than specified action level, or use APR* with approval of Corp. H&S Dept.		
	5 to 50 ppm	Use APR* with VOC cartridges (yellow or black); do not exceed MUC** for respirator type; confirm procedures for respirator usage with Corp. H&S Dept.		
	50 X ppm	STOP WORK. Implement controls, contact Corp H&S Dept.		
☐ AIRBORNE DUST (Total Particulates)	< X mg/m³	Acceptable to continue work without particulate-focused respiratory protection.		
	> “ mg/m³	Implement controls (water spray, reposition workers, ventilation, containment, etc.) to lower dust levels to less than specified action level, or use APR* with approval of Corp. H&S Dept.		
	X to X mg/m³	Use APR* with particulate cartridges appropriate for the hazard; do not exceed MUC** for respirator type; confirm procedures for respirator usage with Corp. H&S Dept.		
	> mg/m³	STOP WORK. Implement controls. For persistent levels greater than action level, contact Corp H&S Dept.		
☐ <OTHER>				
* Air-purifying respirator ** Maximum use concentration Geosyntec Procedures: HS-111-Air Monitoring, HS-602-Lead, HS-605-Hydrogen Sulfide, Wildfire Smoke THA Addendum				

E.2. OTHER WORKER EXPOSURE MONITORING☐ Applicable ☒ Not Applicable, Not Anticipated

E.3. FENCELINE / PERIMETER AIR MONITORING

☒ Applicable ☐ Not Applicable, Not Anticipated

Fence line/perimeter air monitoring to be conducted in accordance with a separate "Perimeter Air Monitoring Plan" for this work; results from fence line/perimeter air monitoring shall NOT be used as the sole basis for determining work zone atmospheric hazards.

Site-Specific Notes, Clarifications: - See Remedial Action Work Plan

PART F – APPROVALS, ACKNOWLEDGEMENTS

F.1. THA PREPARATION, REVIEW/APPROVAL SIGNATURES A THA is typically prepared by project staff, often with input from an HSC, with review/approval, at a minimum, by PM or PD. Corporate H&S staff must be consulted as required or otherwise deemed appropriate*.

THA PREPARED BY:	Printed Name	Signature	Date
	Alondra Soltero		
THA REVIEWED/ APPROVED BY: (Project Manager or Project Director, at a minimum)	Printed Name	Signature	Date

* At a minimum, Corp. H&S **must** review/approve the THA review when Geosyntec staff will encounter "high hazards/high risks," or perform critical tasks, such as (but not limited to):

- | | | |
|---|--|--|
| - Derive action levels for VOCs or toxic dusts | - Operate a UTV/ATV | - Function as a construction "Competent Person" |
| - Instrument monitoring for critical exposure risks | - Tow a trailer on roadway | - Operate a pneumatic or powder-actuated tool |
| - Wear a respirator | - Oversee a hot-work permit system | - Electrical testing & maintenance (<50 V excluded) |
| - Sustained exposure to wildfire smoke AQI _{PM 2.5} >150 | - Enter a permit-required confined space | - Work at height near overhead electrical utility lines |
| - Climb ladders to heights >10' | - Implement lockout/tagout controls | - Enter EZ/CRZ during HAZWOPER cleanup activities |
| - Use a personal fall apparatus | - Enter a trench/excavation >5' deep | - Exposure to radioactive isotopes (α , β , γ) |
| - Operate an aerial lift or fork-lift | - Work near heavy equipment or crane | - Onsite risk of emergency chemical spill |

Corporate H&S **must** also be consulted when Geosyntec subcontractors (under Geosyntec's oversight) perform high hazard/high risk work (such as demolition, blasting, crane lifts, confined space entry, testing/maintenance of electrical systems, lockout/tagout, HAZWOPER cleanup activities), **OR** when supplemental written H&S programs are required for a project (such as Electrical Safety Program, Lockout Program, Confined Space Entry Program, Emergency Response Plan), **OR** when a written safety plan must be submitted to a public agency. Consultation with Corp. H&S is encouraged for all questions/concerns regarding worker safety, regulatory compliance, risk/liability aspects, or project-specific safety requirements.

Geosyntec H&S Procedure: For more information, see HS-204-Work-Specific Hazard and Risk Assessment, Written Safety Plans.

F.2. GEOSYNTEC FIELD CREW ACKNOWLEDGEMENTS

Please sign below to acknowledge you reviewed and understand this THA, participated in project safety briefing and had an opportunity to ask questions about the information herein.

Printed Name	Signature	Employee No.	Date

F.3. SUBCONTRACTOR'S FIELD CREW ACKNOWLEDGEMENTS

☒ Applicable ☐ Not Applicable

Please sign below to acknowledge this THA was made available to you, and you had an opportunity to ask questions about the information herein.

Printed Name	Signature	Company Name	Date

Hospital Name: Miami Valley Hospital

Address: 1 Wyoming Street

Phone Number: (937) 208-2048



Driving Directions to Hospital from Site:

1. Head southwest on Brandt Pike
2. Continue onto Brandt St
3. Continue onto Valley St
4. Valley St. turns left and becomes N. Keowee St.
5. Turn left onto Wayne Ave
6. Turn right onto Wyoming St

Driving Time: 13 mins

Driving Distance: 4.2 miles

Part A – PROJECT/TASK INFORMATION

Project/Site Name:	North Sanitary Landfill (Valleycrest)	Project Number/Org.:	TR0881
Site Address:	950 Brandt St, Dayton, OH 45404		
Task & Worksite Description:	Monitor groundwater and landfill gas via monitoring wells and probes.		
Geosyntec Personnel:	Name	Office Phone	Cell Phone
Site Safety Lead/Officer	Greg Lewis	N/A	513-882-8832
Project Manager	Megan Martz	317-343-4793	317-345-1552
Project Director	Jesse Varsho	630-203-3349	630-803-2659
H&S Coordinator	Jim Bannantine	262-834-0227	414-339-5630
Regional H&S Manager	Jim Bannantine	262-834-0227	414-339-5630
Corporate H&S Director	Bob Poll	831-379-4420	813-240-9231
On-Site Subcontractor(s):	☐ Applicable; provide company name, work task and contact information for each Geosyntec subcontractor below: ☒ Not Applicable		
Client, Contact(s):	Mike Samples, <i>de maximis, inc.</i>	865-691-5052	865-548-1875
ETHICS POINT HOTLINE	US & Canada: 844-231-3371 UK: 800-89-0011 or 800-89-0011	Australia: 800-551-155 or 800-811-011 Ireland: 800-222-55288 or 800-500-000	

Part B - EMERGENCY RESPONSE and FIRST AID

IMPORTANT: After initial emergency response actions and incident stabilization, contact appropriate project and H&S personnel listed in Part A

Site-Specific Notes, Clarifications: Geosyntec will have 2-way radios onsite for communication due to spotty cell phone coverage. A radio will be left with the guard to communicate emergencies.	
Emergency Communication / Alerting	☐ Verbal ☒ Cell Phone ☐ Land Line ☒ 2-Way Radio ☐ Satellite Phone ☐ On-site alarm/signal system ☐ Other:
To Summon Police, Fire, Ambulance	☒ DIAL 911 , for external responders ☐ Other:
WorkCare (for non-emergency injuries)	24/7: 888-449-7787
Other Emergency Contacts (such as security, spill responder, utility-related):	Dayton Police at (937) 333-2677 Fire Department Station 8 at (937) 333-4500 Concentra Urgent Care 228 Troy Street, Dayton, OH 45404 937-228-8132
Nearest EMERGENCY ROOM Medical Services	Hospital Name: Miami Valley Hospital Address: 1 Wyoming St, Dayton, OH 45409 Phone #: (937) 208-2048 ☒ See Attached Directions
Emergency Evacuation - Route, Rally/Muster Point, Shelter Location(s)	In the event of lightning, Geosyntec personnel will wait in their vehicle until 30 minutes past the last lightning strike before resuming work. Notify the on-site representative of any lightning delays.
EMERGENCY and FIRST AID EQUIPMENT required for this work task is listed in PART C.2. – SAFETY EQUIPMENT LIST	

PART C – TASK / HAZARD / CONTROL SUMMARY and EQUIPMENT LIST

C.1 SUMMARY OF TASKS, HAZARDS AND CONTROLS

1. TASKS / WORK ASPECTS	2. HAZARDS / RISKS	3. CONTROLS
Mobilization to Site	- Vehicle Safety - Parking - Traffic - Distracted Driving - Construction/Road Hazards - Animals - Weather - Potential soft conditions and stuck vehicles - COVID 19	- Plan/map travel to site. Inspect vehicle using 360-degree walkaround before starting to drive. See D.1. ROUTINE HAZARD PREPAREDNESS - Allow sufficient time for transit. Plan for adverse weather conditions while driving. Obey speed limit and traffic. Pay close attention to the road and drive appropriately for the conditions. See D.1. ROUTINE HAZARD PREPAREDNESS - Cell phone use prohibited while driving (includes hand free devices). See D.1. ROUTINE HAZARD PREPAREDNESS - Follow COVID-19 prevention measures. See D.13. INFECTIOUS / ALLERGENIC BIOHAZARDS
Movement around the Site	- Slips/trips/falls - Heat/cold stress - Biohazards: snakes, bees, spiders, ticks - Work near water - Unstable conditions - Poor cellular signal - COVID-19	- Wear PPE (protective clothing, safety glasses, steel-toed boots, and high-visibility vests). See D.1. ROUTINE HAZARD PREPAREDNESS - Pay close attention to foot placement; slow deliberate movement, especially around water bodies. See D.3. WATER HAZARDS - Dress for weather conditions. See D.1. ROUTINE HAZARD PREPAREDNESS - There are several unstable areas related to soft/muddy conditions and cut slopes. Do not access these areas without taking proper measures to avoid trips/slips/falls or becoming stuck. See D.3. WATER HAZARDS - Numerous soft, and wet areas are present at the VPS ash ponds that may cause vehicles to become stuck. Stay on the roadway path, do not drive into the ash pond. See D.2. SPECIAL DRIVING/TRAFFIC/TRANSPORTATION HAZARDS - If a vehicle becomes stuck do not attempt to pull it out using site equipment, a third-party towing company is required by the Client. Immediately inform pertinent Geosyntec, Vistra staff of any stuck vehicles. See D.2. SPECIAL DRIVING/TRAFFIC/TRANSPORTATION HAZARDS - Follow COVID-19 prevention measures. See D.13. INFECTIOUS / ALLERGENIC BIOHAZARDS
Sample Collection	- Slips/trips/falls - Work near water - Heavy lifting - Hand tools and pinch points - Contaminants of concern - COVID-19	- Use proper lifting techniques. Lift with legs, not back, and all equipment and supplies over 49 lbs require two-person lifting. SEE D.9. STORAGE OF BULK MATERIALS - Wear work gloves as needed when using hand tools. SEE D.5. HAND TOOLS - Wear appropriate PPE when working around contaminated media. See D.1. ROUTINE HAZARD PREPAREDNESS - Follow COVID-19 prevention measures. See D.13. INFECTIOUS / ALLERGENIC BIOHAZARDS - Take breaks as needed during sediment coring due to the physical nature of the work. SEE D.5. HAND TOOLS

C.2. SAFETY EQUIPMENT LIST (Gear to be brought to the worksite by Geosyntec personnel, or availability confirmed)

Site-Specific Notes, Clarifications: Please review HS 212 – Protection from Biting Stinging Arthropods and Poisonous Plants, identify hazards, and select and implement corresponding control measures for each hazard.				
☒	WEATHER, CLIMATE, SEASONAL	☒ Project-provided drinking water ☒ Canopy for shade, weather protection ☐ Other:	☒ Sunscreen ☐ Ice creepers (boot attachments)	☐ Rock salt, traction sand ☐ Portable heater (electric or kerosene)
☒	HYGIENE PROVISIONS	☐ Hand washing equipment (soap & wash water) ☐ Other:	☒ Hand sanitizer, disinfectant supplies	☐ Sanitary facility, porta-toilet
☒	BASIC PPE	☒ Standard work clothes appropriate for task ☒ Hard-toed boots/shoes ☐ Hardhat	☒ Safety glasses ☒ Work gloves appropriate for task ☐ Noise/hearing protection	☒ High-visibility/reflective vest/apparel ☐ Nuisance dust mask (voluntary use)

☒	BIOLOGICAL HAZARDS	☒ Insect control (DEET/picaridin repellent, wasp spray, other) ☒ Poison ivy protection (Ivy Block skin cream, Technu skin wash) ☒ Tick removal kit ☒ Pant-leg "blousing"/gaiters (tick safe) ☐ Snake chaps/gaiters ☐ Other:	☐ Animal warning device (for bears/cougars/wolves/large animals) ☒ Hand sanitizer (for general hygiene or COVID-19) ☒ Disinfectant supplies (for general hygiene or COVID-19) ☒ Face covers for COVID-19 prevention
☐	SPECIAL HAZARD CONTROLS	☐ Portable GFCI(s) for shock protection ☐ Electrical-hazard-rated boots, gloves ☐ Arc-resistant (AR) protection PPE for arc flash ☐ Flame-resistant (FR) clothing ☐ Work-area delineation supplies ☐ Other:	☐ Lockout/tagout equipment ☐ Portable lighting ☐ Tripod/winch ☐ Ventilation equipment (fan, blower) ☐ Traffic control devices
☒	CHEMICAL PPE and CHEMICAL SAFETY GEAR	☐ Goggles and/or face shield ☒ Chemical protective gloves ☐ Coveralls (Tyvek, or other) ☐ Outer boots, boot covers ☐ Air monitoring equipment, worker exposure monitoring device(s): ☐ Other:	☐ Disposable N95 respirator ☐ Half-face respirator (APR), cartridges ☐ Full-face respirator (APR), cartridges ☐ Exclusion Zone delineation supplies ☒ Decon solution, related supplies ☒ Receptacle for disposable PPE ☐ Chemical hazard emergency gear – listed in "EMERGENCY EQUIPMENT" below
☒	EMERGENCY EQUIPMENT	☐ Air horn, alarm, alerting equipment ☒ 2-Way radios; other communication device ☒ First aid kit(s) – onsite and/or in vehicles ☐ Fire extinguisher – onsite and/or in vehicles ☐ Other:	☐ Eyewash bottle(s) ☐ 15-min. eyewash station ☐ Emergency deluge shower ☐ Chemical spill kit/supplies Vehicle emergency preparedness: ☒ Fire extinguisher, first aid kit ☐ Flares, lights, reflective device ☐ Roadside assistance service

PART D – HAZARD ANALYSIS AND CONTROLS

D.1. ROUTINE HAZARD PREPAREDNESS (This section required for all Tasks)

Site-Specific Notes & Clarifications:

Routine Driving Hazards

- ☒ **Routine work travel** – Use routine safe/defensive driving practices (seat belts, safe speeds, eyes ahead, no tailgating, limit distractions, safe cell phone use, no texting, clear windows, account for weather/road conditions, adequate sleep, other measures as appropriate).
- ☒ **Unfamiliar location** – Plan travel route before driving in roadway: view map, plot your route and/or enter destination and activate navigation device.
- ☒ **Fatigue** – Minimize fatigue during long drives: frequent rest breaks, eat light snacks-avoid heavy meals, stay hydrated, fresh air, no loud music, keep windshield clean; avoid/minimize long distance driving during your ordinary sleep hours; total *work time* and *drive time* should not exceed 14 hours per day.
- ☒ **Unfamiliar vehicle** – Become familiar with vehicle operational controls and handling characteristics before operating vehicle.

Geosyntec Procedures: HS-105-Driver and Vehicle Safety; HS-211-Fatigue Management Plan

General Safety

- ☒ **General site hazards** – Prevent slips/trips/falls (resulting from rough terrain, trip hazards, steep slope, slippery surfaces); maintain good housekeeping.
- ☒ **Musculoskeletal hazards** – Prevent strains/sprains from strenuous tasks, overexertion, repetitive motion/ergonomic/lifting (seek help/lift-aids over 49 lbs.).
- ☒ **Weather/climate-related hazards** – Prevent heat/cold-related illness, use sunscreen, monitor weather, i.d. shelter/refuge, use "30/30 rule" for lightning.
- ☒ **Plant/insect/animal hazards** – Use precautions: poison ivy blocker/wash; insect repellent; tick checks; wasp spray; animal precautions.
- ☐ **Common unsanitary/allergenic hazards** – Use routine hygienic measures/precautions; hand washing/sanitizer, food hygiene, PPE, disinfectant cleaning.
- ☒ **Infectious/Pathogenic** - For COVID-19, and other non-typical/potentially high-risk pathogenic hazards, see D.13 "Infectious/Pathogenic Biohazards."
- ☐ **Worksite traffic hazards** – Implement measures to protect personnel (high-visibility/reflective clothing, on-person lighting, traffic control measures).
- ☐ **Hazardous energy** – Use caution near electrical equipment/wet locations, machinery/physical hazards, stay out of hazard zone/line-of-fire, don't touch.
- ☐ **Illumination hazards/night work** – Illuminate work areas and/or access routes, use high-visibility and reflective clothing or on-person lighting, as appropriate.
- ☐ **Security, potential crime/violence, urban/industrial zones** – Complete the *Assessment for Specific Risk: Working in Urban and Industrial Zones*
- ☒ **Working alone** - Develop a project-specific plan/procedure on limitations for lone work, and specify a plan for periodic communication/contact.

Geosyntec Procedures: HS-124-Heat Stress, HS-125-Cold Stress, HS-127-Ticks, HS-207-Working Alone, HS-208-Housekeeping, HS-210-Walking and Working Surfaces, HS-401-Back Injury Prevention, HS-517-Traffic Safety, *Assessment for Specific Risk: Working in Urban and Industrial Zones*

Basic Personal Protection

- ☐ **Head protection from overhead hazards** – Wear hardhat or "bump cap" as appropriate for hazard.
- ☒ **Hand protection** – Wear protective work gloves appropriate for the hazard and work tasks.
- ☒ **Eye protection** – Wear safety glasses (with side shield or wrap around, either clear or shaded for sun protection), or other appropriate eye protection.
- ☒ **Foot protection, rough terrain** – Wear work boots/shoes with hard toes, ankle support, puncture resistance, traction, as appropriate for conditions.
- ☐ **Hearing protection** – use earplugs or earmuffs (or both) as appropriate for conditions; at a minimum where noise levels exceed 85 dBA.
- ☒ **Protective clothing/nuisance dust mask** – For general protection against dust, dirt, oily residues, unsanitary conditions, as needed.
- ☐ Other personal safety gear required for the task(s) covered in this THA is described above in Site-Specific Notes & Clarifications

Geosyntec Procedures: HS 109-Hearing Conservation, HS 112-Respiratory Protection, HS 113-Personal Protective Equipment

D.2. SPECIAL DRIVING / TRAFFIC / TRANSPORTATION HAZARDS☒ **Applicable** ☐ **Not Applicable, Not Anticipated****Site-Specific Notes & Clarifications:**

☒	SPECIAL DRIVING HAZARDS Off-Road Driving or use of non-typical vehicle, heavy vehicle, van, UTV/ ATV Hazards: Worker injury due to vehicle collision, rollover	☒ For off-road driving, do not exceed capability of vehicle, beware of wet conditions, keep speed low, avoid unsafe orientation on slopes. ☐ UTV/ATV-specific procedures for training, use roll-bar or helmet, operate per manufacturer's instructions. ☐ Special Skills Required for Vehicle type – For vehicles requiring special skills (such as windowless van, heavy work vehicle, utility vehicle, similar) ensure operator is provided training and/or has appropriate operator skills through experience. Geosyntec Procedure(s): HS-510-All Terrain Vehicles
☐	ROADWAY TRAFFIC HAZARDS Where the worksite is located in/near vehicle thoroughfare (road, highway, parking lot, etc.). Hazards: Worker injury from being struck by vehicle traveling in thoroughfare.	☐ Prepare Management of Traffic (MOT) Plan (address location hazards / client and regulatory requirements). ☐ Wear DOT-approved reflective vests where exposed to traffic hazards. ☐ Where possible, park vehicles as protective shield from oncoming traffic. ☐ Configure work area and support vehicles to minimize worker exposure to traffic hazards. ☐ Use DOT signal devices and/or signage to re-route vehicles around work area, site entrances/exits. ☐ Use DOT-trained flaggers or police detail where appropriate or required. Geosyntec Procedure(s): HS-517-Traffic Safety
☐	TOWING/HAULING LOADS Hazards: Vehicle accident, occupant injury from shifting load, unsafe equipment, un-roadworthiness of trailer.	☐ Ensure load within vehicle is firmly secured (rope, straps, load configuration) to prevent shifting during travel. ☐ Slings, chains, strap, rope and related equipment used for towing, hauling, load-securing shall be appropriate for use, and used in a manner as to prevent an unsafe condition. ☐ For trailer use, verify tow-hitch components are compatible, hitch/safety chains secure, signal/braking lights operational, rear-view mirrors effective, tires inflated to proper pressure and tread acceptable. Geosyntec Procedure(s): HS-305-Rail Operations
☐	RAILROAD HAZARD Hazard: Worker injury from being struck by train in R.R. right-of-way	☐ Coordinate with rail company or on-site host facility and implement required safety and security measures. ☐ Site workers to receive safety training for railroad work. Geosyntec Procedure(s): HS-312-Water Transportation Safety
☐	TRANSPORTATION BY WATER	☐ See D.3., "Water Hazards." Geosyntec Procedure(s): HS-310-Helicopter Safety, HS 311-General Aviation (Small Aircraft) Safety
☐	AIRPORT HAZARDS Worker injury when working on/near airport runway, or use of helicopter, light aircraft	☐ Coordinate safety requirements with airport personnel and implement required safety measures. ☐ Site workers to receive safety training for airport work. Geosyntec Procedure(s): HS-310-Helicopter Safety, HS 311-General Aviation (Small Aircraft) Safety
☐	TRAFFIC/VEHICLE HAZARDS RELATED TO HEAVY EQUIPMENT, CONSTRUCTION SITE ACTIVITIES	☐ See D.8., "Construction, Heavy Equipment, Lift Equipment"

D.3. WATER HAZARDS (Working Over/Near Water, Ash Ponds, Quicksand)☐ **Applicable** ☒ **Not Applicable, Not Anticipated****Site-Specific Notes & Clarifications:**

☐	WATER HAZARDS Work/travel in watercraft or on equipment over water or over coal ash impoundment/pond: ☐ Workboat, barge ☐ Water transportation ☐ Hazardous currents (river, tidal/riptide) ☐ Ash pond ☐ Towing, trailer, roadway ☐ Other – describe above Walking into water/wetland, on shoreline, riverbank, dock, bulkhead, abutment, coal ash: ☐ Work on-foot near, or on ice over, waterbody ☐ Wading into water, wetland ☐ Hazardous tidal zone or surf ☐ Water release, flash flood ☐ Coal ash pond, quicksand ☐ Open culvert, arroyo, drainage/irrigation ditch ☐ Diving Hazards (as applicable): - Drowning, cold immersion - Boating collision, navigation, fog, darkness - Fire/fuel hazards - Entrapment (mud/silt/coal ash/quicksand) - Slip/fall hazards – ice, mud, silt, wet surfaces - Weather, heat/cold stress	General water-safety measures for all work near water: ☐ Wear regulatory-approved personal flotation device (PFD) where drowning hazard is present. ☐ Bring emergency rescue and/or signaling equipment (ring buoy and rope, reaching device, flares) ☐ For fall protection over water, see D.4. "Fall Hazards." ☐ For electrical hazards associated with water/wet locations, see D.10. "Electrical Work Tasks." Boating-specific: ☐ Use fuel safety practices, fire extinguisher present in boat. ☐ Develop/follow float plan, monitor weather, navigate/communicate as planned. ☐ Confirm navigation/communication equipment operable before heading onto water. ☐ For work over very cold water, have immersion survival suit available. ☐ For tidal, flash flood, dam release hazards, plan/locate work accordingly. ☐ For towing a boat trailer, see D.2. "Special Driving/Traffic/Transportation Hazards." Work-entering water or along shore/bank or on dock/pier/abutment: ☐ For ice/slip hazards, wear ice creepers, sand work area, use tether, other appropriate measures. ☐ For work on ice over water, verify safe thickness, have ring buoy & rope available ☐ For unsure/slippery footing <u>in</u> water, use wading staff, high-traction soles on waders. ☐ Have lifesaving skiff/boat available in circumstances where other rescue means are inadequate. ☐ Monitor hazardous tides, weather for flash floods, know water release schedule. For ash ponds, quicksand: ☐ Wear regulatory-approved personal flotation device (PFD). ☐ Bring emergency rescue equipment (ring buoy and rope, reaching device) ☐ If walking on ash/quicksand, provide stable walking/working surface (4'x8' plywood, or similar) Geosyntec Procedure(s): HS-306-Working on/near Water and Ice, HS-312-Water Transportation Safety
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D.4. FALL HAZARDS (Falls to Lower Levels)

☐ Applicable ☒ Not Applicable, Not Anticipated

Site-Specific Notes & Clarifications:

☐ WORKING AT HEIGHTS (GENERAL) Hazards: - Injury from falls onto lower surface or falls into hazardous equipment, chemicals, water - Overhead utilities/obstructions - Impalement hazard (such as from falling onto unprotected rebar and similar surface projections) - Hazard posed to ground personnel from falling tools, equipment, materials	Fall protection “trigger heights”: Built environment – US & CAN: 4 ft. (1.2 m.); Construction: US: 6 ft., 10 ft. for scaffolds; CAN: 10 ft. (3 m) Protect from <u>primary</u> (fall) hazards: ☐ Restrict access to hazard (barriers, tape, sign) ☐ Ensure safe access to height (ladder, stair, lift) ☐ Ensure guardrails/stair-rails/handrails present ☐ Ensure covers in place over holes ☐ Use designated “watch person/monitor” ☐ Use tether or positioning device ☐ Use personal fall apparatus (PFA) ☐ Use fall protection net Protect from <u>secondary</u> (collateral) hazards: ☐ Protect site ground personnel from falling objects (restrict access, toe-boards, tether tools) ☐ Install caps on protruding rebar and similar ☐ Working over water; see D.3, “Water Hazards” ☐ Working over hazardous machinery/equipment; see D.5, “Power-Tools/Powered Equipment” ☐ Overhead electrical; See D.11. “Utility-Related Hazards” ☐ Working over chemical hazards; See D.14 and/or D.15 for chemical and/or contaminant hazards. Geosyntec Procedure(s): HS-120-Fall Protection, HS-210-Walking and Working Surfaces, HS-304-Overhead/Underground Utility Hazards
☐ LADDER / STAIRS ☐ Extension/straight ladders ☐ Step ladders ☐ Fixed/installed ladders ☐ Portable/mobile stairs ☐ Job-made or scaffold stairs Hazards: - See general fall hazards, above.	☐ Follow safe work practices: • Use ladders according to safe practices and manufacturer’s instructions. • Maintain 3 points of contact at all times on ladder; keep center of gravity within side rails. • Do not use metal (conductive) ladder near electrical hazard. • Extension/straight ladders shall be properly footed, secured, angled, extend above upper work surface. • Stepladders are set on level ground or properly shimmed, spreaders locked; do not climb/stand on top step, top cap, or rear non-climbing side; use step ladder of sufficient length for work. • Equip stairs with stair handrails where more than 4 steps, and for stairway height of 4’ or more. • Ensure portable stairs are stable, plumb. Geosyntec Procedure(s): HS-120-Fall Protection; HS-501-Ladders
☐ SCAFFOLD ☐ Supported scaffold ☐ Suspended scaffold ☐ Free-standing/mobile scaffold Hazards: - See general fall hazards, above - Equipment collapse	☐ Follow safe work practices: • Identify/coordinate operations with the scaffolding “Competent Person.” • Supported scaffold level, stable, proper attachments, tiebacks, planking, • Suspended scaffolds anchored properly. • Guardrails or personal fall apparatus required above 10 feet. • Proper means of accessing scaffold (proper ladders, stair tower). • Total height of free-standing scaffold not to exceed four times the minimum base dimension. • Do not exceed load limits; store/stage materials in quantities sufficient for immediate use. Geosyntec Procedure(s): HS-507-Scaffolds
☐ AERIAL BOOM/SCISSOR LIFT Hazards: - See general fall hazards, above - Struck-by, run-over, tip over - Caught between (pinch points) - Fluid leaks/fuel hazards or battery-related hazards	☐ Follow safe work practices: • Operators to be trained and certified. • Equipment is inspected after mobilization and is in good condition. • Harness & lanyard worn whenever operating the lift. • Overhead hazards and surface obstructions to be reviewed with operators prior to use. Geosyntec Procedure(s): HS-509-Aerial Lifts
☐ WARNING! Confirmed or possible close proximity to OVERHEAD ELECTRICAL UTILITY LINES.	☐ Follow safe work practices per D.11., “Utility-Related Hazards” Geosyntec Procedure(s): HS-304-Overhead/Underground Utility Hazards

D.5. HAND TOOLS (Manual, Hand-Powered)

☒ Applicable ☐ Not Applicable, Not Anticipated

Site-Specific Notes & Clarifications:

☒ MANUAL HAND TOOL INJURIES ☒ Struck by ☒ Pinch points/crushing injuries ☒ Puncture ☐ Cutting blade/laceration risk ☐ Flying objects, eye hazards ☐ Other, describe above	☒ Proper tool for the job, maintain in good condition, use vise/clamp to hold work piece, proper follow through, stay clear of “line of fire,” appropriate work gloves, keep blades sharp, use wrist strap when dropped tool poses a hazard. ☐ Utility/folding/collapsible knives and fixed open-bladed knives/cutting tools are <u>not</u> permitted, unless specifically authorized. Cutting tools with auto-retracting blades, or with enclosed/guarded blades are permitted. Use cut-resistant heavy work gloves, as applicable. ☐ Ground surface penetration – requires utility clearance; see D.11. “Utility-Related Hazards” Geosyntec Procedures: HS-502-Manual Hand Tools
☒ MUSCULOSKELETAL (MSK) HAZARDS ☐ Risk of <u>acute</u> physical MSK trauma (sprains, strains, soft tissue injuries) ☒ Risk of cumulative/chronic MSK trauma, repetitive motion injuries	☒ For tools requiring high exertion (shovel, hand auger, sledgehammer, pickaxe, slide hammer, similar): do stretching exercises to prepare, clear hazard zone, use stable body position, take rest breaks, avoid overexertion.

D.6. POWERED TOOLS & EQUIPMENT (For Drilling & Heavy Equipment, see D.7 & D.8) ☒ **Applicable** ☐ **Not Applicable, Not Anticipated**

Site-Specific Notes & Clarifications:

☒ Type of powered tools/equipment: ☐ "Power tools" ☒ Powered portable equipment ☐ Powered fixed equipment Energy/power source: ☒ Battery-operated ☐ Electric-powered ☐ 120V ☐ 240V ☐ 480V ☐ Extension/flexible cords ☐ Fuel-powered (gas or liquid) ☐ Pneumatic ☐ Hydraulic ☐ Gunpowder-actuated Hazards of Power Tools and Powered Equipment: ☒ Eye/hand/body injury ☒ Point-of-operation hazards ☒ Pinch points, moving parts ☐ Line-of-fire hazards, struck by ☐ Fire/explosion, ignition sources ☐ Burns from hot surfaces, steam ☐ Noise ☐ Inhalation/atmospheric hazards ☐ Working at heights, falls ☐ Overhead obstruction(s) ☐ Musculoskeletal hazards ☐ Potential (stored) energy ☐ Illumination	☒ General safe work practices for operation of powered tools and equipment: - Inspect before each use to ensure safe operating condition. - Clear personnel from hazard zone; keep personnel out of the "line-of-fire;" heed warning labels/signage. - Arrange worksite for safe access to equipment and safe use of tool; confirm no overhead obstructions. - Secure long hair/loose clothing/hanging jewelry near moving/rotating parts. - Ensure point-of-operation, mechanical power transmission, other moving parts are guarded with protective devices (as applicable); do not override interlocks, guards, protective devices. - Do not make any equipment modifications that create a greater hazard or bypass safety design features. - Use tool/equipment in accordance with manufacturer's use and safety instructions. - Use PPE and/or other safety protections, as appropriate, for eye/hearing/hand/head/body protection. - Provide training or verify operator competency for use of power tool/equipment. - Use ventilation, wet methods, respirators, other applicable means to mitigate inhalation hazard. - Move power cords/pressurized hoses to protect from damage during tool/equipment use. - For spark/heat generating tool/equipment, have fire extinguisher available, remove combustible/flammable materials, or use other means to control fire hazard. - Use safe lifting practices and/or lift aids for moving heavy portable equipment, and use safe operating procedures to protect from acute strains/sprains, overexertion, and cumulative trauma injuries. - Implement safe work practices for compressed air, pressurized systems (pneumatic/hydraulic), stored energy. ☒ Additional requirements for power tools: - Use vise/clamp/work bench or other means to hold/secure a portable/moveable work piece. - Don't carry electrical tools/equipment by the power cord; don't carry pneumatic tools by hoses. - Disconnect tool/equipment from power source before changing bits, blades or making adjustments. ☐ Additional requirements for fixed powered equipment: - Implement lockout/tagout controls for repairs/adjustments/tooling changes. - Equip pneumatic hoses with whip checks; ensure factory fittings are used for high-pressure hose connections. ☐ For climbing/fall hazards associated with large equipment, see D.4. "Fall Hazards." ☐ For electrical hazards, see D.10. "Electrical Work Tasks." ☐ For ground surface penetration, see D.10. "Utility-Related Hazards." ☐ For fuel-safety practices, see D.14. "Commercial Chemical Products." ☐ For air monitoring of atmospheric hazards, see Part E, "Air Monitoring, Worker Exposure Monitoring." Geosyntec Procedure(s): HS-109-Hearing Conservation, HS-113-Personal Protective Equipment, HS-119-Lockout/Tagout, HS-121-Electrical Safety, HS-503-Powered Hand Tools, Others as applicable
☐ WELDING, CUTTING, HOT WORK ☐ Arc-welding (electrical arc) ☐ Gas-welding/cutting (fuel gases) Hazards: - UV/IR light-eye/skin burns - hot-work hazards/fire - toxic metal welding fumes - compressed gases - electrical shock	☐ General safe work practices for operators of welding equipment: - Hot work permit system to be implemented. - Operator properly protected (eye protection, clothing, apron, etc.). - Fire hazard controls (watcher, fire extinguisher, water, remove combustibles from work area). - Protect nearby personnel from hazardous UV, IR light (shielding, curtain); see D.16. "Radiation Hazards." ☐ For welding gas cylinders, secure them upright with caps on when stored or not in use; protect cylinders from damage; NEVER secure gas cylinders to metal welding bench used for electrical arc welding; see D.14. "Commercial Chemical Products." ☐ For arc welding, follow electrical safe work practices; see D.10. "Electrical Work Tasks." ☐ For inhalation hazards from welding fumes (toxic metals) and gases (asphyxiant, flammable), see D.14. "Commercial Chemical Products." Geosyntec Procedure(s): HS-511-Welding, Cutting and Other Hot Work
☐ PORTABLE ELECTRIC GENERATOR Hazards: - Electrical shock - Carbon monoxide in exhaust - Fuel-related fire hazard - Injury from mechanical or lifting hazard - Burns from hot surfaces	☐ Follow general safe work practices for Powered Tools & Equipment (above), and as follows: - Use in accordance with manufacturer's instructions, including instructions for grounding the generator. - Keep generator and work area dry. - Never use indoors, or near building air intake vents due to carbon monoxide hazard. - Provide for ventilation and/or air monitoring where hazardous accumulation of exhaust emissions is possible. - Use hearing protection in close proximity to operating generator, as needed. - Use power cords/extension cords specified by instructions. - Use ground-fault circuit interrupters (GFCIs) in accordance with manufacturer's instructions; see D.10. "Electrical Work Tasks." - Shut down equipment before refueling; see safe practices for flammable/combustible liquids in D.14. "Commercial Chemical Products." Geosyntec Procedures: HS-109-Hearing Conservation, HS-111-Air Monitoring, HS-115-Hazard Communication (for fuel), HS-121-Electrical Safety, Others as applicable

☐	PNEUMATIC / HYDRAULIC HAZARDS ☐ Air compressor ☐ Compressed air system ☐ High-pressure liquid ☐ Pressurized steam (For compressed gas cylinders, see D.14. "Commercial Chemical Products")	☐ Never direct outlet nozzle toward body; use guards, restraints, engineering controls as appropriate. ☐ Never use compressed air for cleaning clothes you are wearing. ☐ If compressed air is used for cleaning, restrict pressure to 30 psi or below, equip nozzle with chip guard. ☐ Use PPE for eye (goggles or face shield)/hand/head/hearing/skin protection, as appropriate for the hazard. ☐ Ensure tank, hoses, fittings are in good repair using factory fittings, equipped with whip-checks. ☐ If pressure relief device poses a hazard to workers, reconfigure or shield device or restrict access by workers.
☐	PORTABLE HEATER ☐ electric ☐ fuel powered Hazards: - Shock (electrical) - Carbon monoxide emissions and fuel-related fire hazards (fueled) - Fires/burns from hot surfaces.	☐ <u>Follow general safety practices for Operation of Equipment/Machinery (above), and as follows:</u> - Keep heater dry and locate heater on level surface away from high traffic areas to prevent tipping. - Never use fuel-powered heaters indoors, or near air intake vents, due to carbon monoxide hazard. - Provide ventilation and/or air monitoring where hazardous accumulation of exhaust emissions is possible. - Keep combustible materials at least 3 feet from hot surfaces. - Do not use an extension cord or power strip to power an electric heater. - For electric heaters, see D.10., "Electrical Work Tasks." - Shut down fuel-powered equipment before refueling; see safe practices for flammable/combustible liquids and/or compressed gases in D.14. "Commercial Chemical Products." <i>Geosyntec Procedures: HS-111-Air Monitoring, HS-115-Hazard Communication (for fuel), HS-121-Electrical Safety, Others as applicable</i>
☐	LOCKOUT/TAGOUT (LO/TO) OF HAZARDOUS ENERGY To prevent unplanned equipment start-up or release of energy when under maintenance/repair.	☐ Prepare site-specific written LO/TO program, and equipment-specific written LO/TO procedures (as applicable); implement control procedures for hazardous energy sources, provide locks/tags, train workers, designate "authorized" personnel, notify "affected" personnel. <i>Geosyntec Procedure(s): HS-119-Lockout Tagout, HS-121-Electrical Safety</i>

D.7. DRILLING (Test Boring, Direct Push, Construction Drilling)

☐ Applicable ☒ Not Applicable, Not Anticipated

Site-Specific Notes & Clarifications:

☐	DRILLING & DIRECT PUSH Includes hazards posed by drilling rig and associated equipment, heavy support vehicles, trailer/towing hazards, and similar mobile equipment. Hazards: - Struck-by equipment - Run over, roll over - Caught between (pinch points) - Manual lifting, musculoskeletal - Fuel/fluid leaks, fuel hazards - Suspended equipment - Roadway hazards.	☐ <u>Follow safe work practices, as applicable:</u> - Non-drilling personnel to stay clear of drilling work zone when drill rig in operation. - Equipment maintained in good repair, inspected daily upon mobilization; backup alarms and emergency stop operational, machine guards in place, whip checks on high pressure lines. - Leaks or defective safety equipment should be repaired before use. - Establish eye contact with operator and use hand signals prior to approaching the rig. - Use PPE near operating rig (eye/head/hearing/hand/foot protection, high visibility vests or equivalent). - Arrange personal/support vehicles to protect drill team and not obstruct travel lanes or other operations. - Operators/helpers maintain safe distance from moving parts; secure loose hair, loose clothing, equipment. - Drill rigs will only be moved with masts lowered. - Maximum safe slope for rig will be followed, drill rig leveled, appropriate blocking/cribbing as needed. - Use safe practices for fuel handling/storage/transport; spill equipment available for fuel/fluid leaks. - Ventilate exhaust and conduct air monitoring, as appropriate, when drilling indoors. - Never climb drill mast without appropriate fall protection. - Use precautions for overhead and underground utilities <i>Geosyntec Procedure(s): HS-403-Drilling, HS-304-Overhead/Underground Utility Hazards, Others as applicable</i>
☐	MECHANICAL LIFTING, RIGGING Applies to lifting truck-mounted boom rig (e.g., drill rig), and all other drilling-related mechanical/electrical hoist equipment. Hazards: - Mechanical hazards - Elevated loads	☐ <u>In addition to general drilling & direct push safety practices (above), as applicable:</u> - Slings, chains, rope, wire rope, as well as sheaves, boom, and attachments used for lifting/hoisting shall be maintained in good condition, inspected daily, and used/stored in a manner as to protect from damage. - Do not exceed loading limits of lifting equipment; perform work in accordance with equipment load chart. - Hooks will be equipped with safety latches. - Ensure anchor points for winch or other lift device are engineered for intended use. - Ensure personnel are not positioned beneath elevated loads. <i>Geosyntec Procedure(s): HS-506-Cranes</i>
☐	WARNING! Confirmed or possible close proximity to OVERHEAD or UNDERGROUND UTILITIES.	☐ Follow safe work practices per D.11. "Utility-Related Hazards." <i>Geosyntec Procedure(s): HS-304-Overhead/Underground Utility Hazards</i>

D.8. CONSTRUCTION, HEAVY EQUIPMENT, LIFT EQUIPMENT

☐ Applicable ☒ Not Applicable, Not Anticipated

Site-Specific Notes & Clarifications:

☐	WORKING NEAR MOBILE HEAVY EQUIPMENT, ON-SITE VEHICLES Hazards: - Struck-by - Caught between - Run over, roll over - Overhead hazards/obstructions - Elevated loads	☐ <u>For personnel on-foot/on-the-ground near operating heavy equipment, follow safe work practices:</u> • High visibility vests for all personnel in construction vehicle work area, on-site roadways and travel lanes. • Maintain unobstructed vision: wear shaded eyewear only in bright sun; don't wear hoods. • Erect barriers and post signs to identify and isolate the equipment hazard zone, if possible. • Stay out of swing radius of equipment, both in front and operating end, as well as at the back of equipment. • Stay out of the travel path of operating heavy equipment. • When crossing vehicle pathway behind moving equipment, cross at a distance not less than 30 feet. • When approaching equipment, always be able to see operator so he/she can see you. • Make eye contact with operator and use hand signals or make radio contact prior to approaching equipment. • Operator to provide "all off" hand signal when it is safe to approach within swing radius of equipment.
☐	OPERATION OF MOBILE HEAVY EQUIPMENT Hazards: - Struck-by - Run over, roll over - Caught between (pinch points) - Fluid leaks/fuel-/fire-hazards - Overhead hazards/obstructions - Potential for body entrapment/crushing - Rotating equipment, moving parts.	☐ <u>Operators to follow safe work practices for operation of heavy equipment:</u> • Only trained/qualified persons allowed to operate heavy equipment. • Wear seatbelts; roll-over protection system present/deployed; do not exceed maximum safe slope. • No passengers on moving/operating equipment except where passenger seat/restraint is present. • Equipment inspected daily upon mobilization; maintained in good repair, backup alarms. • Leaks or defective safety equipment should be repaired before use; fire extinguisher present. • Maintain eye contact with ground personnel and use hand signals to direct their approach near equipment. • High visibility vests for all personnel in construction vehicle work area, on-site roadways and travel lanes. • Cease operation if personnel enter swing radius, travel path or hazard zone of moving parts, elevated loads. • Use safe practices for fuel handling/storage/transport; spill equipment available for fuel/fluid leaks. • Equipment locked, secured, brakes set, buckets/forks lowered, when not in use. • Shut down/lock out equipment to prevent crush situation beneath or between moving parts of equipment. • Ensure personal/support vehicles are parked/located not to obstruct equipment travel lanes/operating zones. • Mark temporary roadways clearly, provide berms/stops where needed. Geosyntec Procedure(s): HS-504-Heavy Equipment, HS-132-Competent Persons
☐	TRENCHING/EXCAVATION Hazards: - Cave-in, entrapment - Hazardous atmosphere - Water accumulation - Falls into excavations - Utility-related hazards - Undermining structures & foundations	☐ <u>Safe work practices when personnel will enter trenches/excavations:</u> • Activities under supervision/oversight of Competent Person, conduct daily inspection of excavation. • Excavated materials placed at least 2' from trench sidewall. • Prevent water accumulation in trench. • Sloping & shoring for trenches/excavations >20' deep must be approved by a Professional Engineer. • Sloping/shoring/trench box for excavations >5' when persons enter trench/excavation. • Sloping/shoring/trench box for shallow (<5') trench/excavation with cave-in hazard. • Workers in trenches to be within 25 feet of ladder or sloped entryway. • Excavations to be protected by perimeter fencing (not barricade tape), if potential for personnel to fall into. • If potential for atmospheric hazard, see D.12. "Confined/Enclosed Spaces" Geosyntec Procedure(s): HS-402-Excavation and Trenching, HS-132-Competent Persons
☐	FORKLIFT Hazards: - Struck-by - Run over/roll over/tip over - Overhead utilities/obstructions - Caught between (pinch points) - Unstable/falling loads - Elevated forks - Fluid leaks	☐ <u>In addition to general safety practices for heavy equipment (above), as applicable:</u> • Qualified operator, per established forklift training (certificate is required); Geosyntec operator must be approved by Director of Health and Safety. • Equipment inspected daily and documented on Forklift Preoperational Inspection Checklist. • Do not exceed lifting load limits. • Forklift shall not be moved/driven with empty forks in raised position. • When not in use, forks lowered, brake set, controls in neutral, key removed. Geosyntec Procedure(s): HS-505-Safe Operation of Forklifts, HS-132-Competent Persons
☐	AERIAL BOOM/SCISSOR LIFT Hazards: - Falls from basket - Overhead utilities/obstructions - Struck-by, run over, tip over - Caught between (pinch points) - Tip over - Fluid leaks.	☐ <u>Follow safe work practices:</u> • Operators to be appropriately trained and certified. • Equipment is inspected after mobilization and is in good condition. • Harness & lanyard worn whenever operating the lift. • Overhead hazards and surface obstructions to be reviewed with operators/riders prior to use. Geosyntec Procedure(s): HS-509-Aerial Lifts
☐	CRANES Hazards: - electrocution by overhead utility - injury in swing radius - injury from falling load - crane tipping over due to overbalancing, high winds, unstable ground, unsafe slope, bad placement of outriggers - injury from mechanical hazards	☐ <u>In addition to general safety practices for Operation of Heavy Equipment (above), as applicable:</u> • Only qualified persons operate cranes (certificate required). • Critical Lift Plan & Checklist prepared/executed (See HS 506-Cranes) prior to mobilization. • Equipment to be inspected prior to mobilization and daily by crane operator. • Crane operator will remain at the controls at all times during operation. • Crane operation must be performed under the direction of an appointed signal person at all times using hand signals and/or voice/radio communication. • Crane to be level and stable (solid ground or crane mats/timbers, outriggers if present, cribbing); over-reaching or exceeding load limits is prohibited. • Keep area beneath suspended loads clear of personnel; tag lines used to maneuver load. • Rigging procedures – see Mechanical Lifts with Rigging, below.

		Geosyntec Procedure(s): HS-506-Cranes, HS-132-Competent Persons
☐	MECHANICAL LIFTS WITH RIGGING Applies to lifting by rigging attached to crane, truck-mounted boom rig (e.g. drill rig), heavy equipment, mechanical/electrical hoist, similar equipment. Hazards: – Mechanical hazards, – Elevated loads	☐ In addition to general safety practices for Operation of Heavy Equipment and Cranes (above), as applicable: • Slings, chains, rope, wire rope, as well as sheaves, boom and attachments used for lifting/hoisting shall be maintained in good condition, inspected daily, and used/stored in a manner as to protect from damage. • Coordinate lifting operations with competent person. • Do not exceed loading limits of lifting equipment; perform work in accordance with equipment load chart. • Hooks will be equipped with safety latches. • Ensure anchor points for winch or other lift device (such as davit arm) are engineered for intended use. • Ensure personnel are not positioned beneath elevated loads and that tag lines are used where appropriate. Geosyntec Procedure(s): HS-506-Cranes
☐	WARNING! Confirmed or possible close proximity to OVERHEAD or UNDERGROUND UTILITIES.	☐ Follow safe work practices per D.11. "Utility-Related Hazards" Geosyntec Procedure(s): HS-304-Overhead/Underground Utility Hazards
☐	DEMOLITION	☐ Develop/implement a demolition safety plan. Geosyntec Procedure(s): HS-132-Competent Persons
☐	BLASTING, UNEXPLODED ORDNANCE	☐ Develop/implement safety plan for blasting, unexploded ordnance, as applicable. Geosyntec Procedure(s): HS-307-Blasting and Use of Explosives, HS-132-Competent Persons
☐	PUBLIC AT RISK, SITE SECURITY	☐ During site operations protect public (overhead protection, fencing, barriers, warning signs). ☐ During off hours, protect public with fencing, barriers, warning signs/lights, other measures as appropriate. ☐ Lock/secure hazardous materials and/or equipment.

D.9. STORAGE/HANDLING OF BULK MATERIALS (for Chemical Storage, see D.14 & 15) ☐ Applicable ☒ Not Applicable, Not Anticipated

Site-Specific Notes & Clarifications:

☐	BULK STORAGE HAZARDS: Collapse/movement of stacked/stored bags, blocks, containers, pipe, boxes, equipment, and similar. ☐ Stack/pallet/rack/shelf ☐ CONEX-box storage, or similar	☐ Store materials in stable manner (stacked, racked, blocked, interlocked, tied, wrapped, or otherwise secured) to prevent tipping, sliding, rolling, falling or collapse. ☐ Do not exceed load limits and ensure storage structure is stable, robust, secure for intended load. ☐ Ensure stored materials do not block aisles, passageways, electrical panels, emergency equipment, emergency access/egress routes, vehicle routes.
☐	LIFTING/MANUAL MATERIAL HANDLING HAZARDS	☐ During manual handling of materials and equipment, use safe lifting practices and/or lift aids; do stretches and use safe postures to protect from acute strains/sprains, overexertion, and cumulative trauma injuries.

D.10. ELECTRICAL WORK TASKS

☒ Applicable ☐ Not Applicable, Not Anticipated

Site-Specific Notes & Clarifications:

☒	USE OF BATTERIES, BATTERY-POWERED EQUIPMENT <50 V, OR OTHER DC EQUIPMENT < 50 V Potential fire hazard (if terminals are shorted), eye/skin hazards (when electrolyte is replenished), inhalation hazard in enclosed spaces.	☒ Follow safe work practices to control hazards of voltage, shock, arcing, overheating, hazardous gases, irritant electrolytes, secondary hazards. ☒ Prevent short-circuiting of terminals when battery is in use (segregated from tools, metal objects) and during transport (use battery transport container or install guard/cover on positive terminal). ☐ For batteries requiring replenishment of electrolyte, use PPE for eye and skin protection, and have eyewash equipment at hand; see discussion of <i>acids/caustics/corrosives</i> in D.14. "Commercial Chemical Products." Geosyntec Procedure(s): HS-121-Electrical Safety
☐	"NORMAL OPERATION" OF ELECTRICAL EQUIPMENT CONNECTED TO AC OR DC POWER SOURCE ≥ 50 V: Electrically powered tools, equipment, machinery, extension cords, portable generators, working near electrical equipment. Hazards: – Electrical shock – Secondary hazards (falls, other injuries).	☐ Follow "normal operation" requirements: • All electrical enclosures/guards/covers must be in place/closed/secured. • Electrical equipment maintained per codes/standards/manufacture's recommendations. • Ensure no indication of damage or impending failure (heat, smoke, buzzing, odors, arcing, melting). • Operate equipment in accordance with manufacturer's standard operating procedures. ☐ Follow general electrical safety work practices to minimize shock hazard and secondary hazards: • Control water-related/wet-location hazards in a manner appropriate for the job tasks/equipment/tool. • Never touch electrical equipment if you are wet or standing/kneeling in water or on wet surfaces. • Use extension cords/power cords properly, rated for use conditions and current draw, prevent damage. • Inspect tool/equipment/extension cords/power cords before each use; remove from use if damaged. • Use GFCI-protected outlet or portable GFCI in wet/moist locations, outdoors, basements, concrete floors. • Do not enter any space delineated by an electrical approach boundary. Geosyntec Procedure(s): HS-121-Electrical Safety
☐	HANDS-ON DIAGNOSTICS/REPAIR ON CIRCUIT(S) CONNECTED TO POWER SOURCE < 50 V: ☐ AC ☐ DC ☐ Battery and/or solar power ☐ Capacitor(s) ☐ Stray voltage from soil electrodes	☐ Implement electrical safe work practices pertaining to: • Workers trained appropriately for the task. • Shock prevention measures. • Eye/skin protection for arcing hazards. • Protection from secondary hazards. Geosyntec Procedure(s): HS-121-Electrical Safety

☐	WORK WITHIN “APPROACH BOUNDARY” OF EXPOSED, ENERGIZED (OR POTENTIALLY ENERGIZED) CONDUCTORS AND/OR CIRCUIT PARTS CONNECTED TO POWER SOURCE 50-600 V*: ☐ AC ☐ DC ☐ 3-phase ☐ Battery and/or solar power ☐ Capacitor(s) ☐ Induced voltage ☐ Stray voltage $\geq 50V$ from soil electrodes * Working on >600 V not permitted for Geosyntec personnel	☐ Prepare project-specific written “Electrical Safety Program” addressing (at a minimum): - Workers trained/designated as “Qualified Electrical Workers” per NFPA 70E (US)/CSA Z462 (CAN) - Assess risks of electrical shock (voltage levels and sources), arc flash hazard and secondary hazards. - Affix electrical hazard warning label to electrical enclosure(s) to be accessed. - Physically delineate arc flash- or limited approach boundary, whichever is farthest from hazard source. - Only “qualified” workers allowed within approach boundaries; prevent entry by non-qualified personnel. - Establish electrically safe working condition; work on live circuits prohibited (except for diagnostic testing). - Use PPE for shock/arc flash protection, as required. - Use other safe procedures/equipment required for the task, such as lockout/tagout. Geosyntec Procedure(s): HS-121-Electrical Safety, HS-129-High Voltage Electricity Safety
☐	LOCKOUT/TAGOUT (LO/TO) OF ELECTRICAL ENERGY To prevent unplanned start-up or release of energy when equipment is under maintenance/repair.	☐ Prepare site-specific written LO/TO program, and equipment-specific written LO/TO procedures (as applicable); implement control procedures for hazardous energy sources, provide locks/tags, train workers, designate “authorized” personnel, notify “affected” personnel. Geosyntec Procedure(s): HS-119-Lockout Tagout, HS-121-Electrical Safety
☐	WARNING! Confirmed or possible close proximity to OVERHEAD ELECTRICAL UTILITY LINES.	☐ Follow safe work practices per D.11. “Utility-Related Hazards.” Geosyntec Procedure(s): HS-304-Overhead/Underground Utility Hazards

D.11. UTILITY-RELATED HAZARDS

☐ Applicable ☒ Not Applicable, Not Anticipated

Site-Specific Notes & Clarifications:

☐	OVERHEAD, ABOVE-GROUND UTILITIES	☐ Arrange for power company/utility owner to de-energize power line. ☐ Do not cross approach boundaries with personnel or equipment; employ other appropriate precautions for the conditions (specify above). ☐ Use additional controls, as applicable: shielding, flagging, observer/monitor. Geosyntec Procedure(s): HS 304-Overhead/Underground Utility Hazards
☐	UNDERGROUND UTILITIES	☐ Confirm appropriate underground utility clearance procedures have been completed prior to ground penetrations, and employ other utility clearance/locator practices, as appropriate for conditions. ☐ Hand digging/augering or vacuum post-holing within 3’ of utility locations or other high-risk condition. Geosyntec Procedure(s): HS 304-Overhead/Underground Utility Hazards

D.12. CONFINED / ENCLOSED SPACES (Including Hazardous Indoor Spaces)

☐ Applicable ☒ Not Applicable, Not Anticipated

Site-Specific Notes & Clarifications:

☐	Type of CONFINED/ENCLOSED/HAZARDOUS INDOOR Workspace: ☐ Indoors (occupied) ☐ Indoors (abandoned, vacant) ☐ Basement, crawl space, attic ☐ Tunnel, shaft, inspection gallery ☐ Storage bin, locker ☐ Culvert, catch basin, sewer ☐ Well vault, utility vault, manhole ☐ Tank, vessel, silo, vat, hopper ☐ Trench, excavation ☐ Machine/equipment pit ☐ Transportation container, railcar ☐ Other – describe above Confirmed or potential hazards: ☐ Flammable/explosive ☐ Oxygen deficiency ☐ Hydrogen sulfide ☐ VOCs ☐ Carbon monoxide ☐ Combustible dust ☐ Combustion/exhaust emissions ☐ Welding/cutting fumes ☐ Electrical	REQUIREMENTS: 1. Contact Corp. H&S Department to determine applicability of confined space entry regulations, and to determine safe work practices for entry into any confined, enclosed or hazardous indoor spaces. 2. Classify the work task by checking one of the following: ☐ CONFINED SPACE classified by U.S. OSHA as a “Permit-Required Confined Space;” ensure OSHA requirements are met in OSHA jurisdictions. ☐ CONFINED/ENCLOSED/INDOOR/CONFINED space NOT classified as an OSHA Permit-Required Confined Space; develop site-specific entry procedure <u>per applicable regulations and Geosyntec requirements.</u> 3. Delineate tasks, hazards and controls associated with the work in Section C.1. “Summary of Tasks, Hazards and Controls,” and in applicable sections in Parts C, D and E of this THA; incorporate applicable safety provisions such as, but not limited to, the following: - Risk assessment; entry plan, entry permit system/safety checklist. - Air monitoring for atmospheric hazards. - Entry roles (supervisor, entrant, attendant), buddy system, regulatory training requirement. - Protect non-entry personnel from unauthorized entry (labels, signage, barriers) - Ingress/egress (stairway, ramp, ladder, tripod/winch, harness/lifeline, etc.). - Communication/alerting/rescue/emergency plan. - Entry hazard controls: - Isolation, cleaning, purging, lockout/tagout, fire protection. - Dilution ventilation to introduce fresh air - Exhaust ventilation to control point source of emissions. - Duct/stack to direct hazardous emissions away from work area. - Respiratory protection.
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☐ Mechanical equipment ☐ Entrapment, engulfment, drowning ☐ Building-related hazards ☐ Other – describe above	- PPE and safety gear to protect from chemical/physical/biological hazards. - Fall protection. - Traffic control. Geosyntec Procedure(s): HS-111-Air Monitoring, HS-112-Respiratory Protection, HS-113-Personal Protective Equipment, HS-118-Confined Space Entry, Others as applicable to the specific work
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D.13. INFECTIOUS / PATHOGENIC BIOHAZARDS

☒ Applicable ☐ Not Applicable, Not Anticipated

Site-Specific Notes & Clarifications: Dead animals

☒ HAZARD TYPE: ☒ COVID-19 ☐ Wastewater, sewer ☐ Bird guano ☐ Mold, fungi, valley fever ☐ Bloodborne pathogens ☐ Discarded syringes ☐ Medical waste ☐ Other (describe above)	☒ Follow Field Work COVID 19 General Prevention Measures (as applicable); list project specific COVID interventions above, communicate/coordinate with project team prior to initiation of work. ☐ Use "Universal Precautions" as applicable for potential exposures to infectious/pathogenic hazards. ☒ Low hazard – use basic hygiene practices, protective gloves, provide for hand washing. ☐ More severe hazard – add protective clothing, respirator/dust mask, decon, as appropriate. ☐ For bloodborne human pathogens follow Bloodborne Pathogen Program. ☐ Arrange with Human Resources for project-specific immunization. ☐ Implement remedial actions (remove syringes, clean up guano, decon/disinfect surfaces, etc.) as appropriate for the scope/scale of work. Geosyntec Procedure(s): HS-133-Bloodborne Pathogens, COVID-19 Considerations and Mitigations for On-Going Business Operations, Field Work Covid-19 General Prevention Measures
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D.14. COMMERCIAL CHEMICAL PRODUCTS (per HAZCOM or WHMIS)

☐ Applicable ☒ Not Applicable, Not Anticipated

Site-Specific Notes & Clarifications:

☐ PRODUCTS REGULATED BY HAZCOM¹ (US) or WHMIS² (CAN)	☐ Safety Data Sheets (SDSs) available, either on site or readily available within same work shift, containers labelled properly, workers trained/oriented on hazards. ☐ For subcontractor/contractor use of chemical products, confirm SDS availability for affected onsite workers.
¹ OSHA Hazard Communication Standard (United States); ² Workplace Hazardous Material Information System (Canada)	
☐ GENERAL SAFE WORK PRACTICES FOR FIELD USE OF CHEMICALS	☐ Consult SDS for H&S hazards, symptoms of exposure; ensure workers have been apprised of safe practices. ☐ Handle with care, maintain good housekeeping, provide adequate illumination in work area. ☐ Pour/dispense/transfer liquid chemicals on stable work surface. ☐ Use chemicals in well ventilated area; use fans/blowers/exhaust for active ventilation, as appropriate. ☐ Have eyewash bottles, eyewash station, deluge capabilities, commensurate for the hazard, readily available. ☐ Have spill/neutralization equipment, appropriate for the chemicals, readily available. ☐ Conduct air monitoring as appropriate; see Part E, "Air Monitoring, Worker Exposure Monitoring."
☐ STORAGE/TRANSPORT OF CHEMICALS/HAZMAT ☐ Non-Emergency (Routine) Chemical Storage Risk of personal contact and/or incidental release ☐ HAZMAT Transport ☐ Risk of Emergency Spill/Release ☐ CFTAS (Chemical Facility Anti-Terrorism Standards) Applicability: On-site overnight storage of non-waste chemical product at quantity ≥ 25 gal(115L) or ≥ 250 lbs. (115 kg)	☐ Transport chemicals only in sealed containers, secured to prevent shifting/breakage during travel. ☐ Store chemicals only in sealed containers; overnight storage in squirt/spray bottles prohibited. ☐ Store flammable/combustible liquids in chemical storage cabinets, or other appropriate storage arrangement. ☐ For liquids, provide secondary containment during storage. ☐ Segregate incompatible chemicals during storage. ☐ For <i>incidental release/spill</i> ; maintain spill kit suitable for low flammability/toxicity/quantity/volatility release. ☐ DOT/TDG/IATA-Regulated transport: see D.17. "Hazmat/Dangerous Goods Shipping/ Transportation." ☐ For <i>emergency spills</i> : describe spill/release hazard and response plan/procedure above, and indicate emergency response contact in Part B, "Emergency Response and First Aid." ☐ Locate emergency gear (eyewash, fire extinguisher, spill kit, safety signage) near storage area, as applicable. ☐ For CFTAS-applicable chemical storage, a safety and chemical management plan must be prepared and reviewed by a H&S Professional before bringing material to the site. (Does not apply to materials brought on to the site for daily work purposes and transported away at the end of each day)
☐ COMPRESSED GAS CYLINDERS ☐ Flammable ☐ Non-flammable ☐ Toxic ☐ Asphyxiant ☐ Oxygen	☐ Secure cylinders upright, caps on when not in use. ☐ Handle with care; use and store cylinders in a manner and location to prevent damage. ☐ Propane cylinders not in use <u>must be stored outdoors</u> in a cage or similar secure ventilated enclosure. ☐ Ensure acetylene cylinders are NOT secured to steel arc welding bench. ☐ Segregate oxygen and fuel gases by distance (20') or fire-rated barrier. ☐ Control ignition sources. ☐ "No smoking" signage at cylinder storage area for flammable gases.
☐ FLAMMABLE/COMBUSTIBLE LIQUIDS	☐ Use proper fuel safety can (metal fuel container with self-closing spout and flame arrestor preferred). ☐ Control/remove ignition sources near storage and use areas. ☐ Grounding and bonding where appropriate. ☐ Ensure a Type B or ABC fire extinguisher is readily available.
☐ ACIDS, CAUSTICS, OTHER CORROSIVES	☐ Use appropriate protection for eyes/face (goggles/face shield) and skin (gloves, sleeves, apron). ☐ Use eyewash, deluge shower, drench hose, hand washing (with water), as appropriate.

☐	TOXIC	☐ For severe eye hazards (due to high corrosivity, large quantity), 15-min. eyewash required. ☐ For toxic substances, use/store in a manner to control exposure hazards (inhalation, ingestion, skin contact, skin absorption); use active ventilation and/or PPE as appropriate.
☐	EMISSIONS FROM FUEL COMBUSTION, HOT PROCESSES ☐ Gasoline ☐ Diesel ☐ Propane/Natural Gas ☐ Welding/cutting/hot work ☐ Vehicle/equipment exhaust ☐ Other	☐ Position outdoor personnel upwind of exhaust source. ☐ Avoid "idling" of equipment when not in use. ☐ Use <i>passive ventilation</i> (air infiltration/air currents) to disperse atmospheric hazards in breathing zone. ☐ Use <i>dilution ventilation</i> (blowers/fans) to provide fresh air to work area and dissipate atmospheric hazards. ☐ Use <i>exhaust ventilation</i> (hood/duct/exhaust stack/blower) to capture/divert exhaust from work area. ☐ Use respiratory protection for high levels of smoke, exhaust particulates, soot. ☐ Conduct air monitoring as appropriate; see Part E," Air Monitoring, Worker Exposure Monitoring."
☐	OTHER HAZARDS	☐ Describe other hazardous substances and safety measures under "Site-Specific Notes & Clarifications," above.

Geosyntec Procedures: HS-115-US-Hazard Communication, HS-115-CA-WHMIS, HS-111-Air Monitoring, HS-112-Respiratory Protection, HS-113-Personal Protective Equipment, HS-114-Safety Training Programs, Others as applicable

D.15. SITE CONTAMINANTS, CHEMICAL WASTES

☒ **Applicable** ☐ **Not Applicable, Not Anticipated**

Site-Specific Notes & Clarifications:		
CHECK ALL THAT APPLY. Provide site-specific notes/clarifications above.		
☒ Soil/groundwater contaminants (historical release) ☐ Recent release, known high concentrations ☐ Former chemical disposal site, landfill ☐ Urban fill, residual contaminants ☐ Containerized waste (drums, process equipment) ☐ Buried drums (known or potential) ☐ Large containers, potential for spills ☐ Contaminated building surfaces ☐ Unexploded ordnance	☐ Explosive dust ☐ Oxygen deficiency ☐ Chlorinated volatile organic compounds (VOCs) ☐ BTEX, petroleum derived VOCs ☐ Fuel oils, petroleum, waste oil, lubricants ☐ Metals, metal compounds, metal dusts ☐ Elemental mercury ☐ Polyaromatic hydrocarbons (PAHs) ☐ Potential for flammable vapors	☐ Potential for flammable gas (methane) ☐ Corrosive, acids/caustics, strong irritants ☐ Asbestos abatement work ☐ Pesticides, herbicides, fungicides ☐ Sensitizers ☐ Radioactive contaminants ☐ Controlled substances, drugs ☐ Other - describe above
NOTE: For sites with one or more "high-risk contaminants" (below) designated/recognized as a <u>contaminant of concern</u> , or <u>exceeding an environmental reporting threshold</u> , or representing a <u>potential exceedance of an action level or exposure limit</u> , the THA must be reviewed by the H&S Dept. before initiating the work:		
☐ Asbestos ☐ Arsenic/arsenic compounds ☐ Benzene (except as trace constituent of petroleum fuel) ☐ Beryllium	☐ Cadmium ☐ Chromium VI (Hexavalent chromium) ☐ Dioxins ☐ Reactives – Cyanides/sulfides (HCN, H ₂ S)	☐ Lead ☐ Methylene chloride ☐ Polychlorinated biphenyls (PCBs) ☐ Vinyl chloride
☐	FOR WORK CONSISTING OF CLEANUP OPERATIONS, CORRECTIVE ACTIONS, PRELIMINARY INVESTIGATIONS at an "UNCONTROLLED HAZ. WASTE SITE" (per HAZWOPER, 29 CFR 1910.120 or equivalent), delineate procedures in "Site-Specific Notes and Clarifications" (or attachments) addressing the following, as applicable to the work: - Workers attend pre-work orientation on hazards, risks, onsite safety measures, emergency contingencies. - Implement site control plan - delineate Exclusion Zone(s), Contaminant Reduction Zone(s), Support Zone (aka EZ, CRZ, SZ). - Include site map/figure depicting work locations and other relevant site-specific information. - Site workers in EZ or CRZ to have 40-hour HAZWOPER training, current 8-hour refresher, 3 days supervised field experience. - Site supervisor(s) required to have 8-hour Supervisor training. - Site workers in EZ or CRZ to participate in medical monitoring program, as applicable. - Implement site-specific procedures for worker protection via engineering controls, work practices, personal protective equipment (PPE), air monitoring, decontamination procedures, spill containment, emergency preparedness and response. - Conduct air monitoring, as appropriate; see Part E," Air Monitoring, Worker Exposure Monitoring." PPE program: Specify Levels of Protection and specific PPE to be used for applicable tasks; Level D: No respirator, no chemical protective clothing, standard work clothes, basic PPE; (COVID-19 face covers allowed) Modified Level D: No respirator, chemical protective clothing as appropriate; (COVID-19 face covers allowed) Level C: Air-purifying respirator, chemical protective clothing as appropriate; consult with Corp. H&S Dept. required. Level B: Air-supplied respirator, chemical protective clothing/suit as appropriate; consult with Corp. H&S Dept. required. Level A: Fully encapsulating suit, self-contained breathing apparatus (SCBA); Level A prohibited for Geosyntec personnel. Geosyntec Procedures: HS-301-HAZWOPER, HS-108-Medical Monitoring Surveillance, HS-111-Air Monitoring, HS-112-Respiratory Protection, HS-113-Personal Protective Equipment, HS-114-Safety Training Programs, HS-115-Hazard Communication, HS-405-Drum Sampling, Others as applicable	
☒	FOR SITE WITH CHEMICAL CONTAMINANTS OR WASTE BUT NOT REGULATED BY HAZWOPER - Workers to be knowledgeable/aware of chemical hazards thru safety training/orientation and availability of hazard information. - Implement controls to minimize worker exposure through engineering controls, work practices, PPE, decon, as appropriate. - Evaluate worker exposure via air monitoring/sampling, as applicable; see Part E," Air Monitoring, Worker Exposure Monitoring." Geosyntec Procedures: HS-111-Air Monitoring, HS-112-Respiratory Protection, HS-113-Personal Protective Equipment,	

HS-114-Safety Training Programs, HS-115-Hazard Communication, Others as applicable		
☐	STORAGE/TRANSPORT OF IDW* Spill/Release Risk: ☐ Risk of incidental spill/release ☐ Risk of emergency spill/release * Investigation-Derived Waste	☐ Describe site-specific procedures above for spill containment, container handling, as applicable. ☐ For liquids, provide secondary containment during storage. ☐ Segregate incompatible chemicals during storage. ☐ Locate emergency gear (eyewash, fire extinguisher, spill kit, safety signage) near storage area, as applicable. ☐ For incidental spills; spill kit on-site for low-hazard releases (low-flammability/toxicity/quantity/volatility) ☐ For emergency spills: describe spill/release hazard and response plan/procedure above, and indicate Emergency response contact in Part B, "Emergency Response and First Aid." ☐ DOT/TDG/IATA-Regulated transport: see D.17. "Hazmat/Dangerous Goods Shipping/Transportation." Geosyntec Procedures: HS-406-Unknown Hazardous Waste Drum Handling
☐	OFF-SITE MIGRATION OF AIRBORNE CONTAMINANTS	☐ Implement controls to minimize hazard migration (dust suppression, covers, foam, etc.). ☐ Community/perimeter air monitoring to be conducted per perimeter air monitoring plan; see E.3 "Fence Line/Perimeter Air Monitoring."

D.16. RADIATION HAZARDS (Other than Sunlight)

☐ Applicable ☒ Not Applicable, Not Anticipated

Site-Specific Notes & Clarifications:

☐	IONIZING RADIATION	Potential hazard sources may include nuclear density gauges, host-facility X-ray equipment, radioactive contaminants (α , β , γ), medical or laboratory waste. Describe hazards & safety measures above in Site-Specific Notes & Clarifications. Conduct exposure monitoring, as appropriate; see Part E, "Air Monitoring, Worker Exposure Monitoring." Geosyntec Procedures: HS-126-Radiation Safety Program, HS-128-Ionizing and Non-Ionizing Radiation
☐	NON-IONIZING RADIATION	Potential hazard sources may include lasers, UV/IR sources, microwaves & high-frequency radio waves from cell-phone transmitter, high-intensity visible light. Describe hazards & safety measures above in Site-Specific Notes & Clarifications. Conduct exposure monitoring, as appropriate; see Part E, "Air Monitoring, Worker Exposure Monitoring." Geosyntec Procedures: HS-128-Ionizing and Non-Ionizing Radiation

D.17. HAZMAT/DANGEROUS GOODS SHIPPING/TRANSPORTATION

☐ Applicable ☒ Not Applicable, Not Anticipated

MODE(S) OF TRANSPORT:	☐ Road	☐ Rail	☐ Air	☐ Sea	☐ Inland Waterway	☐ International
IMPORTANT: Ensure that each individual who will be involved in shipping/transportation of hazardous material is current with required training (awareness, function-specific, safety, security) in accordance with applicable regulatory authority (DOT, FAA, IATA, TDG), and ensure adherence to applicable regulations. Geosyntec Procedures: HS-135-Hazardous Materials Procedures						
Site-Specific Notes & Clarifications:						

PART E – AIR MONITORING, WORKER EXPOSURE MONITORING

E.1. AIR MONITORING

☐ Applicable ☒ Not Applicable, Not Anticipated

Site-Specific Notes, Clarifications:

AIR-TESTING PARAMETERS - Select site-specific testing parameters; list associated equipment in Part C.2, Safety Equipment List.

☐ VOCs	☐ Oxygen (O ₂) – oxygen meter	☐ Particulates - total dust meter
☐ Photoionization detector (PID): X eV	☐ Lower Explosive Level (LEL) - LEL meter	☐ % Methane – methane meter
☐ Flame ionization detector (FID)	☐ Hydrogen sulfide (H ₂ S) – H ₂ S detector	☐ Calibration kit for each parameter
☐ Colorimetric indicator tubes – describe above	☐ Carbon monoxide (CO) – CO detector	☐ Other:

SUBSTANCE-SPECIFIC (PRE-SET) ACTION LEVELS - Sustained breathing zone action levels (sustained general work-area levels for LEL).

☐ O ₂ (Oxygen)	19.5-23%	Acceptable to continue work without O ₂ -focused respiratory protection.
	<19.5%	STOP WORK, ventilate to raise O ₂ to >19.5% for re-entry. For persistent hazard, contact Corp. H&S Dept.
	>23.0%	STOP WORK, ventilate to lower O ₂ to <23% for re-entry. For persistent hazard, contact Corp. H&S Dept.
☐ LEL (Lower Explosive Limit)	IMPORTANT:	Confirm sufficient oxygen is present (min. 8-12%) to ensure accurate LEL readings.
	<10% LEL	Acceptable to continue working in work area; continue to monitor LEL.
	≥10% LEL	STOP WORK. Implement controls (reposition workers, ventilate, contain/eliminate source, etc.); resume work ONLY when LEL readings are <10%, sustained.
☐ H ₂ S (Hydrogen Sulfide)	< 1 ppm	Acceptable to continue work without H ₂ S-focused respiratory protection.
	1-10 ppm	Implement controls (reposition workers, ventilate, contain/eliminate source, scheduling, etc.) to limit exposures to <1ppm, or use APR* with VOC/acid-gas cartridges (yellow); do not exceed MUC* for respirator type; confirm acceptability of respirator usage with Corp. H&S Dept.
	> 10 ppm	Implement controls (reposition workers, ventilate, contain/eliminate source, scheduling, etc.) to limit exposures to <10ppm (with respirator), or <1ppm (without respirator). For persistent levels >10 ppm, STOP WORK, contact Corp. H&S Dept.
☐ CO	< 25 ppm	Acceptable to continue work without CO-focused respiratory protection.

☐ (Carbon Monoxide)	≥ 25 ppm	Implement controls (reposition workers, ventilate, contain/eliminate source, scheduling, etc.) to limit exposures to <25ppm. For persistent levels >25ppm, STOP WORK, contact Corp. H&S Dept.
☐ WILDFIRE SMOKE (AQI for PM 2.5)	≤ 150	In this Air Quality Index (AQI) range, it's acceptable to continue work without respiratory protection.
	151-500	Voluntary use of N95 respirator is appropriate.
	>500	STOP WORK, or use APR* with approval of Corp. H&S Dept.
☐ <OTHER>		
SITE-DERIVED ACTION LEVELS – Sustained breathing zone action levels; derived based on site contaminants; REVIEW WITH CORP. H&S DEPT. REQUIRED.		
☐ VOCs (Volatile Organic Compounds)	< X ppm	Acceptable to continue work without VOC-focused respiratory protection.
	> “ ppm	Implement controls (reposition workers, ventilation, containment, eliminate source, etc.) to lower VOC exposures to less than specified action level, or use APR* with approval of Corp. H&S Dept.
	X to X ppm	Use APR* with VOC cartridges (yellow or black); do not exceed MUC** for respirator type; confirm procedures for respirator usage with Corp. H&S Dept.
	> X ppm	STOP WORK. Implement controls, for persistent levels greater than action contact Corp H&S Dept.
☐ AIRBORNE DUST (Total Particulates)	< X mg/m ³	Acceptable to continue work without particulate-focused respiratory protection.
	> “ mg/m ³	Implement controls (water spray, reposition workers, ventilation, containment, etc.) to lower dust levels to less than specified action level, or use APR* with approval of Corp. H&S Dept.
	X to X mg/m ³	Use APR* with particulate cartridges appropriate for the hazard; do not exceed MUC** for respirator type; confirm procedures for respirator usage with Corp. H&S Dept.
	> mg/m ³	STOP WORK. Implement controls. For persistent levels greater than action level, contact Corp H&S Dept.
☐ <OTHER>		
* Air-purifying respirator ** Maximum use concentration		
Geosyntec Procedures: HS-111-Air Monitoring, HS-602-Lead, HS-605-Hydrogen Sulfide, Wildfire Smoke THA Addendum		

E.2. OTHER WORKER EXPOSURE MONITORING / SAMPLING

☒ Applicable ☐ Not Applicable, Not Anticipated

☒ Heat/Cold Stress Testing/Monitoring ☐ Air Sampling (sample collection, passive dosimeter) ☐ Wipe/Bulk Sampling (to evaluate worker exposure)	☐ Wildfire Smoke – Tracking AQI (Air Quality Index) ☐ Ionizing or Non-ionizing Radiation Testing ☐ Noise Testing	☐ <Other> ☐ <Other>
Site-Specific Notes, Clarifications:		
Geosyntec Procedures: HS-109-Hearing Protection, HS-111-Air Monitoring, HS-124-Heat Stress Prevention, HS-125-Cold Stress Prevention, HS-126-Radiation Safety Program, HS-128-Ionizing and Non-ionizing Radiation, HS-601-Asbestos, HS-602-Lead, HS-604-Respirable Crystalline Silica, HS-605-Hydrogen Sulfide		

E.3. FENCELINE / PERIMETER AIR MONITORING

☐ Applicable ☒ Not Applicable, Not Anticipated

Fence line/perimeter air monitoring to be conducted in accordance with a separate “Perimeter Air Monitoring Plan” for this work; results from fence line/perimeter air monitoring shall NOT be used as the sole basis for determining work zone atmospheric hazards.
Site-Specific Notes, Clarifications:

PART F – APPROVALS, ACKNOWLEDGEMENTS

F.1. THA PREPARATION, REVIEW/APPROVAL SIGNATURES A THA is typically prepared by project staff, often with input from an HSC, with review/approval, at a minimum, by PM or PD. Corporate H&S staff must be consulted as required or otherwise deemed appropriate*.

THA PREPARED BY:	Printed Name	Signature	Date
	Alondra Soltero		
THA REVIEWED/ APPROVED BY: (Project Manager or Project Director, at a minimum)	Printed Name	Signature	Date

* At a minimum, Corp. H&S **must** review/approve the THA review when Geosyntec staff will encounter “high hazards/high risks,” or perform critical tasks, such as (but not limited to):

- Climb ladders to heights >10'

- Implement lockout/tagout controls

- Instrument monitoring for critical exposure risks

- Use a personal fall apparatus
- Self-perform tasks classified as construction labor
- Climb ladders to heights >10'
- Tow a trailer on roadway
- Oversee a hot-work permit system
- Enter a permit-required confined space
- Operate a UTV/ATV, aerial lift or fork-lift
- Use of unmanned aerial vehicle (drone)
- Enter a trench/excavation >5' deep
- Work near heavy equipment or crane
- Function as a construction "Competent Person"
- Operate a pneumatic or powder-actuated tool
- Electrical testing & maintenance (<50 V excluded)
- Work at height near overhead electrical utility lines
- Derive action levels for VOCs or toxic dusts
- Wear a respirator
- Presence of "high-risk" contaminant(s)
- Sustained exposure to wildfire smoke AQI_{PM 2.5} >150
- Enter EZ/CRZ during HAZWOPER cleanup activities
- Exposure to radioactive isotopes (α , β , γ)
- Onsite risk of emergency chemical spill
- Applicability of Chemical Anti-Terrorism Standards

Corporate H&S **must** also be consulted when Geosyntec subcontractors (under Geosyntec's oversight) perform high hazard/high risk work (such as demolition, blasting, crane lifts, confined space entry, testing/maintenance of electrical systems, lockout/tagout, HAZWOPER cleanup activities), **OR** when supplemental written H&S programs are required for a project (such as Electrical Safety Program, Lockout Program, Confined Space Entry Program, Emergency Response Plan), **OR** when a written safety plan must be submitted to a public agency. Consultation with Corp. H&S is encouraged for all questions/concerns regarding worker safety, regulatory compliance, risk/liability aspects, or project-specific safety requirements.

Geosyntec H&S Procedure: For more information, see HS-204-Work-Specific Hazard and Risk Assessment, Written Safety Plans.

F.2. GEOSYNTEC FIELD CREW ACKNOWLEDGEMENTS

Please sign below to acknowledge you reviewed and understand this THA, participated in project safety briefing and had an opportunity to ask questions about the information herein.

Printed Name	Signature	Employee No.	Date

F.3. SUBCONTRACTOR'S FIELD CREW ACKNOWLEDGEMENTS

☐ Applicable ☒ Not Applicable

Please sign below to acknowledge this THA was made available to you, and you had an opportunity to ask questions about the information herein.

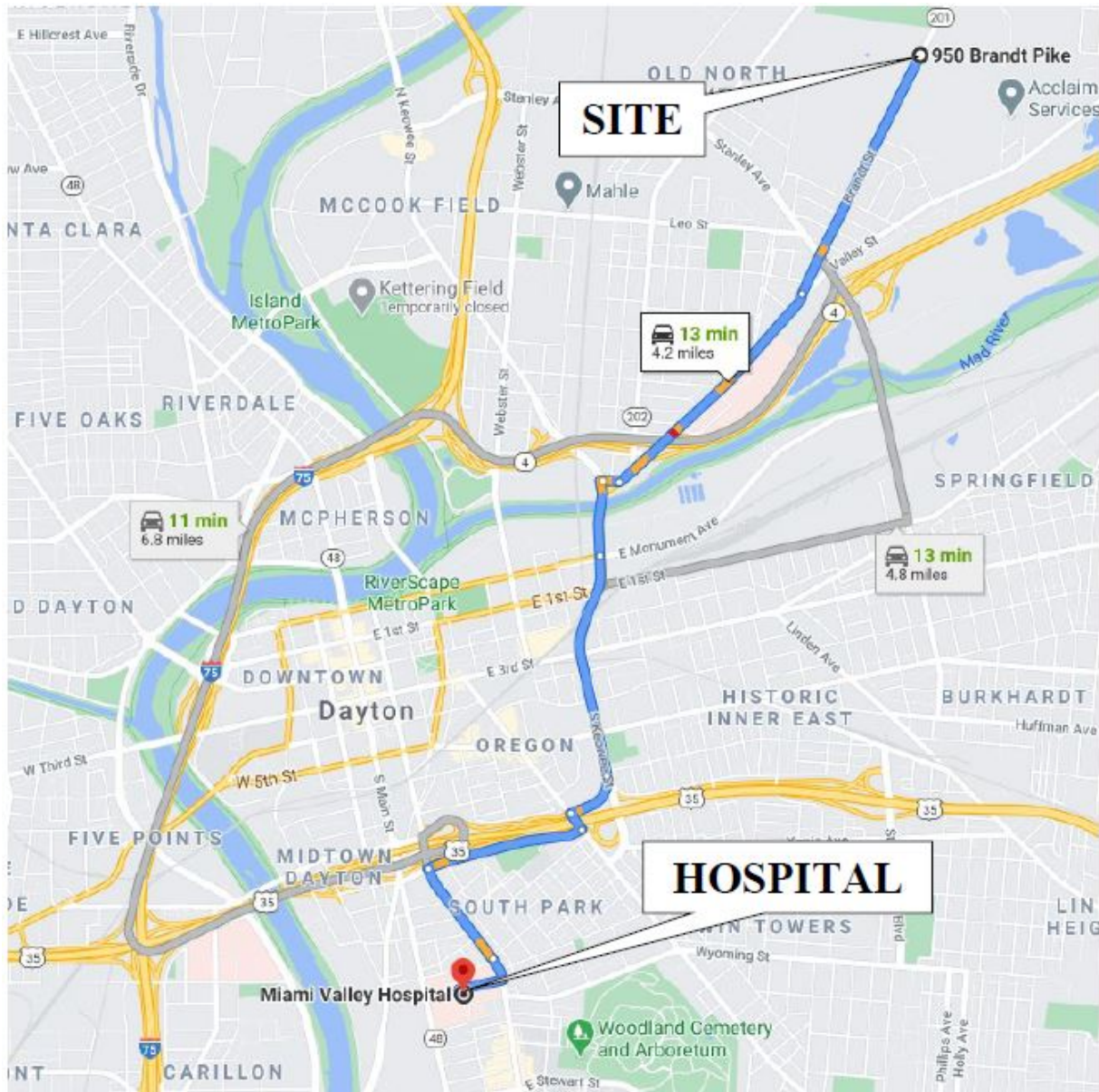
Printed Name	Signature	Company Name	Date

ROUTE TO HOSPITAL EMERGENCY ROOM

Hospital Name: Miami Valley Hospital

Address: 1 Wyoming Street

Phone Number: (937) 208-2048



Driving Directions to Hospital from Site:

1. Head southwest on Brandt Pike
2. Continue onto Brandt St
3. Continue onto Valley St
4. Valley St. turns left and becomes N. Keowee St.
5. Turn left onto Wayne Ave
6. Turn right onto Wyoming St

Driving Time: 13 mins

Driving Distance: 4.2 miles

Part A – PROJECT/TASK INFORMATION

Project/Site Name:	North Sanitary Landfill (Valleycrest)		Project Number/Org:	TR0881
Site Address:	950 Brandt St, Dayton, OH 45404			
Task & Worksite Description:	Well and probe installation and decommissioning.			
Geosyntec Personnel:	Name	Office Phone	Cell Phone	
Site Lead/H&S Officer	Greg Lewis	N/A	513-882-8832	
Project Manager	Megan Martz	317-343-4793	317-345-1552	
Project Director	Jesse Varsho	630-203-3349	630-803-2659	
H&S Coordinator	Jim Bannantine	262-834-0227	414-339-5630	
Regional H&S Manager	Jim Bannantine	262-834-0227	414-339-5630	
Corporate H&S Director	Bob Poll	813-379-4420	813-240-9231	
On-Site Subcontractor(s): ☐ Not Applicable	☒ Applicable; provide company name, work task and contact information for each Geosyntec subcontractor below:			
	TBD			
Client Contact(s):	Mike Samples, <i>de maximis, inc.</i>		865-691-5052	865-548-1875
ETHICS POINT HOTLINE	US & Canada: 844-231-3371 UK: 800-89-0011 or 800-89-0011		Australia: 800-551-155 or 800-811-011 Ireland: 800-222-55288 or 800-500-000	

Part B - EMERGENCY RESPONSE and FIRST AID

IMPORTANT: After initial emergency response actions and incident stabilization, contact appropriate project and H&S personnel listed in Part A

Site-Specific Notes, Clarifications: Consider relevant risk factors & response procedures (fire/explosion, medical, chemicals/spills, security, site factors, weather, communications), as well as client/regulatory requirements and available of onsite/offsite emergency services (and the possible need for emergency contact numbers other than 911): Temperature checks will be completed daily. Personnel will not be admitted to the site if they have an elevated temperature or appear visibly sick.	
Emergency Communication / Alerting	☒ Verbal ☒ Cell Phone ☐ Land Line ☐ 2-Way Radio ☐ Satellite Phone ☐ On-site alarm/signal system ☐ Other:
To Summon Police, Fire, Ambulance	☒ DIAL 911 , for external responders ☐ Other:
WorkCare (for non-emergency injuries)	24/7: 888-449-7787
Other Emergency Contacts (such as security, spill responder, utility-related):	Dayton Police at (937) 333-2677 Fire Department Station 8 at (937) 333-4500 Concentra Urgent Care 228 Troy Street, Dayton, OH 45404 937-228-8132
Nearest EMERGENCY ROOM Medical Services	Hospital Name: Miami Valley Hospital Address: 1 Wyoming St, Dayton, OH 45409 Phone #: (937) 208-2048 ☒ See Attached Directions
Emergency Evacuation - Route, Rally/Muster Point, Shelter Location(s)	In the event of lightning, Geosyntec personnel will wait in their vehicle until 30 minutes past the last lightning strike before resuming work. Notify the on-site representative of any lightning delays.
EMERGENCY and FIRST AID EQUIPMENT required for this work task is listed in PART C.2. – SAFETY EQUIPMENT LIST	

PART C – TASK / HAZARD / CONTROL SUMMARY and EQUIPMENT LIST

C.1 SUMMARY OF TASKS, HAZARDS AND CONTROLS

1. TASKS / WORK ASPECTS	2. HAZARDS / RISKS	3. CONTROLS
Mobilization/Demobilization	- Routine work travel - Off road driving - COVID-19	See D.1. ROUTINE HAZARD PREPAREDNESS See D.2 SPECIAL DRIVING/TRAFFIC/TRANSPORTATION HAZARDS See D.13. INFECTIOUS / ALLERGENIC BIOHAZARDS - Avoid cell phone use while driving - Obey all posted traffic signs and local laws

		• Demonstrate defensive driving • Plan route before beginning travel • Allow pedestrians the right-of-way • Familiarize with new area/site conditions • Follow COVID-19 prevention measures.
Site walk and Locate Sample Points	• Slips/trips/falls • Crowded/busy work spaces • COVID-19 • Off Road Driving	See C.2. SAFETY EQUIPMENT LIST See D.1. ROUTINE HAZARD PREPAREDNESS See D.13. INFECTIOUS / ALLERGENIC BIOHAZARDS • Pay close attention to foot placement; slow deliberate movement, especially around operating equipment and uneven/slippery surfaces. • Wear steel toed boots, hard hats with side protection, and safety glasses, if necessary • Stay hydrated and take short breaks • Stay clear of heavy equipment. Follow general safe work practices for heavy equipment. Do not pass under elevated work. • If entering a workspace/building; watch for overhead clearance. Ensure the site personnel/manager is aware of your presence.
Drilling and Installation of Wells	• Noises • Heavy lifting • Heavy equipment • Overhead hazards • Underground Utilities • COVID-19 • Limited lighting • Potential methane gas	See C.2. SAFETY EQUIPMENT LIST See D.6. POWERED TOOLS & EQUIPMENT See D.7. DRILLING See D.8. CONSTRUCTION, HEAVY EQUIPMENT, LIFT EQUIPMENT See D.9. ELECTRICAL WORK TASKS See D.10. UTILITY-RELATED HAZARDS See D.13. INFECTIOUS / ALLERGENIC BIOHAZARDS See D.14. COMMERCIAL CHEMICAL PRODUCTS See D.15. SITE CONTAMINANTS, CHEMICAL WASTES See E.1 AIR MONITORING • Wear hearing protection while drill rig is in operation • Use proper lifting techniques. Lift with legs, not back, and all equipment and supplies over 49 lbs. require two-person lift. • All locations will be cleared by public and private locates prior to drilling. • Stay clear of all heavy equipment and machinery. • Follow COVID-19 prevention measures. • Only complete work when sufficient daylight is available. • Monitor work area air using a four-gas multi-meter.
Staff Gauge Recording	• Water hazards • Slips/trips/falls • Hand tools • COVID-19 • Plants and insects	See C.2. SAFETY EQUIPMENT LIST See D.3 WATER HAZARDS FOR STAFF GAUGE RECORDING See D.5. HAND TOOLS See D.15. SITE CONTAMINANTS, CHEMICAL WASTES • PFD must be worn during installation
Well Sampling	• Heavy lifting • Hand tools and pinch points • Contaminants of concern • COVID-19 • Limited lighting • Potential methane gas	See C.2. SAFETY EQUIPMENT LIST See D.5. HAND TOOLS See D.6. POWERED TOOLS & EQUIPMENT See D.9. ELECTRICAL WORK TASKS See D.13. INFECTIOUS / ALLERGENIC BIOHAZARDS See D.14. COMMERCIAL CHEMICAL PRODUCTS See D.15. SITE CONTAMINANTS, CHEMICAL WASTES See E.1 AIR MONITORING • Use proper lifting techniques. Lift with legs, not back, and all equipment and supplies over 50 lbs require two-person lift. • Wear work gloves as needed when using hand tools. • Wear appropriate PPE when working around contaminated media. • Follow COVID-19 prevention measures. • Only complete work when sufficient daylight is available. • Monitor work area air using a four-gas multi-meter.

C.2. SAFETY EQUIPMENT LIST (Gear to be brought to the worksite by Geosyntec personnel, or availability confirmed)

Site-Specific Notes & Clarifications: Hard hats and level D PPE must be worn on site at all times. Be mindful of ice and snow slipping hazards. PFD and/or fall protection may be needed for staff gauge readings depending on selected approach.				
☒	WEATHER, CLIMATE, SEASONAL	☒ Project-provided drinking water ☒ Canopy for shade, weather protection ☐ Other:	☒ Sunscreen ☐ Ice creepers (boot attachments)	☐ Rock salt, traction sand ☐ Portable heater (electric or kerosene)
☒	HYGIENE PROVISIONS	☐ Hand washing equipment (soap & wash water) ☐ Other:	☒ Hand sanitizer, disinfectant supplies	☐ Sanitary facility, porta-toilet
☒	BASIC PPE	☒ Standard work clothes appropriate for task ☒ Hard-toed boots/shoes ☒ Hardhat	☒ Safety glasses ☒ Work gloves appropriate for task ☒ Noise/hearing protection	☒ High-visibility/reflective vest/apparel ☒ Nuisance dust mask (voluntary use)
☒	BIOLOGICAL HAZARDS	☒ Insect control (DEET/picaridin repellent, wasp spray, other) ☒ Poison ivy protection (Ivy Block skin cream, Technu skin wash) ☒ Tick removal kit ☒ Pant-leg "blousing"/gaiters (tick safe) ☐ Snake chaps/gaiters ☐ Other:	☐ Animal warning device (for bears/cougars/wolves/large animals) ☒ Hand sanitizer (for general hygiene or COVID-19) ☒ Disinfectant supplies (for general hygiene or COVID-19) ☒ Face covers for COVID-19 prevention	
☐	SPECIAL HAZARD CONTROLS	☐ Portable GFCI(s) for shock protection ☐ Electrical-hazard-rated boots, gloves ☐ Arc-resistant (AR) protection PPE for arc flash ☐ Flame-resistant (FR) clothing ☐ Work-area delineation supplies ☐ Other:	☐ Lockout/tagout equipment ☐ Portable lighting ☐ Tripod/winch ☐ Ventilation equipment (fan, blower) ☐ Traffic control devices	☐ Personal fall protection apparatus ☐ Personal flotation device ☐ Ring buoy & rope ☐ Marine survival suit
☒	CHEMICAL PPE and CHEMICAL SAFETY GEAR	☐ Goggles and/or face shield ☐ Chemical protective gloves ☐ Coveralls (Tyvek, or other) ☐ Outer boots, boot covers ☐ Air monitoring equipment, worker exposure monitoring device(s): 4-gas multimeter to monitor potential methane gas in work area ☐ Other:	☐ Disposable N95 respirator ☐ Half-face respirator (APR), cartridges ☐ Full-face respirator (APR), cartridges ☐ Exclusion Zone delineation supplies	☒ Decon solution, related supplies ☒ Receptacle for disposable PPE ☐ Chemical hazard emergency gear – listed in "EMERGENCY EQUIPMENT" below
☒	EMERGENCY EQUIPMENT	☐ Air horn, alarm, alerting equipment ☐ 2-Way radios; other communication device ☒ First aid kit(s) – onsite and/or in vehicles ☒ Fire extinguisher – onsite and/or in vehicles ☐ Other:	☐ Eyewash bottle(s) ☐ 15-min. eyewash station ☐ Emergency deluge shower ☐ Chemical spill kit/supplies	Vehicle emergency preparedness: ☒ Fire extinguisher, first aid kit ☐ Flares, lights, reflective device ☐ Roadside assistance service

PART D – HAZARD ANALYSIS AND CONTROLS

D.1. ROUTINE HAZARD PREPAREDNESS (This section required for all Tasks)

Site-Specific Notes & Clarifications: General hazards include travel to and from site, heavy lifting with transporting equipment, pinch points, potential overhead hazards. Potential traffic of heavy machines/trucks. Limited lighting is available on site.

Routine Driving Hazards

- ☒ **Routine work travel** – Use routine safe/defensive driving practices (seat belts, safe speeds, eyes ahead, no tailgating, limit distractions, safe cell phone use, no texting, clear windows, account for weather/road conditions, adequate sleep, other measures as appropriate).
- ☒ **Unfamiliar location** – Plan travel route before driving in roadway: view map, plot your route and/or enter destination and activate navigation device.
- ☒ **Fatigue** – Minimize fatigue during long drives: frequent rest breaks, eat light snacks-avoid heavy meals, stay hydrated, fresh air, no loud music, keep windshield clean; avoid/minimize long distance driving during your ordinary sleep hours; total *work time* and *drive time* should not exceed 14 hours per day.
- ☒ **Unfamiliar vehicle** – Become familiar with vehicle operational controls and handling characteristics before operating vehicle.

Geosyntec Procedures: HS-105-Driver and Vehicle Safety; HS-211-Fatigue Management Plan

General Safety

- ☒ **General site hazards** – Prevent slips/trips/falls (resulting from rough terrain, trip hazards, steep slope, slippery surfaces); maintain good housekeeping.
 - ☒ **Musculoskeletal hazards** – Prevent strains/sprains from strenuous tasks, overexertion, repetitive motion/ergonomic/lifting (seek help/lift-aids over 49 lbs.).
 - ☒ **Weather/climate-related hazards** – Prevent heat/cold-related illness, use sunscreen, monitor weather, i.d. shelter/refuge, use “30/30 rule” for lightning.
 - ☒ **Plant/insect/animal hazards** – Use precautions: poison ivy blocker/wash; insect repellent; tick checks; wasp spray; animal precautions.
 - ☒ **Common unsanitary/allergenic hazards** – Use routine hygienic measures/precautions; hand washing/sanitizer, food hygiene, PPE, disinfectant cleaning.
 - ☒ **Infectious/Pathogenic** - For COVID-19, and other non-typical/potentially high-risk pathogenic hazards, see **D.13 “Infectious/Pathogenic Biohazards.”**
 - ☐ **Worksite traffic hazards** – Implement measures to protect personnel (high-visibility/reflective clothing, on-person lighting, traffic control measures).
 - ☐ **Hazardous energy** – Use caution near electrical equipment/wet locations, machinery/physical hazards, stay out of hazard zone/line-of-fire, don’t touch.
 - ☐ **Illumination hazards/night work** – Illuminate work areas and/or access routes, use high-visibility and reflective clothing or on-person lighting, as appropriate.
 - ☐ **Security, potential crime/violence, urban/industrial zones** – Complete the *Assessment for Specific Risk: Working in Urban and Industrial Zones*
 - ☒ **Working alone** - Develop a project-specific plan/procedure on limitations for lone work, and specify a plan for periodic communication/contact.
- Geosyntec Procedures:** HS-124-Heat Stress, HS-125-Cold Stress, HS-127-Ticks, HS-207-Working Alone, HS-208-Housekeeping, HS-210-Walking and Working Surfaces, HS-401-Back Injury Prevention, HS-517-Traffic Safety, *Assessment for Specific Risk: Working in Urban and Industrial Zones*

Basic Personal Protection

- ☒ **Head protection from overhead hazards** – Wear hardhat or “bump cap” as appropriate for hazard.
 - ☒ **Hand protection** – Wear protective work gloves appropriate for the hazard and work tasks.
 - ☒ **Eye protection** – Wear safety glasses (with side shield or wrap around, either clear or shaded for sun protection), or other appropriate eye protection.
 - ☒ **Foot protection, rough terrain** – Wear work boots/shoes with hard toes, ankle support, puncture resistance, traction, as appropriate for conditions.
 - ☒ **Hearing protection** – use earplugs or earmuffs (or both) as appropriate for conditions; at a minimum where noise levels exceed 85 dBA.
 - ☐ **Protective clothing/nuisance dust mask** – For general protection against dust, dirt, oily residues, unsanitary conditions, as needed.
 - ☐ Other personal safety gear required for the task(s) covered in this THA is described above in Site-Specific Notes & Clarifications
- Geosyntec Procedures:** HS 113-Personal Protective Equipment

D.2. SPECIAL DRIVING / TRAFFIC / TRANSPORTATION HAZARDS

☒ **Applicable** ☐ **Not Applicable, Not Anticipated**

Site-Specific Notes & Clarifications: Absolutely no-self extraction of a vehicle if stuck. A tow truck must be used in ALL cases if a vehicle gets stuck.

☒	SPECIAL DRIVING HAZARDS Off-Road Driving or use of non-typical vehicle, heavy vehicle, van, UTV/ATV Hazards: Worker injury due to vehicle collision, rollover	☒ For off-road driving, do not exceed capability of vehicle, beware of wet conditions, keep speed low, avoid unsafe orientation on slopes. ☐ UTV/ATV-specific procedures for training, use roll-bar or helmet, operate per manufacturer’s instructions. ☐ Special Skills Required for Vehicle type – For vehicles requiring special skills (such as windowless van, heavy work vehicle, utility vehicle, similar) ensure operator is provided training and/or has appropriate operator skills through experience.	Geosyntec Procedure(s): HS-510-All Terrain Vehicles
☐	ROADWAY TRAFFIC HAZARDS Where the worksite is located in/near vehicle thoroughfare (road, highway, parking lot, etc.). Hazards: Worker injury from being struck by vehicle traveling in thoroughfare.	☐ Prepare Management of Traffic (MOT) Plan (address location hazards / client and regulatory requirements). ☐ Wear DOT-approved reflective vests where exposed to traffic hazards. ☐ Where possible, park vehicles as protective shield from oncoming traffic. ☐ Configure work area and support vehicles to minimize worker exposure to traffic hazards. ☐ Use DOT signal devices and/or signage to re-route vehicles around work area, site entrances/exits. ☐ Use DOT-trained flaggers or police detail where appropriate or required.	Geosyntec Procedure(s): HS-517-Traffic Safety
☐	TOWING/HAULING LOADS Hazards: Vehicle accident, occupant injury from shifting load, unsafe equipment, un-roadworthiness of trailer.	☐ Ensure load within vehicle is firmly secured (rope, straps, load configuration) to prevent shifting during travel. ☐ Slings, chains, strap, rope and related equipment used for towing, hauling, load-securing shall be appropriate for use, and used in a manner as to prevent an unsafe condition. ☐ For trailer use, verify tow-hitch components are compatible, hitch/safety chains secure, signal/braking lights operational, rear-view mirrors effective, tires inflated to proper pressure and tread acceptable.	
☐	RAILROAD HAZARD Hazard: Worker injury from being struck by train in R.R. right-of-way	☐ Coordinate with rail company or on-site host facility and implement required safety and security measures. ☐ Site workers to receive safety training for railroad work.	Geosyntec Procedure(s): HS-305-Rail Operations
☐	TRANSPORTATION BY WATER	☐ See D.3., “Water Hazards.”	Geosyntec Procedure(s): HS-312-Water Transportation Safety
☐	AIRPORT HAZARDS Worker injury when working on/near airport runway, or use of helicopter, light aircraft	☐ Coordinate safety requirements with airport personnel and implement required safety measures. ☐ Site workers to receive safety training for airport work.	Geosyntec Procedure(s): HS-310-Helicopter Safety, HS 311-General Aviation (Small Aircraft) Safety
☐	TRAFFIC/VEHICLE HAZARDS RELATED TO HEAVY EQUIPMENT, CONSTRUCTION SITE ACTIVITIES	☐ See D.8., “Construction, Heavy Equipment, Lift Equipment”	

D.3. WATER HAZARDS (Working Over/Near Water, Ash Ponds, Quicksand)
☐ Applicable
 ☒ Not Applicable, Not Anticipated

Site-Specific Notes & Clarifications: Working near water for staff gauge recordings. If the staff gauges are not accessible due to safety concerns, staff will contact the project manager to determine the appropriate response.

☐ WATER HAZARDS Work/travel in watercraft or on equipment over water or over coal ash impoundment/pond: ☐ Workboat, barge ☐ Water transportation ☐ Hazardous currents (river, tidal/riptide) ☐ Ash pond ☐ Towing, trailer, roadway ☐ Other – describe above Walking into water/wetland, on shoreline, riverbank, dock, bulkhead, abutment, coal ash: ☐ Work on-foot near, or on ice over, waterbody ☐ Wading into water, wetland ☐ Hazardous tidal zone or surf ☐ Water release, flash flood ☐ Coal ash pond, quicksand ☐ Open culvert, arroyo, drainage/irrigation ditch ☐ Diving Hazards (as applicable): - Drowning, cold immersion - Boating collision, navigation, fog, darkness - Fire/fuel hazards - Entrapment (mud/silt/coal ash/quicksand) - Slip/fall hazards – ice, mud, silt, wet surfaces - Weather, heat/cold stress	General water-safety measures for all work near water: ☐ Wear regulatory-approved personal flotation device (PFD) where drowning hazard is present. ☐ Bring emergency rescue and/or signaling equipment (ring buoy and rope, reaching device, flares) ☐ For fall protection over water, see D.4. “Fall Hazards.” ☐ For electrical hazards associated with water/wet locations, see D.9. “Electrical Hazards.” Boating-specific: ☐ Use fuel safety practices, fire extinguisher present in boat. ☐ Develop/follow float plan, monitor weather, navigate/communicate as planned. ☐ Confirm navigation/communication equipment operable before heading onto water. ☐ For work over very cold water, have immersion survival suit available. ☐ For tidal, flash flood, dam release hazards, plan/locate work accordingly. ☐ For towing a boat trailer, see D.2. “Special Driving/Traffic/Transportation Hazards.” Work-entering water or along shore/bank or on dock/pier/abutment: ☐ For ice/slip hazards, wear ice creepers, sand work area, use tether, other appropriate measures. ☐ For work on ice over water, verify safe thickness, have ring buoy & rope available ☐ For unsure/slippery footing <u>in</u> water, use wading staff, high-traction soles on waders. ☐ Have lifesaving skiff/boat available in circumstances where other rescue means are inadequate. ☐ Monitor hazardous tides, weather for flash floods, know water release schedule. For ash ponds, quicksand: ☐ Wear regulatory-approved personal flotation device (PFD). ☐ Bring emergency rescue equipment (ring buoy and rope, reaching device) ☐ If walking on ash/quicksand, provide stable walking/working surface (4’x8’ plywood, or similar)
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Geosyntec Procedure(s): HS-306-Working on/near Water and Ice, HS-312-Water Transportation Safety

D.4. FALL HAZARDS (Falls to Lower Levels)
☐ Applicable
 ☒ Not Applicable, Not Anticipated
D.5. HAND TOOLS (Manual, Hand-Powered)
☒ Applicable
 ☐ Not Applicable, Not Anticipated

Site-Specific Notes & Clarifications: Wear appropriate working gloves while handling tools.

☒ MANUAL HAND TOOLS ☒ Struck by ☒ Pinch points ☒ Puncture ☒ Cutting blade ☒ Repetitive motion, musculo-skeletal hazard ☒ Flying objects, eye hazards ☐ Other, describe above	☒ Proper tool for the job, maintain in good condition, use vise/clamp to hold work piece, proper follow through, stay clear of “line of fire,” appropriate work gloves, keep blades sharp, use wrist strap when dropped tool poses a hazard. ☒ Utility/folding/collapsible knives and fixed open-bladed knives/cutting tools are <u>not</u> permitted, unless specifically authorized. Cutting tools with auto-retracting blades, or with enclosed/guarded blades are permitted. Use cut-resistant heavy work gloves, as applicable. ☒ For tools requiring high exertion (shovel, hand auger, sledgehammer, pickaxe, slide hammer, similar): do stretching exercises to prepare, clear hazard zone, use stable body position, take rest breaks, avoid overexertion. ☒ Ground surface penetration – requires utility clearance; see D.10. “Utility-Related Hazards”
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Geosyntec Procedures: HS-502-Manual Hand Tools

D.6. POWERED TOOLS & EQUIPMENT (For Drilling & Heavy Equipment, see D.7 & D.8)
☒ Applicable
 ☐ Not Applicable, Not Anticipated

Site-Specific Notes & Clarifications: Wear safety glasses, work gloves, hearing protection, and steel toe boots during sampling activities.

☒ Type of powered tools/equipment: ☐ “Power tools” ☒ Powered portable equipment ☐ Powered fixed equipment Energy/power source: ☒ Battery-operated ☐ Electric-powered ☐ 120V ☐ 240V ☐ 480V ☐ Extension/flexible cords	☒ General safe work practices for operation of powered tools and equipment: • Inspect before each use to ensure safe operating condition. • Clear personnel from hazard zone; keep personnel out of the “line-of-fire;” heed warning labels/signage. • Arrange worksite for safe access to equipment and safe use of tool; confirm no overhead obstructions. • Secure long hair/loose clothing/hanging jewelry near moving/rotating parts. • Ensure point-of-operation, mechanical power transmission, other moving parts are guarded with protective devices (as applicable); do not override interlocks, guards, protective devices. • Do not make any equipment modifications that create a greater hazard or bypass safety design features. • Use tool/equipment in accordance with manufacturer’s use and safety instructions. • Use PPE and/or other safety protections, as appropriate, for eye/hearing/hand/head/body protection. • Provide training or verify operator competency for use of power tool/equipment. • Use ventilation, wet methods, respirators, other applicable means to mitigate inhalation hazard.
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	☐ Fuel-powered (gas or liquid) ☐ Pneumatic ☐ Hydraulic ☐ Gunpowder-actuated Hazards of Power Tools and Powered Equipment: ☐ Eye/hand/body injury ☐ Point-of-operation hazards ☐ Pinch points, moving parts ☐ Line-of-fire hazards, struck by ☐ Fire/explosion, ignition sources ☐ Burns from hot surfaces, steam ☐ Noise ☐ Inhalation/atmospheric hazards ☐ Working at heights, falls ☐ Overhead obstruction(s) ☐ Musculoskeletal hazards ☐ Potential (stored) energy ☐ Illumination	• Move power cords/pressurized hoses to protect from damage during tool/equipment use. • For spark/heat generating tool/equipment, have fire extinguisher available, remove combustible/flammable materials, or use other means to control fire hazard. • Use safe lifting practices and/or lift aids for moving heavy portable equipment, and use safe operating procedures to protect from acute strains/sprains, overexertion, and cumulative trauma injuries. • Implement safe work practices for compressed air, pressurized systems (pneumatic/hydraulic), stored energy. ☐ Additional requirements for power tools: • Use vise/clamp/work bench or other means to hold/secure a portable/moveable work piece. • Don't carry electrical tools/equipment by the power cord; don't carry pneumatic tools by hoses. • Disconnect tool/equipment from power source before changing bits, blades or making adjustments. ☐ Additional requirements for fixed powered equipment: • Implement lockout/tagout controls for repairs/adjustments/tooling changes. • Equip pneumatic hoses with whip checks; ensure factory fittings are used for high-pressure hose connections. ☐ For climbing/fall hazards associated with large equipment, see D.4. "Fall Hazards." ☐ For electrical hazards, see D.9. "Electrical Hazards." ☐ For ground surface penetration, see D.10. "Utility-Related Hazards." ☐ For fuel-safety practices, see D.14. "Commercial Chemical Products." ☐ For air monitoring of atmospheric hazards, see Part E, "Air Monitoring, Worker Exposure Monitoring." Geosyntec Procedure(s): HS-109-Hearing Conservation, HS-113-Personal Protective Equipment, HS-119-Lockout/Tagout, HS-121-Electrical Safety, HS-503-Powered Hand Tools, Others as applicable
☐	WELDING, CUTTING, HOT WORK ☐ Arc-welding (electrical arc) ☐ Gas-welding/cutting (fuel gases) Hazards: - UV/IR light-eye/skin burns - hot-work hazards/fire - toxic metal welding fumes - compressed gases - electrical shock	☐ General safe work practices for operators of welding equipment: • Hot work permit system to be implemented. • Operator properly protected (eye protection, clothing, apron, etc.). • Fire hazard controls (watcher, fire extinguisher, water, remove combustibles from work area). • Protect nearby personnel from hazardous UV, IR light (shielding, curtain); see D.16. "Radiation Hazards." ☐ For welding gas cylinders, secure them upright with caps on when stored or not in use; protect cylinders from damage; NEVER secure gas cylinders to metal welding bench used for electrical arc welding; see D.14. "Commercial Chemical Products." ☐ For arc welding, follow electrical safe work practices; see D.9. "Electrical Hazards." ☐ For inhalation hazards from welding fumes (toxic metals) and gases (asphyxiant, flammable), see D.14. "Commercial Chemical Products." Geosyntec Procedure(s): HS-511-Welding, Cutting and Other Hot Work
☐	PORTABLE ELECTRIC GENERATOR Hazards: - Electrical shock - Carbon monoxide in exhaust - Fuel-related fire hazard - Injury from mechanical or lifting hazard - Burns from hot surfaces	☐ Follow general safe work practices for Powered Tools & Equipment (above), and as follows: • Use in accordance with manufacturer's instructions, including instructions for grounding the generator. • Keep generator and work area dry. • Never use indoors, or near building air intake vents due to carbon monoxide hazard. • Provide for ventilation and/or air monitoring where hazardous accumulation of exhaust emissions is possible. • Use hearing protection in close proximity to operating generator, as needed. • Use power cords/extension cords specified by instructions. • Use ground-fault circuit interrupters (GFCIs) in accordance with manufacturer's instructions; see D.9. "Electrical Hazards." • Shut down equipment before refueling; see safe practices for flammable/combustible liquids in D.14. "Commercial Chemical Products." Geosyntec Procedures: HS-109-Hearing Conservation, HS-111-Air Monitoring, HS-115-Hazard Communication (for fuel), HS-121-Electrical Safety, Others as applicable
☐	PNEUMATIC / HYDRAULIC HAZARDS ☐ Air compressor ☐ Compressed air system ☐ High-pressure liquid ☐ Pressurized steam (For compressed gas cylinders, see D.14. "Commercial Chemical Products")	☐ Never direct outlet nozzle toward body; use guards, restraints, engineering controls as appropriate. ☐ Never use compressed air for cleaning clothes you are wearing. ☐ If compressed air is used for cleaning, restrict pressure to 30 psi or below, equip nozzle with chip guard. ☐ Use PPE for eye (goggles or face shield)/hand/head/hearing/skin protection, as appropriate for the hazard. ☐ Ensure tank, hoses, fittings are in good repair using factory fittings, equipped with whip-checks. ☐ If pressure relief device poses a hazard to workers, reconfigure or shield device or restrict access by workers.

☐ PORTABLE HEATER ☐ electric ☐ fuel powered Hazards: - Shock (electrical) - Carbon monoxide emissions and fuel-related fire hazards (fueled) - Fires/burns from hot surfaces.	☐ <u>Follow general safety practices for Operation of Equipment/Machinery (above), and as follows:</u> - Keep heater dry and locate heater on level surface away from high traffic areas to prevent tipping. - Never use fuel-powered heaters indoors, or near air intake vents, due to carbon monoxide hazard. - Provide ventilation and/or air monitoring where hazardous accumulation of exhaust emissions is possible. - Keep combustible materials at least 3 feet from hot surfaces. - Do not use an extension cord or power strip to power an electric heater. - For electric heaters, see D.9., "Electrical Hazards." - Shut down fuel-powered equipment before refueling; see safe practices for flammable/combustible liquids and/or compressed gases in D.14. "Commercial Chemical Products." <i>Geosyntec Procedures: HS-111-Air Monitoring, HS-115-Hazard Communication (for fuel), HS-121-Electrical Safety, Others as applicable</i>
☐ LOCKOUT/TAGOUT (LO/TO) OF HAZARDOUS ENERGY To prevent unplanned equipment start-up or release of energy when under maintenance/repair.	☐ Prepare site-specific written LO/TO program, and equipment-specific written LO/TO procedures (as applicable); implement control procedures for hazardous energy sources, provide locks/tags, train workers, designate "authorized" personnel, notify "affected" personnel. <i>Geosyntec Procedure(s): HS-119-Lockout Tagout, HS-121-Electrical Safety</i>

D.7. DRILLING (Test Boring, Direct Push, Construction Drilling)

☒ **Applicable** ☐ **Not Applicable, Not Anticipated**

Site-Specific Notes & Clarifications: Private utility locates will be used to clear the test well location prior to drilling.

☒ DRILLING & DIRECT PUSH Includes hazards posed by drilling rig and associated equipment, heavy support vehicles, trailer/towing hazards, and similar mobile equipment. Hazards: - Struck-by equipment - Run over, roll over - Caught between (pinch points) - Manual lifting, musculoskeletal - Fuel/fluid leaks, fuel hazards - Suspended equipment - Roadway hazards.	☒ <u>Follow safe work practices, as applicable:</u> - Non-drilling personnel to stay clear of drilling work zone when drill rig in operation. - Equipment maintained in good repair, inspected daily upon mobilization; backup alarms and emergency stop operational, machine guards in place, whip checks on high pressure lines. - Leaks or defective safety equipment should be repaired before use. - Establish eye contact with operator and use hand signals prior to approaching the rig. - Use PPE near operating rig (eye/head/hearing/hand/foot protection, high visibility vests or equivalent). - Arrange personal/support vehicles to protect drill team and not obstruct travel lanes or other operations. - Operators/helpers maintain safe distance from moving parts; secure loose hair, loose clothing, equipment. - Drill rigs will only be moved with masts lowered. - Maximum safe slope for rig will be followed, drill rig leveled, appropriate blocking/cribbing as needed. - Use safe practices for fuel handling/storage/transport; spill equipment available for fuel/fluid leaks. - Ventilate exhaust and conduct air monitoring, as appropriate, when drilling indoors. - Never climb drill mast without appropriate fall protection. - Use precautions for overhead and underground utilities <i>Geosyntec Procedure(s): HS-403-Drilling, HS-304-Overhead/Underground Utility Hazards, Others as applicable</i>
☒ MECHANICAL LIFTING, RIGGING Applies to lifting truck-mounted boom rig (e.g., drill rig), and all other drilling-related mechanical/electrical hoist equipment. Hazards: - Mechanical hazards - Elevated loads	☒ <u>In addition to general drilling & direct push safety practices (above), as applicable:</u> - Slings, chains, rope, wire rope, as well as sheaves, boom, and attachments used for lifting/hoisting shall be maintained in good condition, inspected daily, and used/stored in a manner as to protect from damage. - Do not exceed loading limits of lifting equipment; perform work in accordance with equipment load chart. - Hooks will be equipped with safety latches. - Ensure anchor points for winch or other lift device are engineered for intended use. - Ensure personnel are not positioned beneath elevated loads. <i>Geosyntec Procedure(s): HS-506-Cranes</i>
☒ WARNING! Confirmed or possible close proximity to OVERHEAD or UNDERGROUND UTILITIES.	☒ Follow safe work practices per D.10. "Utility-Related Hazards." <i>Geosyntec Procedure(s): HS-304-Overhead/Underground Utility Hazards</i>

D.8. CONSTRUCTION, HEAVY EQUIPMENT, LIFT EQUIPMENT

☒ **Applicable** ☐ **Not Applicable, Not Anticipated**

Site-Specific Notes & Clarifications: Stay clear of heavy machinery while in use and pay close attention to rig operators.

☒ WORKING NEAR MOBILE HEAVY EQUIPMENT, ON-SITE VEHICLES Hazards: - Struck-by - Caught between - Run over, roll over - Overhead hazards/obstructions - Elevated loads	☒ <u>For personnel on-foot/on-the-ground near operating heavy equipment, follow safe work practices:</u> - High visibility vests for all personnel in construction vehicle work area, on-site roadways and travel lanes. - Maintain unobstructed vision: wear shaded eyewear only in bright sun; don't wear hoods. - Erect barriers and post signs to identify and isolate the equipment hazard zone, if possible. - Stay out of swing radius of equipment, both in front and operating end, as well as at the back of equipment. - Stay out of the travel path of operating heavy equipment. - When crossing vehicle pathway behind moving equipment, cross at a distance not less than 30 feet. - When approaching equipment, always be able to see operator so he/she can see you. - Make eye contact with operator and use hand signals or make radio contact prior to approaching equipment. - Operator to provide "all off" hand signal when it is safe to approach within swing radius of equipment.
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☒	OPERATION OF MOBILE HEAVY EQUIPMENT Hazards: - Struck-by - Run over, roll over - Caught between (pinch points) - Fluid leaks/fuel-/fire-hazards - Overhead hazards/obstructions - Potential for body entrapment/crushing - Rotating equipment, moving parts.	☒ <u>Operators to follow safe work practices for operation of heavy equipment:</u> • Only trained/qualified persons allowed to operate heavy equipment. • Wear seatbelts; roll-over protection system present/deployed; do not exceed maximum safe slope. • No passengers on moving/operating equipment except where passenger seat/restraint is present. • Equipment inspected daily upon mobilization; maintained in good repair, backup alarms. • Leaks or defective safety equipment should be repaired before use; fire extinguisher present. • Maintain eye contact with ground personnel and use hand signals to direct their approach near equipment. • High visibility vests for all personnel in construction vehicle work area, on-site roadways and travel lanes. • Cease operation if personnel enter swing radius, travel path or hazard zone of moving parts, elevated loads. • Use safe practices for fuel handling/storage/transport; spill equipment available for fuel/fluid leaks. • Equipment locked, secured, brakes set, buckets/forks lowered, when not in use. • Shut down/lock out equipment to prevent crush situation beneath or between moving parts of equipment. • Ensure personal/support vehicles are parked/located not to obstruct equipment travel lanes/operating zones. • Mark temporary roadways clearly, provide berms/stops where needed. Geosyntec Procedure(s): HS-504-Heavy Equipment, HS-132-Competent Persons
☐	TRENCHING/EXCAVATION Hazards: - Cave-in, entrapment - Hazardous atmosphere - Water accumulation - Falls into excavations - Utility-related hazards - Undermining structures & foundations	☐ <u>Safe work practices when personnel will enter trenches/excavations:</u> • Activities under supervision/oversight of Competent Person, conduct daily inspection of excavation. • Excavated materials placed at least 2' from trench sidewall. • Prevent water accumulation in trench. • Sloping & shoring for trenches/excavations >20' deep must be approved by a Professional Engineer. • Sloping/shoring/trench box for excavations >5' when persons enter trench/excavation. • Sloping/shoring/trench box for shallow (<5') trench/excavation with cave-in hazard. • Workers in trenches to be within 25 feet of ladder or sloped entryway. • Excavations to be protected by perimeter fencing (not barricade tape), if potential for personnel to fall into. • If potential for atmospheric hazard, see D.10. "Confined Spaces, Hazardous Indoor/Enclosed Spaces" Geosyntec Procedure(s): HS-402-Excavation and Trenching, HS-132-Competent Persons
☐	FORKLIFT Hazards: - Struck-by - Run over/roll over/tip over - Overhead utilities/obstructions - Caught between (pinch points) - Unstable/falling loads - Elevated forks - Fluid leaks	☐ <u>In addition to general safety practices for heavy equipment (above), as applicable:</u> • Qualified operator, per established forklift training (certificate is required); Geosyntec operator must be approved by Director of Health and Safety. • Equipment inspected daily and documented on Forklift Preoperational Inspection Checklist. • Do not exceed lifting load limits. • Forklift shall not be moved/driven with empty forks in raised position. • When not in use, forks lowered, brake set, controls in neutral, key removed. Geosyntec Procedure(s): HS-505-Safe Operation of Forklifts, HS-132-Competent Persons
☐	AERIAL BOOM/SCISSOR LIFT Hazards: - Falls from basket - Overhead utilities/obstructions - Struck-by, run over, tip over - Caught between (pinch points) - Tip over - Fluid leaks.	☐ <u>Follow safe work practices:</u> • Operators to be appropriately trained and certified. • Equipment is inspected after mobilization and is in good condition. • Harness & lanyard worn whenever operating the lift. • Overhead hazards and surface obstructions to be reviewed with operators/riders prior to use. Geosyntec Procedure(s): HS-509-Aerial Lifts
☐	CRANES Hazards: - electrocution by overhead utility - injury in swing radius - injury from falling load - crane tipping over due to overbalancing, high winds, unstable ground, unsafe slope, bad placement of outriggers - injury from mechanical hazards	☐ <u>In addition to general safety practices for Operation of Heavy Equipment (above), as applicable:</u> • Only qualified persons operate cranes (certificate required). • Critical Lift Plan & Checklist prepared/executed (See HS 506-Cranes) prior to mobilization. • Equipment to be inspected prior to mobilization and daily by crane operator. • Crane operator will remain at the controls at all times during operation. • Crane operation must be performed under the direction of an appointed signal person at all times using hand signals and/or voice/radio communication. • Crane to be level and stable (solid ground or crane mats/timbers, outriggers if present, cribbing); over-reaching or exceeding load limits is prohibited. • Keep area beneath suspended loads clear of personnel; tag lines used to maneuver load. • Rigging procedures – see Mechanical Lifts with Rigging, below. Geosyntec Procedure(s): HS-506-Cranes, HS-132-Competent Persons
☐	MECHANICAL LIFTS WITH RIGGING Applies to lifting by rigging attached to crane, truck-mounted boom rig (e.g. drill rig), heavy equipment, mechanical/electrical hoist, similar equipment. Hazards: - Mechanical hazards, - Elevated loads	☐ <u>In addition to general safety practices for Operation of Heavy Equipment and Cranes (above), as applicable:</u> • Slings, chains, rope, wire rope, as well as sheaves, boom and attachments used for lifting/hoisting shall be maintained in good condition, inspected daily, and used/stored in a manner as to protect from damage. • Coordinate lifting operations with competent person. • Do not exceed loading limits of lifting equipment; perform work in accordance with equipment load chart. • Hooks will be equipped with safety latches. • Ensure anchor points for winch or other lift device (such as davit arm) are engineered for intended use. • Ensure personnel are not positioned beneath elevated loads and that tag lines are used where appropriate.

		Geosyntec Procedure(s): HS-506-Cranes
☒	WARNING! Confirmed or possible close proximity to OVERHEAD or UNDERGROUND UTILITIES.	☒ Follow safe work practices per D.10. "Utility-Related Hazards" Geosyntec Procedure(s): HS-304-Overhead/Underground Utility Hazards
☐	DEMOLITION	☐ Develop/implement a demolition safety plan. Geosyntec Procedure(s): HS-132-Competent Persons
☐	BLASTING, UNEXPLODED ORDNANCE	☐ Develop/implement safety plan for blasting, unexploded ordnance, as applicable. Geosyntec Procedure(s): HS-307-Blasting and Use of Explosives, HS-132-Competent Persons
☒	PUBLIC AT RISK, SITE SECURITY	☐ During site operations protect public (overhead protection, fencing, barriers, warning signs). ☒ During off hours, protect public with fencing, barriers, warning signs/lights, other measures as appropriate. ☒ Lock/secure hazardous materials and/or equipment.

D.9. ELECTRICAL WORK TASKS

☒ **Applicable** ☐ **Not Applicable, Not Anticipated**

Site-Specific Notes & Clarifications: Geosyntec will inspect all electrical equipment and will use extension cords when necessary.

☒	USE OF BATTERIES, BATTERY-POWERED EQUIPMENT <50 V, OR OTHER DC EQUIPMENT < 50 V Potential fire hazard (if terminals are shorted), eye/skin hazards (when electrolyte is replenished), inhalation hazard in enclosed spaces.	☒ Follow safe work practices to control hazards of voltage, shock, arcing, overheating, hazardous gases, irritant electrolytes, secondary hazards. ☒ Prevent short-circuiting of terminals when battery is in use (segregated from tools, metal objects) and during transport (use battery transport container or install guard/cover on positive terminal). ☒ For batteries requiring replenishment of electrolyte, use PPE for eye and skin protection, and have eyewash equipment at hand; see discussion of <i>acids/caustics/corrosives</i> in D.14. "Commercial Chemical Products." Geosyntec Procedure(s): HS-121-Electrical Safety
☒	"NORMAL OPERATION" OF ELECTRICAL EQUIPMENT CONNECTED TO AC OR DC POWER SOURCE ≥ 50 V: Electrically powered tools, equipment, machinery, extension cords, portable generators, working near electrical equipment. Hazards: – Electrical shock – Secondary hazards (falls, other injuries).	☒ <u>Follow "normal operation" requirements:</u> • All electrical enclosures/guards/covers must be in place/closed/secured. • Electrical equipment maintained per codes/standards/manufacture's recommendations. • Ensure no indication of damage or impending failure (heat, smoke, buzzing, odors, arcing, melting). • Operate equipment in accordance with manufacturer's standard operating procedures. ☒ <u>Follow general electrical safety work practices to minimize shock hazard and secondary hazards:</u> • Control water-related/wet-location hazards in a manner appropriate for the job tasks/equipment/tool. • Never touch electrical equipment if you are wet or standing/kneeling in water or on wet surfaces. • Use extension cords/power cords properly, rated for use conditions and current draw, prevent damage. • Inspect tool/equipment/extension cords/power cords before each use; remove from use if damaged. • Use GFCI-protected outlet or portable GFCI in wet/moist locations, outdoors, basements, concrete floors. • Do not enter any space delineated by an electrical approach boundary. Geosyntec Procedure(s): HS-121-Electrical Safety
☐	HANDS-ON DIAGNOSTICS/REPAIR ON CIRCUIT(S) CONNECTED TO POWER SOURCE < 50 V: ☐ AC ☐ DC ☐ Battery and/or solar power ☐ Capacitor(s) ☐ Stray voltage from soil electrodes	☐ <u>Implement electrical safe work practices pertaining to:</u> • Workers trained appropriately for the task. • Shock prevention measures. • Eye/skin protection for arcing hazards. • Protection from secondary hazards. Geosyntec Procedure(s): HS-121-Electrical Safety
☐	WORK WITHIN "APPROACH BOUNDARY" OF EXPOSED, ENERGIZED (OR POTENTIALLY ENERGIZED) CONDUCTORS AND/OR CIRCUIT PARTS CONNECTED TO POWER SOURCE 50-600 V*: ☐ AC ☐ DC ☐ 3-phase ☒ Battery and/or solar power ☐ Capacitor(s) ☐ Induced voltage ☐ Stray voltage ≥50V from soil electrodes * Working on >600 V not permitted for Geosyntec personnel	☐ <u>Prepare project-specific written "Electrical Safety Program" addressing (at a minimum):</u> • Workers trained/designated as "Qualified Electrical Workers" per NFPA 70E (US)/CSA Z462 (CAN) • Assess risks of electrical shock (voltage levels and sources), arc flash hazard and secondary hazards. • Affix electrical hazard warning label to electrical enclosure(s) to be accessed. • Physically delineate arc flash- or limited approach boundary, whichever is farthest from hazard source. • Only "qualified" workers allowed within approach boundaries; prevent entry by non-qualified personnel. • Establish electrically safe working condition; work on live circuits prohibited (except for diagnostic testing). • Use PPE for shock/arc flash protection, as required. • Use other safe procedures/equipment required for the task, such as lockout/tagout. Geosyntec Procedure(s): HS-121-Electrical Safety, HS-129-High Voltage Electricity Safety
☐	LOCKOUT/TAGOUT (LO/TO) OF ELECTRICAL ENERGY To prevent unplanned start-up or release of energy when equipment is under maintenance/repair.	☐ Prepare site-specific written LO/TO program, and equipment-specific written LO/TO procedures (as applicable); implement control procedures for hazardous energy sources, provide locks/tags, train workers, designate "authorized" personnel, notify "affected" personnel. Geosyntec Procedure(s): HS-119-Lockout Tagout, HS-121-Electrical Safety
☐	WARNING! Confirmed or possible close proximity to OVERHEAD ELECTRICAL UTILITY LINES.	☐ Follow safe work practices per D.10. "Utility-Related Hazards." Geosyntec Procedure(s): HS-304-Overhead/Underground Utility Hazards

D.10. UTILITY-RELATED HAZARDS☒ **Applicable** ☐ **Not Applicable, Not Anticipated****Site-Specific Notes & Clarifications:** Clearance of public utilities will be completed by JULIE. A private utility locator will clear individual locations prior to drilling.

☐	OVERHEAD, ABOVE-GROUND UTILITIES	☐ Arrange for power company/utility owner to de-energize power line. ☐ Do not cross approach boundaries with personnel or equipment; employ other appropriate precautions for the conditions (specify above). ☐ Use additional controls, as applicable: shielding, flagging, observer/monitor. Geosyntec Procedure(s): HS 304-Overhead/Underground Utility Hazards
☒	UNDERGROUND UTILITIES	☒ Confirm appropriate underground utility clearance procedures have been completed prior to ground penetrations, and employ other utility clearance/locator practices, as appropriate for conditions. ☒ Hand digging/auguring or vacuum post-holing within 3' of utility locations or other high-risk condition. Geosyntec Procedure(s): HS 304-Overhead/Underground Utility Hazards

D.11. CONFINED / ENCLOSED SPACES (Including Hazardous Indoor Spaces)☐ **Applicable** ☒ **Not Applicable, Not Anticipated****D.12. STORAGE OF BULK MATERIALS** (for Chemical Storage, see D.14 & D.15)☐ **Applicable** ☒ **Not Applicable, Not Anticipated****D.13. INFECTIOUS / PATHOGENIC BIOHAZARDS**☒ **Applicable** ☐ **Not Applicable, Not Anticipated****Site-Specific Notes & Clarifications:** COVID-19 awareness and prevention of potential exposures. Follow both Geosyntec and Dynegy preventive measures and use appropriate PPE. Daily temperature checks will be completed at the site entrance.

☒	HAZARD TYPE: ☒ COVID-19 ☐ Wastewater, sewer ☐ Bird guano ☐ Mold, fungi, valley fever ☐ Bloodborne pathogens ☐ Discarded syringes ☐ Medical waste ☐ Other (describe above)	☒ Follow Field Work COVID 19 General Prevention Measures (as applicable); list project specific COVID interventions above, communicate/coordinate with project team prior to initiation of work. ☐ Use "Universal Precautions" as applicable for potential exposures to infectious/pathogenic hazards. ☒ Low hazard – use basic hygiene practices, protective gloves, provide for hand washing. ☐ More severe hazard – add protective clothing, respirator/dust mask, decon, as appropriate. ☐ For bloodborne human pathogens follow Bloodborne Pathogen Program. ☐ Arrange with Human Resources for project-specific immunization. ☐ Implement remedial actions (remove syringes, clean up guano, decon/disinfect surfaces, etc.) as appropriate for the scope/scale of work. Geosyntec Procedure(s): HS-133-Bloodborne Pathogens, COVID-19 Considerations and Mitigations for On-Going Business Operations, Field Work Covid-19 General Prevention Measures
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D.14. COMMERCIAL CHEMICAL PRODUCTS (per HAZCOM or WHMIS)☒ **Applicable** ☐ **Not Applicable, Not Anticipated****Site-Specific Notes & Clarifications:** Geosyntec will monitor storage of any flammable/combustible materials brought on site by the drilling subcontractor (i.e., diesel fuel storage can or similar).

☐	PRODUCTS REGULATED BY HAZCOM¹ (US) or WHMIS² (CAN)	☐ Safety Data Sheets (SDSs) available, either on site or readily available within same work shift, containers labelled properly, workers trained/oriented on hazards. ☐ For subcontractor/contractor use of chemical products, confirm SDS availability for affected onsite workers. ¹ OSHA Hazard Communication Standard (United States); ² Workplace Hazardous Material Information System (Canada)
☐	GENERAL SAFE WORK PRACTICES FOR FIELD USE OF CHEMICALS	☐ Consult SDS for H&S hazards, symptoms of exposure; ensure workers have been apprised of safe practices. ☐ Handle with care, maintain good housekeeping, provide adequate illumination in work area. ☐ Pour/dispense/transfer liquid chemicals on stable work surface. ☐ Use chemicals in well ventilated area; use fans/blowers/exhaust for active ventilation, as appropriate. ☐ Have eyewash bottles, eyewash station, deluge capabilities, commensurate for the hazard, readily available. ☐ Have spill/neutralization equipment, appropriate for the chemicals, readily available. ☐ Conduct air monitoring as appropriate; see Part E, "Air Monitoring, Worker Exposure Monitoring."
☐	STORAGE/TRANSPORT OF CHEMICALS/HAZMAT Spill/Release Risk: ☐ Risk of <i>incidental spill/release</i> ☐ Risk of <i>emergency spill/release</i>	☐ Transport chemicals only in sealed containers, secured to prevent shifting/breakage during travel. ☐ Store chemicals only in sealed containers; overnight storage in squirt/spray bottles prohibited. ☐ Store flammable/combustible liquids in chemical storage cabinets, or other appropriate storage arrangement. ☐ For liquids, provide secondary containment during storage. ☐ Segregate incompatible chemicals during storage. ☐ Locate emergency gear (eyewash, fire extinguisher, spill kit, safety signage) near storage area, as applicable. ☐ For <i>incidental spills</i> ; spill kit on-site for low-hazard releases (low flammability/toxicity/quantity/volatility) ☐ For <i>emergency spills</i> : describe spill/release hazard and response plan/procedure above, and indicate emergency response contact in Part B, "Emergency Response and First Aid." ☐ DOT/TDG/IATA-Regulated transport: see D.17. "Hazmat/Dangerous Goods Shipping/ Transportation."
☐	COMPRESSED GAS CYLINDERS ☐ Flammable ☐ Non-flammable ☐ Toxic ☐ Asphyxiant	☐ Secure cylinders upright, caps on when not in use. ☐ Handle with care; use and store cylinders in a manner and location to prevent damage. ☐ Propane cylinders not in use <u>must be stored outdoors</u> in a cage or similar secure ventilated enclosure. ☐ Ensure acetylene cylinders are NOT secured to steel arc welding bench. ☐ Segregate oxygen and fuel gases by distance (20') or fire-rated barrier.

☐	Oxygen	☐ Control ignition sources. ☐ "No smoking" signage at cylinder storage area for flammable gases.
☐	FLAMMABLE/COMBUSTIBLE LIQUIDS	☐ Use proper fuel safety can (metal fuel container with self-closing spout and flame arrestor preferred). ☐ Control/remove ignition sources near storage and use areas. ☐ Grounding and bonding where appropriate. ☐ Ensure a Type B or ABC fire extinguisher is readily available.
☐	ACIDS, CAUSTICS, OTHER CORROSIVES	☐ Use appropriate protection for eyes/face (goggles/face shield) and skin (gloves, sleeves, apron). ☐ Use eyewash, deluge shower, drench hose, hand washing (with water), as appropriate. ☐ For severe eye hazards (due to high corrosivity, large quantity), 15-min. eyewash required.
☐	TOXIC	☐ For toxic substances, use/store in a manner to control exposure hazards (inhalation, ingestion, skin contact, skin absorption); use active ventilation and/or PPE as appropriate.
☒	EMISSIONS FROM FUEL COMBUSTION, HOT PROCESSES ☐ Gasoline ☐ Diesel ☐ Propane/Natural Gas ☐ Welding/cutting/hot work ☒ Vehicle/equipment exhaust ☐ Other	☒ Position outdoor personnel upwind of exhaust source. ☒ Avoid "idling" of equipment when not in use. ☐ Use <i>passive ventilation</i> (air infiltration/air currents) to disperse atmospheric hazards in breathing zone. ☐ Use <i>dilution ventilation</i> (blowers/fans) to provide fresh air to work area and dissipate atmospheric hazards. ☐ Use <i>exhaust ventilation</i> (hood/duct/exhaust stack/blower) to capture/divert exhaust from work area. ☐ Use respiratory protection for high levels of smoke, exhaust particulates, soot. ☐ Conduct air monitoring as appropriate; see Part E," Air Monitoring, Worker Exposure Monitoring."
☐	OTHER HAZARDS	☐ Describe other hazardous substances and safety measures under "Site-Specific Notes & Clarifications," above.
Geosyntec Procedures: HS-115-US-Hazard Communication, HS-115-CA-WHMIS, HS-111-Air Monitoring, HS-112-Respiratory Protection, HS-113-Personal Protective Equipment, HS-114-Safety Training Programs, Others as applicable		

D.15. SITE CONTAMINANTS, CHEMICAL WASTES

☒ **Applicable** ☐ **Not Applicable, Not Anticipated**

Site-Specific Notes & Clarifications:		
CHECK ALL THAT APPLY. Provide site-specific notes/clarifications above.		
☒ Soil/groundwater contaminants (historical release) ☐ Recent release, known high concentrations ☒ Former chemical disposal site, landfill ☐ Urban fill, residual contaminants ☐ Containerized waste (drums, process equipment) ☐ Buried drums (known or potential) ☐ Large containers, potential for spills ☐ Contaminated building surfaces ☐ Unexploded ordnance ☐ Explosive dust	☐ Oxygen deficiency ☐ Chlorinated volatile organic compounds (VOCs) ☐ BTEX, petroleum derived VOCs ☐ Fuel oils, petroleum, waste oil, lubricants ☒ Metals, metal compounds, metal dusts ☐ Elemental mercury ☐ Polyaromatic hydrocarbons (PAHs) ☐ Polychlorinated biphenyls (PCBs) ☐ Potential for flammable vapors ☒ Potential for flammable gas (methane)	☐ Corrosive, acids/caustics, strong irritants ☐ Sulfides, hydrogen sulfide (H ₂ S) ☐ Cyanides, hydrogen cyanide (HCN) ☐ Asbestos ☐ Lead paint ☐ Pesticides, herbicides, fungicides ☐ Sensitizers ☐ Radioactive contaminants ☐ Controlled substances, drugs ☐ Other - describe above
☐ FOR WORK CONSISTING OF CLEANUP OPERATIONS, CORRECTIVE ACTIONS, PRELIMINARY INVESTIGATIONS at an "UNCONTROLLED HAZ. WASTE SITE" (per HAZWOPER, 29 CFR 1910.120 or equivalent), delineate procedures in "Site-Specific Notes and Clarifications" (or attachments) addressing the following, as applicable to the work: - Workers attend pre-work orientation on hazards, risks, onsite safety measures, emergency contingencies. - Implement site control plan - delineate Exclusion Zone(s), Contaminant Reduction Zone(s), Support Zone (aka EZ, CRZ, SZ). - Include site map/figure depicting work locations and other relevant site-specific information. - Site workers in EZ or CRZ to have 40-hour HAZWOPER training, current 8-hour refresher, 3 days supervised field experience. - Site supervisor(s) required to have 8-hour Supervisor training. - Site workers in EZ or CRZ to participate in medical monitoring program, as applicable. - Implement site-specific procedures for worker protection via engineering controls, work practices, personal protective equipment (PPE), air monitoring, decontamination procedures, spill containment, emergency preparedness and response. - Conduct air monitoring, as appropriate; see Part E," Air Monitoring, Worker Exposure Monitoring." PPE program: Specify Levels of Protection and specific PPE to be used for applicable tasks; Level D: No respirator, no chemical protective clothing, standard work clothes, basic PPE; (COVID-19 face covers allowed) Modified Level D: No respirator, chemical protective clothing as appropriate; (COVID-19 face covers allowed) Level C: Air-purifying respirator, chemical protective clothing as appropriate; consult with Corp. H&S Dept. required. Level B: Air-supplied respirator, chemical protective clothing/suit as appropriate; consult with Corp. H&S Dept. required. Level A: Fully encapsulating suit, self-contained breathing apparatus (SCBA); Level A prohibited for Geosyntec personnel. Geosyntec Procedures: HS-301-HAZWOPER, HS-108-Medical Monitoring Surveillance, HS-111-Air Monitoring, HS-112-Respiratory Protection, HS-113-Personal Protective Equipment, HS-114-Safety Training Programs, HS-115-Hazard Communication, HS-405-Drum Sampling, Others as applicable		
☒ FOR SITE WITH CHEMICAL CONTAMINANTS OR WASTE BUT NOT REGULATED BY HAZWOPER - Workers to be knowledgeable/aware of chemical hazards thru safety training/orientation and availability of hazard information. - Implement controls to minimize worker exposure through engineering controls, work practices, PPE, decon, as appropriate.		

	– Evaluate worker exposure via air monitoring/sampling, as applicable; see Part E, “Air Monitoring, Worker Exposure Monitoring.” Geosyntec Procedures: HS-111-Air Monitoring, HS-112-Respiratory Protection, HS-113-Personal Protective Equipment, HS-114-Safety Training Programs, HS-115-Hazard Communication, Others as applicable	
☐ STORAGE/TRANSPORT OF IDW* Spill/Release Risk: ☐ Risk of <i>incidental spill/release</i> ☐ Risk of <i>emergency spill/release</i> <i>* Investigation-Derived Waste</i>	☐ Describe site-specific procedures above for spill containment, container handling, as applicable. ☐ For liquids, provide secondary containment during storage. ☐ Segregate incompatible chemicals during storage. ☐ Locate emergency gear (eyewash, fire extinguisher, spill kit, safety signage) near storage area, as applicable. ☐ For <i>incidental spills</i> ; spill kit on-site for low-hazard releases (low-flammability/toxicity/quantity/volatility) ☐ For <i>emergency spills</i> : describe spill/release hazard and response plan/procedure above, and indicate Emergency response contact in Part B, “Emergency Response and First Aid.” ☐ DOT/TDG/IATA-Regulated transport: see D.17. “Hazard/Dangerous Goods Shipping/Transportation.” Geosyntec Procedures: HS-406-Unknown Hazardous Waste Drum Handling	
☐ OFF-SITE MIGRATION OF AIRBORNE CONTAMINANTS	☐ Implement controls to minimize hazard migration (dust suppression, covers, foam, etc.). ☐ Community/perimeter air monitoring to be conducted per perimeter air monitoring plan; see E.3 “Fence Line/Perimeter Air Monitoring.”	

D.16. RADIATION HAZARDS (Other than Sunlight)

☐ Applicable ☒ Not Applicable, Not Anticipated

D.17. HAZMAT/DANGEROUS GOODS SHIPPING/TRANSPORTATION

☐ Applicable ☒ Not Applicable, Not Anticipated

PART E – AIR MONITORING, WORKER EXPOSURE MONITORING

E.1. AIR MONITORING

☐ Applicable ☒ Not Applicable, Not Anticipated

E.2. OTHER WORKER EXPOSURE MONITORING

☐ Applicable ☒ Not Applicable, Not Anticipated

E.3. FENCELINE / PERIMETER AIR MONITORING

☐ Applicable ☒ Not Applicable, Not Anticipated

PART F – APPROVALS, ACKNOWLEDGEMENTS

F.1. THA PREPARATION, REVIEW/APPROVAL SIGNATURES A THA is typically prepared by project staff, often with input from an HSC, with review/approval, at a minimum, by PM or PD. Corporate H&S staff must be consulted as required or otherwise deemed appropriate*.

THA PREPARED BY:	Printed Name	Signature	Date
	Alondra Soltero		
THA REVIEWED/ APPROVED BY: (Project Manager or Project Director, at a minimum)	Printed Name	Signature	Date

* At a minimum, Corp. H&S **must** review/approve the THA review when Geosyntec staff will encounter “high hazards/high risks,” or perform critical tasks, such as (but not limited to):

- | | | |
|---|--|---|
| - Derive action levels for VOCs or toxic dusts | - Operate a UTV/ATV | - Function as a construction “Competent Person” |
| - Instrument monitoring for critical exposure risks | - Tow a trailer on roadway | - Operate a pneumatic or powder-actuated tool |
| - Wear a respirator | - Oversee a hot-work permit system | - Electrical testing & maintenance (<50 V excluded) |
| - Sustained exposure to wildfire smoke AQI _{PM 2.5} >150 | - Enter a permit-required confined space | - Work at height near overhead electrical utility lines |
| - Climb ladders to heights >10' | - Implement lockout/tagout controls | - Enter EZ/CRZ during HAZWOPER cleanup activities |
| - Use a personal fall apparatus | - Enter a trench/excavation >5' deep | - Exposure to radioactive isotopes (α, β, γ) |
| - Operate an aerial lift or fork-lift | - Work near heavy equipment or crane | - Onsite risk of emergency chemical spill |

Corporate H&S **must** also be consulted when Geosyntec subcontractors (under Geosyntec’s oversight) perform high hazard/high risk work (such as demolition, blasting, crane lifts, confined space entry, testing/maintenance of electrical systems, lockout/tagout, HAZWOPER cleanup activities), **OR** when supplemental written H&S programs are required for a project (such as Electrical Safety Program, Lockout Program, Confined Space Entry Program, Emergency Response Plan), **OR** when a written safety plan must be submitted to a public agency. Consultation with Corp. H&S is encouraged for all questions/concerns regarding worker safety, regulatory compliance, risk/liability aspects, or project-specific safety requirements.

Geosyntec H&S Procedure: For more information, see HS-204-Work-Specific Hazard and Risk Assessment, Written Safety Plans.

F.2. GEOSYNTEC FIELD CREW ACKNOWLEDGEMENTS

Please sign below to acknowledge you reviewed and understand this THA, participated in project safety briefing and had an opportunity to ask questions about the information herein.

Printed Name	Signature	Employee No.	Date

F.3. SUBCONTRACTOR'S FIELD CREW ACKNOWLEDGEMENTS

☒ Applicable ☐ Not Applicable

Please sign below to acknowledge this THA was made available to you, and you had an opportunity to ask questions about the information herein.

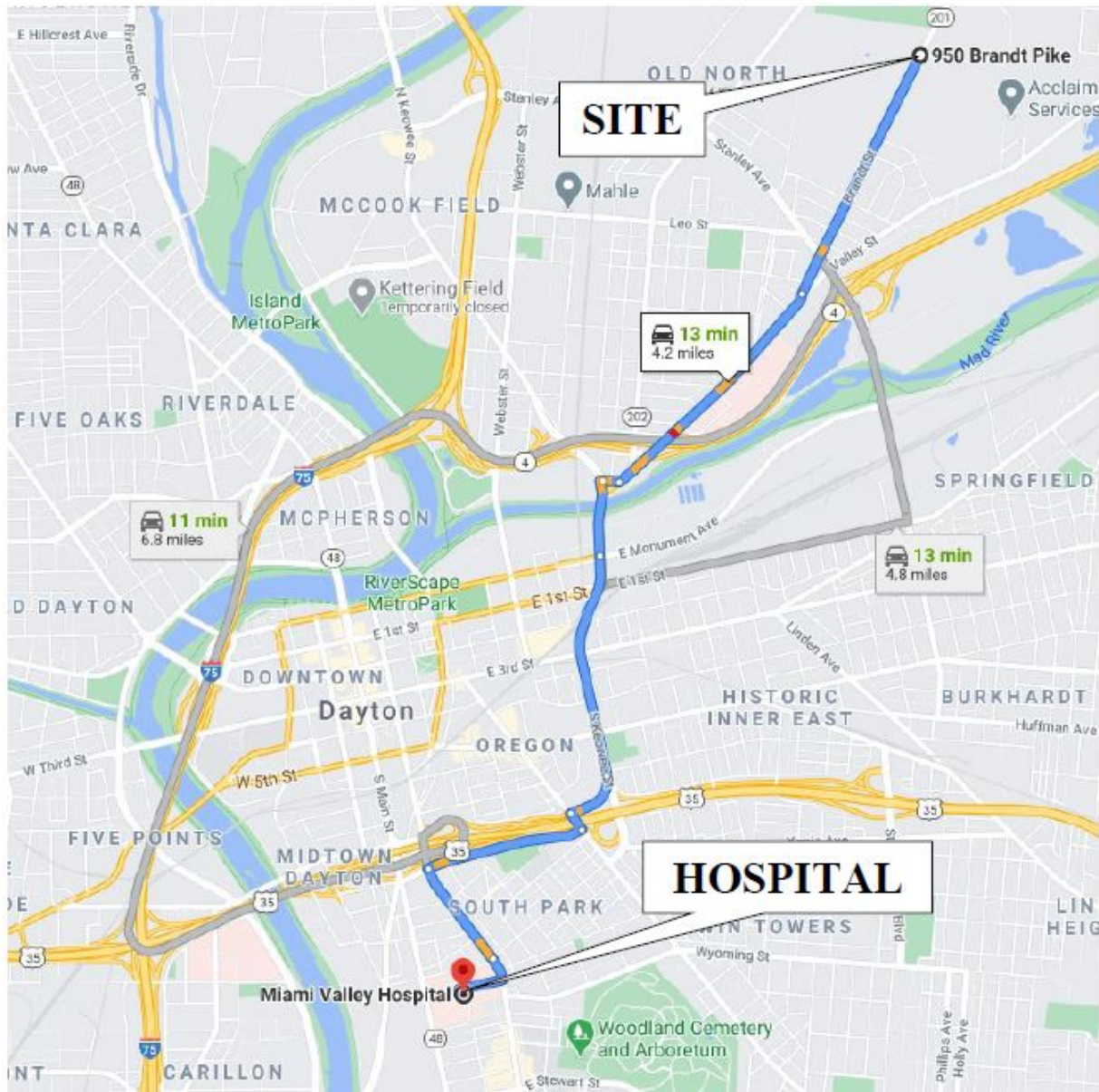
Printed Name	Signature	Company Name	Date

ROUTE TO HOSPITAL EMERGENCY ROOM

Hospital Name: Miami Valley Hospital

Address: 1 Wyoming Street

Phone Number: (937) 208-2048



Driving Directions to Hospital from Site:

1. Head southwest on Brandt Pike
2. Continue onto Brandt St
3. Continue onto Valley St
4. Valley St. turns left and becomes N. Keowee St.
5. Turn left onto Wayne Ave
6. Turn right onto Wyoming St

Driving Time: 13 mins

Driving Distance: 4.2 miles

Appendix C: Generic Summary of Chemical Hazards

**GCCS and Leachate Management
Hazard Assessment**

<u>Column 1</u> Task Description/ Location	<u>Column 2</u> Hazard Description	<u>Column 3</u> Engineering Controls	<u>Column 4</u> Work Practice Controls	<u>Column 5</u> PPE - Required*
General Grouped Tasks/Locations				
General Wellfield Operations (Sealed System)	- Heat - Cold - Uneven terrain/walking surfaces - Insects - Snakes	Proper wellhead height	- Cut grass/vegetation in work area - Check accessibility to work area - Plan each task appropriately	<u>High visibility safety vest</u> <u>Safety-toed work boots</u> <u>Work uniform (e.g. long pants, shirt with sleeves)</u> <u>Approved portable gas monitor</u>
General Wellfield Operations (Unsealed System)	- LFG (flammability, oxygen deficiency, toxicity) - Heat - Cold - Uneven terrain/walking surfaces - Insects - Snakes	- Proper wellhead height - Design for easy wellhead installation/removal - Isolation valves - Temporary pipe seals (e.g., fernco caps) - Intrinsically safe/ex-proof equipment	- Cut grass/vegetation in work area - Check accessibility to work area - Plan each task appropriately - LOTO procedures	<u>High visibility safety vest</u> <u>Safety-toed work boots</u> <u>Work uniform (e.g. long pants, shirt with sleeves)</u> <u>Approved portable gas monitor</u>
General Tasks Involving Liquids (leachate and condensate)	- LFG (flammability, oxygen deficiency, toxicity) - Heat - Cold - Uneven terrain/walking surfaces - Insects - Snakes - LFG condensate & leachate splashing	- Proper sump height - Proper wellhead height - Isolation valves - Temporary pipe seals (e.g., fernco caps)	- Cut grass/vegetation in work area - Check accessibility to work area - Plan each task appropriately	<u>High visibility safety vest</u> <u>Safety-toed work boots</u> <u>Work uniform (e.g. long pants, shirt with sleeves)</u> <u>Approved portable gas monitor</u> <u>Suitable work gloves (e.g., nitrile)</u> <u>Safety glasses</u> - Safety goggles - Face shield
General Operations Around GCCS Control Devices	- LFG (flammability, oxygen deficiency, toxicity) - Heat - Cold - Uneven terrain/walking surfaces - Insects - Snakes - LFG condensate & leachate splashing - Equipment/material with sharp/abrasive surfaces - Rotating equipment - Overhead objects/equipment - Noise	- Walking platforms - Equipment guards - Installation of "carport" over equipment - Intrinsically safe/ex-proof equipment	- Cut grass/vegetation in work area - Check accessibility to work area - Clear area of obstructions - Conduct work when flare is cool	<u>High visibility safety vest</u> <u>Safety-toed work boots</u> <u>Work uniform (e.g. long pants, shirt with sleeves)</u> <u>Approved portable gas monitor</u> <u>Hard hat</u> - Hearing protection

	▪ Hot equipment surfaces			
General Permit Required Confined Spaces	▪ LFG (flammability, oxygen deficiency, toxicity) ▪ Heat ▪ Cold ▪ Uneven terrain/walking surfaces ▪ Insects ▪ Snakes ▪ Other hazards described in site permit-required confined space entry program	▪ Follow site permit-required confined space entry program	▪ Follow site permit-required confined space entry program	▪ <u>Follow site permit-required confined space entry program</u>

Additional Requirements for Specific Tasks

Water Level Readings	▪ LFG (flammability, oxygen deficiency, toxicity) ▪ Heat ▪ Cold ▪ Uneven terrain/walking surfaces ▪ Insects ▪ Snakes ▪ Equipment/material with sharp/abrasive surfaces ▪ LFG condensate & leachate splashing	▪ Proper device height ▪ Isolation valves ▪ Temporary pipe seals (e.g., fernco caps)	▪ Cut grass/vegetation in work area ▪ Check accessibility to work area ▪ Plan each task appropriately ▪ Keep device under vacuum	▪ <u>High visibility safety vest</u> ▪ <u>Safety-toed work boots</u> ▪ <u>Work uniform (e.g. long pants, shirt with sleeves)</u> ▪ <u>Approved portable gas monitor</u> ▪ <u>Suitable work gloves</u> ▪ <u>Safety glasses</u> ▪ Safety Goggles ▪ Face shield
Pump Removal/Installation	▪ LFG (flammability, oxygen deficiency, toxicity) ▪ Heat ▪ Cold ▪ Uneven terrain/walking surfaces ▪ Insects ▪ Snakes ▪ Equipment/material with sharp/abrasive surfaces ▪ LFG condensate & leachate splashing	▪ Proper device height ▪ Isolation valves ▪ Temporary pipe seals (e.g., fernco caps) ▪ Intrinsically safe/ex-proof equipment	▪ Cut grass/vegetation in work area ▪ Check accessibility to work area ▪ Plan each task appropriately ▪ Clear area of obstructions ▪ LOTO procedures	▪ <u>High visibility safety vest</u> ▪ <u>Safety-toed work boots</u> ▪ <u>Work uniform (e.g. long pants, shirt with sleeves)</u> ▪ <u>Approved portable gas monitor</u> ▪ <u>Suitable work gloves</u> ▪ <u>Safety glasses</u> ▪ Safety goggles ▪ Face shield
HDPE Fusion Welding	▪ Electric shock ▪ Equipment/material with sharp/abrasive surfaces ▪ Hot equipment surfaces ▪ Pinching/crushing	▪ Equipment guards	▪ Electric power supply/cables in proper condition ▪ Plan each task appropriately ▪ Clear area of obstructions ▪ Level work plane ▪ Only properly trained people use fusion equipment	▪ <u>Safety-toed work boots</u> ▪ <u>Work uniform (e.g. long pants, shirt with sleeves)</u> ▪ <u>Suitable work gloves</u>

Waste Excavation	▪ LFG (flammability, oxygen deficiency, toxicity) ▪ Uneven terrain/walking surface ▪ Equipment/material with sharp/abrasive surfaces ▪ Flying objects/particulates ▪ LFG leachate splashing ▪ Heavy equipment & other vehicles ▪ Limited visibility ▪ Overhead objects/equipment ▪ Excavation collapse ▪ Heights 4 ft. or more above lower level ▪ Asbestos	▪ Barriers in high-traffic areas ▪ Forced air ventilation ▪ Portable railing ▪ Excavation covers	▪ Check accessibility to work area ▪ Plan each task appropriately ▪ Clear area of obstructions ▪ Level work plane ▪ Slope excavation walls ▪ Use escape ladders ▪ Asbestos safety procedures	▪ <u>High visibility safety vest</u> ▪ <u>Safety-toed work boots</u> ▪ <u>Work uniform (e.g. long pants, shirt with sleeves)</u> ▪ <u>Approved portable gas monitor</u> ▪ <u>Suitable work gloves</u> ▪ <u>Hard hat</u> ▪ <u>Safety glasses</u> ▪ Safety goggles ▪ Safety glasses and face shield ▪ Respirator for asbestos ▪ Tyvek suit
Working With Electricity	▪ Electric shock ▪ Equipment/material with sharp/abrasive surfaces	▪	▪ Electric power supply/cables in proper condition ▪ Plan each task appropriately ▪ LOTO procedures	▪ <u>Safety-toed work boots</u> ▪ <u>Work uniform (e.g. long pants, shirt with sleeves)</u> ▪ Suitable work gloves
Working With Compressed Air	▪ Noise ▪ Flying objects/particulates	▪	▪ Compressed air pipes/hoses in proper condition ▪ LOTO procedures	▪ <u>Safety-toed work boots</u> ▪ <u>Work uniform (e.g. long pants, shirt with sleeves)</u> ▪ <u>Safety glasses</u> ▪ Safety goggles ▪ Safety glasses and face shield ▪ Hearing protection
Working With Power Tools	▪ Electric shock ▪ Equipment/material with sharp/abrasive surfaces ▪ Noise ▪ Flying objects/particulates	▪ Equipment guards	▪ Electric power supply/cables in proper condition ▪ Plan each task appropriately ▪ Clear area of obstructions ▪ Level work plane	▪ <u>Safety-toed work boots</u> ▪ <u>Work uniform (e.g. long pants, shirt with sleeves)</u> ▪ <u>Safety glasses</u> ▪ Suitable work gloves ▪ Hearing protection ▪ Safety goggles ▪ Safety glasses and face shield
Working With Sharp/Abrasive Surfaces or Tools	▪ Equipment/material with sharp/abrasive surfaces	▪ Equipment guards	▪ Plan each task appropriately ▪ Clear area of obstructions ▪ Level work plane	▪ <u>Safety-toed work boots</u> ▪ <u>Work uniform (e.g. long pants, shirt with sleeves)</u> ▪ <u>Suitable work gloves</u>
Working With Overhead Equipment	▪ Falling objects ▪ Overhead objects/equipment ▪ Limited visibility	▪ Equipment above walking height ▪ Proper anchors ▪ Cover over normal working areas	▪ Check accessibility to work area ▪ Plan each task appropriately ▪ Clear area of obstructions ▪ Level work plane	▪ <u>Safety-toed work boots</u> ▪ <u>Work uniform (e.g. long pants, shirt with sleeves)</u> ▪ <u>Hard hat</u> ▪ <u>Safety glasses</u> ▪ Safety goggles ▪ Safety glasses and face shield

Working At Height > 4'	- Falls - Uneven terrain/walking surface	- Ladders - Cages/other fall protection - Walking platforms	- Check accessibility to work area - Plan each task appropriately - Clear area of obstructions - Level work plane	- Safety-toed work boots <u>Work uniform (e.g. long pants, shirt with sleeves)</u>
Working Around Heavy Equipment/Vehicles	- Impact - Crushing - Flying objects/particulates	Barriers in high-traffic areas	- Check accessibility to work area - Plan each task appropriately - Clear area of obstructions - Level work plane	<u>High visibility safety vest</u> <u>Safety-toed work boots</u> <u>Work uniform (e.g. long pants, shirt with sleeves)</u> <u>Hard hat</u> <u>Safety glasses</u> - Safety goggles - Safety glasses and face shield
Grass Cutting/Weed Eating	- Equipment/material with sharp/abrasive surfaces - Flying objects/particulates - Noise	Equipment guards	- Check accessibility to work area - Plan each task appropriately - Clear area of obstructions - Level work plane	<u>High visibility safety vest</u> <u>Safety-toed work boots</u> <u>Work uniform (e.g. long pants, shirt with sleeves)</u> <u>Safety glasses</u> - Suitable work gloves - Safety goggles - Hearing protection
Operating ATV (e.g., Honda 4-wheeler)	- Impact with other vehicles/objects - Falls - Rollover - Flying objects/particulates	Equipment guards	- Do not operate on public streets - Operate only as designed - Do not operate in dangerous areas - Do not operate in a dangerous manner	<u>High visibility safety vest</u> <u>Safety-toed work boots</u> <u>Work uniform (e.g. long pants, shirt with sleeves)</u> <u>Helmet</u> <u>Safety glasses</u> - Suitable gloves - Safety goggles
Operating Off-Road Utility Vehicle (e.g., Gator, Mule)	- Impact with other vehicles/objects - Falls - Rollover - Flying objects/particulates	- Equipment guards - Seat belts - Roll bar/cage	- Do not operate on public streets - Operate only as designed - Do not operate in dangerous areas - Do not operate in a dangerous manner - Fasten seat belts	<u>High visibility safety vest</u> <u>Safety-toed work boots</u> <u>Work uniform (e.g. long pants, shirt with sleeves)</u> <u>Safety glasses</u> - Safety goggles - Suitable gloves
Power Washing	- Electric shock - High pressure water - Noise - Flying objects/particulates - Splashing water - Hot equipment surfaces	Equipment guards	- Electric power supply/cables in proper condition - High pressure hoses in proper condition - Plan each task appropriately - Clear area of obstructions/people - Level work plane	<u>High visibility safety vest</u> <u>Safety-toed work boots</u> <u>Work uniform (e.g. long pants, shirt with sleeves)</u> <u>Safety glasses</u> <u>Suitable work gloves</u> - Safety goggles - Safety glasses and face shield - Hearing protection

Painting	▪ Electric shock ▪ High pressure liquid ▪ Flying objects/particulates ▪ Paint vapors	▪ Equipment guards	▪ Electric power supply/cables in proper condition ▪ High pressure hoses in proper condition ▪ Plan each task appropriately ▪ Clear area of obstructions/people ▪ Level work plane ▪ Paint only in well ventilated area ▪ Forced air ventilation	▪ <u>Safety-toed work boots</u> ▪ <u>Work uniform (e.g. long pants, shirt with sleeves)</u> ▪ <u>Safety glasses</u> ▪ Safety goggles ▪ Respirator
----------	---	--	--	---

***Underlined denotes the minimum PPE to be used. Non-underlined indicates PPE to be used as appropriate.**

TASK-SPECIFIC HAZARD ASSESSMENT

Task	Hazards	Control Measures
surveying, fence and road repair, mowing, seeding, routine non-intrusive maintenance and inspections	heat/cold stress uneven terrain sharp or rusty objects confined spaces buried hazards biological hazards	work/rest cycles, liquid consumption, shelter flagging/marking PPE level D surrounding awareness
leachate sampling soil sampling ground water monitoring well development and sampling	heat/cold stress dermal contact uneven terrain, sharp or rusty objects explosive atmospheres confined spaces biological hazards electrical hazards liquid management ladders	work/rest cycles, liquid consumption, shelter flagging/marking surrounding awareness PPE level D or C gloves / Tyvek air monitoring CGI and PID LOTO, SWPPP spill prevention
subsurface soil boring, installation of ground water wells, gas wells, leachate wells, gas probes abandonment of wells and probes	heat/cold stress dermal contact inhalation hazards uneven terrain sharp or rusty objects explosive atmospheres heavy equipment noise confined spaces buried hazards biological hazards liquid management	work/rest cycles, liquid consumption, shelter flagging/marking surrounding awareness PPE level D/C/B gloves / Tyvek respiratory protection air monitoring CGI and PID ventilation, hearing protection dust suppression spill prevention SWPPP
landfill gas probe monitoring maintenance and inspection	heat/cold stress uneven terrain sharp or rusty objects explosive atmospheres biological hazards confined spaces	work/rest cycles, liquid consumption, shelter flagging/marking PPE level D surrounding awareness air monitoring CGI and PID
confined space entry	See section 3 of HASP	

TABLE 2-2

TASK SPECIFIC HAZARD ASSESSMENT

Task	Hazards	Control Measures
Refuse excavation	heat/cold stress, uneven terrain sharp or rusty objects dermal contact inhalation hazard explosive atmospheres buried hazards biological hazards heavy equip operation, noise liquid management	work/rest cycles, liquid consumption, shelter flagging/marketing PPE level D/C/B surrounding awareness gloves / Tyvek respiratory protection air monitoring CGI and PID ventilation, hearing protection spill prevention, SWPPP
excavation out of refuse	heat/cold stress dermal contact explosive atmospheres uneven terrain, sharp or rusty objects, confined spaces buried hazards biological hazards heavy equip operation, noise	work/rest cycles, liquid consumption, shelter flagging/marketing PPE level D surrounding awareness air monitoring CGI and PID hearing protection
cap repair, contact with leachate and/or contaminated soils	heat/cold stress dermal contact inhalation hazards uneven terrain, sharp or rusty objects explosive atmospheres biological hazards liquid management heavy equipment operation	work/rest cycles, liquid consumption, shelter flagging/marketing PPE level D/C/B surrounding awareness gloves / Tyvek respiratory protection air monitoring CGI and PID hearing protection, ventilation spill prevention, SWPPP
equipment decon	heat/cold stress dermal contact inhalation hazards	work/rest cycles, liquid consumption, shelter PPE level D/C air monitoring PID
installation of passive vents vent maintenance and inspections	heat/cold stress, dermal contact, biological hazards explosive atmospheres uneven terrain, sharp or rusty objects, confined spaces buried hazards, ladders heavy equip operation, noise liquid management	work/rest cycles, liquid consumption, shelter flagging/marketing, PPE level D/C air monitoring CGI and PID hearing protection spill prevention, SWPPP

TABLE 2-2

TASK SPECIFIC HAZARD ASSESSMENT

Task	Hazards	Control Measures
installation of leachate extraction system sump pumps, controls, leachate system maintenance operation and inspection tank pumping/transfer	heat/cold stress dermal contact inhalation hazards uneven terrain sharp or rusty objects explosive atmospheres confined spaces, ladders biological hazards electrical hazards liquid management heavy equipment noise compressed air hazards	Work/rest cycles, liquid consumption, shelter flagging/marking surrounding awareness PPE level D/C/B gloves / Tyvek respiratory protection air monitoring CGI and PID ventilation, spill prevention LOTO, SWPPP dust suppression hearing protection
Installation of gas extraction system flare, controls, blower gas sampling gas system maintenance operation and inspection	heat/cold stress dermal contact uneven terrain, sharp or rusty objects explosive atmospheres biological hazards liquid management confined spaces heavy equipment operation electrical hazards	work/rest cycles, liquid consumption, shelter flagging/marking PPE level D/C gloves / Tyvek air monitoring CGI and PID dust suppression hearing protection spill prevention, SWPPP LOTO
gas recovery plant, wastewater treatment plant	ladders, electrical hazards heat/cold stress explosive atmospheres heavy equip operation, noise liquid management confined spaces dermal contact inhalation hazards chemical hazards compressed air hazards welding hazards	LOTO work/rest cycles, liquid consumption, shelter hearing protection surrounding awareness air monitoring CGI and PID ventilation respiratory protection spill prevention, SWPPP PPE level D/C/B hazard communication program

This table represents potential hazards a site worker (including contractors) may be subjected too. This Assessment is intended to include as many potential hazards as possible; however, a Site may have specific hazards not included herein.

See table 3-2 for action levels requiring upgrade in level of protection and stop work criteria. PPE = personal protective equipment.

PID = photoionization detector, such as HNU or Microtip. CGI = combustible gas/oxygen/H₂S meter. SWPPP = stormwater pollution prevention plan.

LOTO = lock out tag out. Requirement for fire extinguishers is on a site by site and project basis.

Appendix C: Generic Summary of Chemical Hazards

Petroleum Hydrocarbons

Gasoline, diesel, oil, and heavier hydrocarbons, such as grease, may be present. Volatile components of gasoline include benzene, toluene, ethylbenzene, and xylenes (BTEX).

The primary exposure routes for petroleum hydrocarbons during Site activities are inhalation, dermal contact, and ingestion of contaminated soil, sediment, dust, or water. Lighter petroleum hydrocarbons such as gasoline and benzene readily volatilize and are primarily an inhalation concern, whereas the primary route of exposure to heavier petroleum hydrocarbons such as aromatic hydrocarbons, oil, and grease is dermal contact. The target organs primarily affected by prolonged exposure to petroleum hydrocarbons are the respiratory system, central nervous system, kidneys, liver, and skin. Prolonged dermal contact with petroleum hydrocarbons can cause irritation or dermatitis. The BTEX compounds are known or suspected human carcinogens.

Petroleum hydrocarbons such as gasoline are also flammable and can be a physical hazard when present in high concentrations. Combustion of petroleum hydrocarbons can produce carbon dioxide, carbon monoxide, aldehydes, fumes, smoke (particulate matter) and other products of incomplete combustion. Intentional and inadvertent combustion of petroleum hydrocarbons is not expected during sampling activities; however, personnel will evacuate the area should a fire occur. The table below summarizes BTEX exposure limits.

Chemical Name	PEL ¹	TLV ²
Benzene	1	0.5
Toluene	200	50
Ethylbenzene	100	100
Xylene	100	100

¹ OSHA Permissible Exposure Limit (in parts per million)

² ACGIH Threshold Limit Value (in parts per million)

Polycyclic Aromatic Hydrocarbons (PAHs)

PAHs are produced during combustion events due to inadequate oxidation of fuel. PAHs in the pure state are yellowish crystalline solids. They are found in coal tar and in products of incomplete combustion. These chemicals have varying degrees of potency for causing cancer, with benzo(a)pyrene being among the most potent. The PAHs are evaluated collectively as COAL TAR PITCH VOLATILES. Coal tar pitch volatiles may cause photo-sensitization and a rash where sunlight strikes the skin. Exposure may also cause cancer of lungs, skin, bladder or kidneys. Benzo(b)fluoranthene, benzo(j)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, chrysene, and indeno(1,2,3,c,d)pyrene have been identified as carcinogenic.

This information on PAH compounds is presented for awareness. While the potential for Site personnel sustaining significant inhalation exposures to volatilized PAH compounds during the Site activities of this project is minimal, there is the potential for inhalation of PAH-contaminated dust, and handling of contaminated soils presents skin exposure hazards. Use of dust suppression techniques (as appropriate) and the proper use of the PPE will adequately protect personnel. Some significant PAH compounds include:

- Anthracene
- Benzo(a)pyrene Benzo(a)anthracene
- Chrysene Benzo(b)fluoranthene
- Fluoranthene Benzo(k)fluoranthene
- Fluorene Benzo(g,h,i)perylene
- Indeno(1,2,3,c,d)pyrene Benzo(d,e,f)phenanthrene
- Phenanthrene

OSHA PEL for coal tar pitch volatiles is 0.2 mg/m³ and NIOSH REL is 0.1 mg/m³, TLV 0.2 mg/m³ is for 8-hour time weighted average (TWA).

PCBs

PCBs are carcinogenic chlorinated hydrocarbons. Potential exposure routes are through inhalation, skin absorption, ingestion and skin or eye contact and may irritate eyes, cause acne, cause liver damage or have reproductive effects. Carcinogenic effects such as tumors and leukemia have been observed in animals. The OSHA permissible exposure limit (PEL) for 8-hour time-weighted average (TWA) is 1 mg/m³ (skin). The NIOSH PEL is 0.001 mg/m³.

RCRA Metals

These metals include arsenic, barium, cadmium, chrome, mercury, selenium, and silver. Heavy metals are known to cause neurologic effects (lead, mercury), kidney damage (cadmium), and respiratory damage (arsenic, cadmium). Oral and respiratory exposures should be minimized. The table below summarizes exposure limits.

Chemical Name	PEL ¹	TLV ²
Arsenic	0.01	0.01
Lead	0.05	0.05
Mercury	0.01	0.25

¹ OSHA Permissible Exposure Limit (PEL) in parts per million

² ACGIH Threshold Limit Value (TLV) in parts per million

Pesticides, Herbicides, and/or Rodenticides

These compounds are highly stable and valued for their residual action against insects. They are also stored in the body fat of mammals and are eliminated very slowly. These pesticides affect the central nervous system. Symptoms of poisoning include tremors and convulsions. Chronic effects associated with organochlorine pesticide poisoning include liver damage. Many of the chlorinated hydrocarbon pesticides are directly absorbed through the skin to cause systemic effects.

Chlorinated Solvents/Volatile Organic Compounds (VOCs)

Chlorinated VOCs are widely used as solvents in industrial operations such as degreasing, manufacturing, cleaning and dry cleaning, and are also present in household products and automotive fluids. They readily form vapors which can accumulate in indoor air spaces (i.e., via migration through the subsurface) and react with ozone to form sub-micron sized particles with the potential to cause adverse respiratory health effects. Free product releases (via surface or subsurface discharges or inadequate disposal) can migrate downward to significant depths and through fine-grained deposits to groundwater, and can persist as wide-scale sources of vapor plumes for long periods of time.

The likely routes of exposure to chlorinated solvents include inhalation, ingestion and direct contact with the skin or eye. The toxicity of chlorinated solvents varies; many affect the CNS and some are identified as carcinogens. PCE can affect the CNS and cause irritation of the skin, eyes, and upper respiratory tract. TCE can depress the CNS, affect kidneys, liver, and lungs and can cause rapid and irregular heartbeat. Toxic effects are increased when combined with alcohol, caffeine, and other drugs. DCA can cause CNS depression and damage to the liver, kidneys, heart, and digestive system. Eye contact with DCA can cause irritation and serious injury if not removed promptly. DCA and TCE are flammable liquids; the LEL of both solvents are approximately 6% and their flash points are less than 100°F. PCE is not considered flammable. These chlorinated solvents are only slightly soluble in water.

Exposure levels will be maintained below OSHA PEL or NIOSH REL as shown in the table below.

Chemical Name	PEL ¹	REL ²
1,2 DCA	50	1
TCE	100	Ca
PCE	100	Ca

¹ OSHA Permissible Exposure Limit (PEL) in parts per million

² ACGIH Threshold Limit Value (TLV) in parts per million

Ca = Carcinogenic

Acids/Bases

Strong acids and bases (such as hydrochloric acid, nitric acid, sodium hydroxide, potassium hydroxide) are potentially present at the Site.

Such substances expose the personnel to the following risks:

- Irritations and caustic injuries (chemical burns). Acids and bases, have a noxious power which varies in strength with the tissue these substances come in contact with. Some compounds (for example sodium hydroxide) may be responsible for very bad injuries to the skin, the eyes and, in case of accidental ingestion, to the upper digestive system. Furthermore, irritating gases and vapors (such as gaseous chlorine) may develop during different reactions.
- Acute intoxications. Intoxication may occur as a result of accidental ingestion or inhalation or, less frequently, as a result of skin contact.
- Chronic intoxications.

These may arise as a consequence of prolonged exposure to relatively small doses, unable to produce acute effects. The most frequently reported toxic effects include liver disease, nephropathy, coagulation disorders and nervous system disorders.

Appendix D: Air Monitoring

Appendix D: Air Monitoring

Applies to Task: ☐ ① ☐ ② ☐ ③ ☐ ④ ☐ ⑤ ☐ ⑥ ☐ ⑦ ☐ ⑧

☐ Photoionization Detector (PID) Brand/Model No.: <u>10.6 eV: lamp</u> Monitoring Frequency: <u>Continuous</u>		☐ Oxygen (O₂) Meter Brand/Model No.: <u>Multi-Gas Meter</u> Monitoring Frequency: <u>Continuous</u>		☐ Explosimeter Brand/Model No.: <u>4-Gas Meter</u> Monitoring Frequency: _____							
Breathing Zone Reading (ppm) Less than 10 Level D PPE 10 to 50 Level C PPE Greater than 1000 Stop work. Evacuate the area. If upon return, levels still exceed the action level, stop work and implement engineering controls. Note: _____		Reading (%) Less than 19.5 Stop work. Evacuate the area. 19.5 to 23.5 Continue to work with caution. Greater than 23.5 Stop work. Evacuate the area. Note: _____		Source (% LEL) <table border="0"> <tr> <td>Reading</td> <td>Action</td> </tr> <tr> <td>1 to 10</td> <td>Continue with caution.</td> </tr> <tr> <td>Greater than 10</td> <td>Stop work. Evacuate the area. If upon return, concentration still exceeds 10% LEL, ventilate until concentration is back to <10% LEL.</td> </tr> </table> Note: _____		Reading	Action	1 to 10	Continue with caution.	Greater than 10	Stop work. Evacuate the area. If upon return, concentration still exceeds 10% LEL, ventilate until concentration is back to <10% LEL.
Reading	Action										
1 to 10	Continue with caution.										
Greater than 10	Stop work. Evacuate the area. If upon return, concentration still exceeds 10% LEL, ventilate until concentration is back to <10% LEL.										
☐ Flame Ionization Detector (FID) Brand/Model No.: _____ Monitoring Frequency: _____		☐ Chemical Detector Tube Brand/Model No.: <u>VC and BZ Detector</u> Monitoring Frequency: _____		☐ Other Brand/Model No.: _____ Monitoring Frequency: _____							
Breathing Zone Reading (ppm) _____ to _____ Level D PPE _____ to _____ Level C PPE Greater than _____ Stop work. Evacuate the area. If upon return, levels still exceed _____, stop work and implement engineering controls. Note: _____		Breathing Zone Reading (ppm) Less than 1 Level D PPE Greater than 1 Level C PPE Note: _____		Breathing Zone Reading _____ to _____ Level D PPE _____ to _____ Level C PPE Greater than _____ Stop work. Evacuate the area. If upon return, levels still exceed _____, stop work and implement engineering controls. Note: _____							

Appendix E: Personal Protective Equipment

Appendix E: Personal Protective Equipment

	Task ①	Task ②	Task ③	Task ④	Task ⑤	Task ⑥	Task ⑦	Task ⑧
Potential PPE Level per Task:	☒ D ☐ C	☒ D ☐ C	☒ D ☐ C	☒ D ☐ C	☐ D ☐ C	☐ D ☐ C	☐ D ☐ C	☐ D ☐ C

Modified Level D		Level C	
Equipment	Material/Type	Equipment	Material/Type
☒ Safety glasses		☐ Full-face air-purifying respirator	Cartridge Type:
☒ Hard-toed boots		☐ Half-mask air-purifying respirator	Cartridge Type:
☒ Protective clothing		☐ Safety glasses	
☒ Hard hat*		☐ Hard-toed boots	
☒ Hearing protection*		☐ Protective clothing	
☒ High-visibility vest*		☐ Hard hat	
☐ Outer boots*		☐ Hearing protection*	
☐ Outer gloves*		☐ High-visibility vest*	
☒ Other:	Facial mask/covering	☐ Outer boots*	
		☐ Outer gloves*	
		☐ Inner gloves*	
		☐ Other:	

* PPE items may be downgraded (only with concurrence of SHSO and PM).

Appendix F: Safety Data Sheets

Appendix F: Safety Data Sheets

Included in this HASP	Chemical
☐	Acetone
☐	Alconox
☐	Ammonia
☐	Bentonite
☐	Diesel Fuel Oil No. 2-D
☐	Gasoline
☐	Helium
☐	Hexane
☐	Hydrochloric Acid
☐	Hydrogen
☐	Isobutylene Calibration Gas
☐	Isopropyl Alcohol
☐	KB-1
☐	Methane Calibration Gas
☐	Nitric Acid
☐	Permanganate
☐	Portland Cement
☐	Sulfuric Acid
☐	Other: _____
☐	Other: _____
☐	Other: _____
☐	Other: _____

Note: SDSs are for chemicals that used to perform project work, not Site contaminants.

SDSs Not Applicable for Pre-Final RD

Appendix D

Emergency Response Plan

EMERGENCY RESPONSE PLAN

North Sanitary Facility

Dayton, OH

Prepared by

Geosyntec 
consultants

engineers | scientists | innovators

931 Chatham Lane, Suite 103
Columbus, OH 43221

Project Number: TR0881

August 2021

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SECTION 1

INTRODUCTION

As stated in Statement of Work (SOW) Section 4.5 (Emergency Response and Reporting):

If any event occurs during performance of the Work that causes or threatens to cause a release of waste material on, at, or from the Site and that either constitutes an emergency situation or that may present an immediate threat to public health or welfare or the environment, Settling Work Parties shall (1) immediately take all appropriate action to prevent, abate, or minimize such release or threat of release; (2) immediately notify the authorized EPA officer (as specified in Paragraph 4.5c) orally; and (3) take such actions in consultation with the authorized EPA officer and in accordance with all applicable provisions of the Health and Safety Plan, the Emergency Response Plan, and any other deliverable approved by EPA under the SOW.

SOW Section 6.7b (Emergency Response Plan) states the requirements for the Emergency Response Plan (ERP) as follows:

The Emergency Response Plan (ERP) must describe procedures to be used in the event of an accident or emergency at the Site (for example, power outages, water impoundment failure, treatment plant failure, slope failure, etc.). The ERP must include:

- 1) Name of the person or entity responsible for responding in the event of an emergency incident;*
- 2) Plan and date(s) for meeting(s) with the local community, including local, State, and Federal agencies involved in the cleanup, as well as emergency squads and hospitals;*
- 3) Spill prevention, control and countermeasures (SPCC) plan, if applicable, consistent with regulations under 40 CFR Part 112, describing measures to prevent, and contingency plans for, spills and discharges;*
- 4) Notification activities in accordance with Paragraph 4.5b (Release Reporting) in the event of a release of hazardous substances requiring reporting under Section 103 of CERCLA, 42 U.S.C. §9603, or Section 304 of the Emergency Planning and Community Right to Know Act (EPCRA), 42 U.S.C. § 11004; and*
- 5) A description of all necessary actions to ensure compliance with Paragraph 11 (Emergency and Releases) of the Consent Decree in the event of an occurrence during the performance of the Work that causes or threatens a release of waste material from the Site that constitutes an emergency or may present an imminent threat to public health, welfare, or the environment.*

This ERP is structured as follows:

- Section 1 Introduction
- Section 2 Responsible Entities
- Section 3 Community Meetings
- Section 4 Spill Prevention, Control, and Countermeasures Plan
- Section 5 Notifications
- Section 6 Emergencies and Releases

It is noted that Section 6.3 (Emergency Contingency Plan) of the November 23, 2004 “Operations and Maintenance Manual for the Landfill Gas Abatement System” by SCS Engineers will remain in effect for the existing system until it is replaced by a new system.

SECTION 2

RESPONSIBLE ENTITIES

An Emergency Information Sheet containing the hospital location, directions, government agency phone numbers, emergency phone numbers, and directions to the hospital is presented below.

EMERGENCY INFORMATION		
Contact	Phone Number	Hospital Directions
Local Police	911	<i>Fill in Directions:</i> 1. Head southwest on Brandt Pike 2. Continue onto Brandt St 3. Continue onto Valley St 4. Valley St. turns left and becomes N. Keowee St. 5. Turn left onto Wayne Ave 6. Turn right onto Wyoming St Driving Time: 9 mins Driving Distance: 4.1 miles
Dayton Police	937-333-2677	
335 W Third St		
Dayton, OH 45402		
Fire Department - Dayton Fire Station 8	911 937-333-4500	
Ambulance	911	
Local Hospital: Miami Valley Hospital 1 Wyoming St Dayton, OH 45409	937-208-2048	
National Poison Center	800-222-1222	
Ohio EPA 24-hour Emergency Spill Hotline	800-282-9378 or 614-224-0946	
Geosyntec Project Manager John Buyers		
Work: 519-514-2644 Cell: 519-497-8819		
Geosyntec Local Contact (Indianapolis) Megan Martz		
Work: 317-343-4793 Cell: 317-345-1552		
Geosyntec Regional Health & Safety Manager Jim Bannantine		
Work: 262-834-0227 Cell: 414-339-5630		
Client Contact Mike Samples, <i>de maximis, inc.</i>		
Work: 865-691-5052 Cell: 865-548-1875		

Emergency information should be posted as appropriate. Site personnel will use their cell phones/smart phones for contact purposes.

SECTION 3

COMMUNITY MEETINGS

In advance of remedial construction, a meeting will be held with the local community, including local, State, and Federal agencies involved in the cleanup, as well as emergency squads and hospitals. The purpose of this meeting is to inform these local authorities of the nature of the work and potential risks, to ensure that these responders are equipped to respond to a Site emergency, and to identify and resolve any potential problems, concerns, or conflicts.

SECTION 4

SPILL PREVENTION, CONTROL, AND COUNTERMEASURES PLAN

As the design advances and the nature of operations and associated materials becomes known, if applicable, a Spill Prevention, Control, and Countermeasures (SPCC) Plan will be developed consistent with 40 CFR Part 112 (Oil Pollution Prevention), describing measures to prevent, and contingency plans for, spills and discharges. In the meantime, the following procedures will be used:

- 1) ***Small Spills*** - Spills or releases of hazardous chemicals in quantities that do not present an immediate risk to personnel can be corrected and cleaned up by the employee.
- 2) ***Large Spills*** - If the spill or release presents a hazard to either personnel or the environment, the immediate area shall be evacuated, and the Site Supervisor contacted. Do not attempt to remediate the spill/release unless you have received specific Spill Response Training. The Site Supervisor will contact the appropriate HAZMAT response team for stopping the leak and performing the cleanup.

SECTION 5

NOTIFICATIONS

As stated in SOW Section 4.5:

- b. Release Reporting: Upon the concurrence of any event during performance of the Work that Settling Work Parties are required to report pursuant to Section 103 of CERCLA, 42 U.S.C. § 9603, or Section 304 of the Emergency Planning and Community Right-to-know Act (EPCRA), 42 U.S.C. § 11004, Settling Work Parties shall, immediately notify the authorized EPA officer orally.*
- c. The “authorized EPA officer” for purposes of immediate oral notifications and consultations under Paragraph 4.5a and Paragraph 4.5b is the lead EPA Project Coordinator, or the EPA Alternate Project Coordinator (if the EPA Project Coordinator is unavailable), Region 5.*
- d. For any event covered by Paragraph 4.5a and Paragraph 4.5b, Settling Work Parties shall: (1) within 14 days after the onset of such event, submit a report to EPA describing the actions or events that occurred and the measures taken, and to be taken, in response thereto; and (2) within 30 days after the conclusion of such event, submit a report to EPA describing all actions taken in response to such event.*
- e. The reporting requirements under Paragraph 4.5 are in addition to the reporting required by CERCLA § 103 or EPCRA § 304.*

SECTION 6

EMERGENCIES AND RELEASES

As the design advances and the nature of operations and associated materials becomes known, emergency procedures specific to those features will be developed. In the meantime, initial procedures have been developed as discussed in the following sections:

Section 6.1 Emergency Communication

Section 6.2 Muster Location

Section 6.3 Potential Emergencies

6.1 Emergency Communication

In case of an emergency, an evacuation alarm will be sounded, which means that all the personnel should evacuate the area and proceed to a muster point for further instruction. If an adjacent facility's alarm is activated, then work will stop immediately, equipment will be de-energized and/or secured as necessary for safety reasons, and personnel will go immediately to the rally point as indicated in pre-start and daily safety meetings.

Emergency evacuation drills will be conducted as deemed necessary by the Site Supervisor, and documentation of the drills will be maintained by the Site Supervisor in project filing.

The Site Supervisor will notify all project personnel of the emergency through verbal or cell phone/smart phone communications. Cell phones/smart phones will be taken to the muster point to enable further receipt of instruction(s) from the Site Supervisor.

The following signals shall be established for use with auto or compressed air-type horns:

- i) 3 Blasts: evacuate EZs and meet at the designated evacuation area
- ii) An "All Clear" will be conveyed by radio communication

6.2 Muster Location

The primary muster point will be the Site entrance on 950 Brandt Pike.

6.3 Potential Emergencies

- A. ***Severe Weather*** - Severe weather includes hurricanes, tornadoes, lightning and flooding. Some of these conditions, such as tornadoes, can come upon the Site suddenly, with little to no warning. The following actions shall be implemented for each situation:

- 1) Tornadoes - Radio stations will provide continual updates when conditions are right for potential tornado formation. The Site Supervisor will listen to the continual updates, and if conditions worsen, personnel will either be sent to their primary residence (if time and conditions allow), or to pre-designated shelters. In the event of being outside when a tornado forms, personnel shall lie flat in the nearest low point in the ground (unless time permits evacuation to the designated shelter). Designated shelters will be identified.
- 2) Lightning - In the event of lightning, all equipment shall be shut off, and personnel shall enter the nearest structure. UNDER no circumstances stand under a solitary tree. If a structure is not nearby, then either remain in an enclosed vehicle, or lie flat at a low point on the ground.
- 3) Flooding - When flooding is expected, proceed to the highest available point (i.e., multi-story building).

B. *Fire/Explosion* - In the event an evacuation is necessary, all personnel shall proceed to the primary muster location, unless the primary location is downwind from the emergency, in which case a secondary muster location shall be used. Contact the local Fire Department. Fire extinguishers are selected as follows:

Class A for combustible materials

Class B for flammable liquid, gas or grease

Class C for electrical equipment

Class D for combustible metal

C. *Medical Emergencies* - Medical emergencies can be the result of work-related accidents (e.g., broken bones, serious cuts) or occurrences. In the event of a medical emergency:

- 1) Ensure the injured worker is in no immediate danger (e.g., lying face down in water).
- 2) Touch or move the injured employee ONLY if an immediate danger exists, and then only to alleviate the life-threatening situation.
- 3) After alleviating the life-threatening situation, send someone to contact the ambulance and notify the Site Supervisor.
- 4) The person initially finding the emergency should stay at the scene, unless no one else is available to call the ambulance.

- 5) Once the ambulance is contacted, the Site Supervisor shall designate someone to meet the ambulance at the entrance to the Site to direct the responders to the emergency.
- D. ***Structural Collapse*** - In the event of the collapse of a structure, all personnel shall muster at the primary muster location to ensure no one is trapped in the collapsed building. If everyone is not accounted for, the Fire Department and ambulance service shall be contacted. The Site Supervisor shall designate someone to remain at the Site entrance to direct emergency responders to the emergency Site.
- E. ***Bomb Threat:***
- 1) The receipt of a bomb threat at the Site requires a quick assessment as to whether the threat is an actual warning, harassment, or a hoax, and to determine the appropriate call to action.
 - 2) An advance provision will be made for the immediate communication of any bomb threat to the Site.
 - 3) Upon reaching a decision after consideration and assessment, the prearranged procedure is to be placed into action.
 - 4) Clear-cut levels of authority will be established to minimize risk to persons and property. Particular characteristics and conditions existing at each location will require that each area develop specific emergency procedures.

Appendix E

LFG Transition Evaluation Weekly Data Tables

VALLEYCREST WEEKLY PROBE REPORT FOR SHUTDOWN TEST
(% Gas by Volume)

Date:	Monday, August 16, 2021			
Weekly Probes	CH4	O2	CO2	Bal
CP1-3	0.0	14.1	6.8	79.1
CP1-11	0.0	7.8	12.4	79.8
GP-02 (for CP1b-1R)	0.0	14.8	7.8	77.4
TGP1b-A	0.0	17.7	4.2	78.1
TGP1b-C	0.0	14.5	8.1	77.4
GP-04	0.0	18.1	4.5	77.4
CP2-1	0.0	20.4	1.6	78.0
CP2-4R	0.0	18.6	3.3	78.1
CP2-5R	0.0	18.6	3.5	77.9
CP3-1RR	0.0	13.3	5.6	81.1
CP3-5R	0.0	20.4	1.3	78.3
CP3-9	0.0	18.7	3.5	77.8
CP3-13R	0.0	20.0	2.1	77.9
TGP-89	0.0	19.7	2.7	77.6

	Monday, August 16, 2021			
Weekly Probes	CH4	O2	CO2	Bal
CP4-1	0.0	11.5	8.9	79.6
CP4-6	0.0	16.7	5.1	78.2
TGP-76	0.0	5.0	10.1	84.9
TGP-68	0.0	18.3	3.7	78.0
TGP-53	0.0	16.2	8.3	75.5
TGP-75	0.0	15.6	8.0	76.4

- Notes: (1) Sampling instrument used is a calibrated Landtec GEM 5000 or equivalent multi-gas meter;
(2) Balance gas (Bal) is assumed to be mostly nitrogen and is a calculated value, not measured.
(3) Additional Probes may be added as needed if CH4 > 5% is detected.

VALLEYCREST WEEKLY PROBE REPORT FOR SHUTDOWN TEST
(% Gas by Volume)

Date:	August 23, 2021			
Weekly Probes	CH4	O2	CO2	Bal
CP1-3	0.0	13.7	7.0	79.3
CP1-11	0.0	13.2	7.8	79.0
GP-02 (for CP1b-1R)	0.0	13.5	8.0	78.5
TGP1b-A	0.0	17.3	3.4	79.3
TGP1b-C	0.0	14.1	8.1	77.8
GP-04	0.0	3.9	17.1	79.0
CP2-1	0.0	19.3	1.0	79.7
CP2-4R	0.0	17.9	2.7	79.4
CP2-5R	0.0	18.0	2.9	79.1
CP3-1RR	0.0	14.2	5.8	80.0
CP3-5R	0.0	19.0	1.2	79.8
CP3-9	0.0	17.4	3.1	79.5
CP3-13R	0.0	19.1	1.4	79.5
TGP-89	0.0	18.7	1.9	79.4

	August 23, 2021			
Weekly Probes	CH4	O2	CO2	Bal
CP4-1	0.0	13.7	6.8	79.5
CP4-6	0.0	13.5	6.2	80.3
TGP-76	0.0	5.4	10.3	84.3
TGP-68	0.0	18.4	2.7	78.9
TGP-53	0.0	15.4	6.5	78.1
TGP-75	0.0	15.2	6.5	78.3

Notes: (1) Sampling instrument used is a calibrated Landtec GEM 5000 or equivalent multi-gas meter;
(2) Balance gas (Bal) is assumed to be mostly nitrogen and is a calculated value, not measured.
(3) Additional Probes may be added as needed if CH₄ > 5% is detected.

VALLEYCREST WEEKLY PROBE REPORT FOR SHUTDOWN TEST
(% Gas by Volume)

Date:	August 30, 2021			
Weekly Probes	CH4	O2	CO2	Bal
CP1-3	0.0	12.0	7.0	81.0
CP1-11	0.0	7.4	13.1	79.5
GP-02 (for CP1b-1R)	0.0	8.9	12.6	78.5
TGP1b-A	0.0	15.8	3.9	80.3
TGP1b-C	0.0	14.1	7.0	78.9
GP-04	0.0	16.1	4.5	79.4
CP2-1	0.0	18.7	1.6	79.7
CP2-4R	0.0	14.5	6.1	79.4
CP2-5R	0.0	16.6	3.4	80.0
CP3-1RR	0.0	12.7	4.2	83.1
CP3-5R	0.0	19.4	1.0	79.6
CP3-9	0.0	18.5	1.8	79.7
CP3-13R	0.0	18.1	2.1	79.8
TGP-89	0.0	18.1	2.1	79.8

	August 30, 2021			
Weekly Probes	CH4	O2	CO2	Bal
CP4-1	1.3	0.6	16.1	82.0
CP4-6	0.0	14.1	5.2	80.7
TGP-76	0.0	5.8	10.1	84.1
TGP-68	0.0	15.3	4.1	80.6
TGP-53	0.0	12.1	4.2	83.7
TGP-75	0.0	14.5	6.0	79.5

Notes: (1) Sampling instrument used is a calibrated Landtec GEM 5000 or equivalent multi-gas meter;
(2) Balance gas (Bal) is assumed to be mostly nitrogen and is a calculated value, not measured.
(3) Additional Probes may be added as needed if CH4 > 5% is detected.

VALLEYCREST WEEKLY PROBE REPORT FOR SHUTDOWN TEST
(% Gas by Volume)

Date:	September 6, 2021			
Weekly Probes	CH4	O2	CO2	Bal
CP1-3	0.0	7.1	11.0	81.9
CP1-11	0.0	2.1	7.7	90.2
GP-02 (for CP1b-1R)	0.0	11.6	8.5	79.9
TGP1b-A	0.0	13.5	6.3	80.2
TGP1b-C	0.6	0.1	16.1	83.2
GP-04	0.0	16.3	4.4	79.3
CP2-1	0.0	19.3	1.2	79.5
CP2-4R	0.0	10.8	7.5	81.7
CP2-5R	0.0	16.0	4.1	79.9
CP3-1RR	0.0	13.7	3.7	82.6
CP3-5R	0.0	19.9	0.7	79.4
CP3-9	0.0	15.8	4.4	79.8
CP3-13R	0.0	18.3	2.2	79.5
TGP-89	0.0	17.5	2.7	79.8

	September 6, 2021			
Weekly Probes	CH4	O2	CO2	Bal
CP4-1	0.5	1.7	15.8	82.0
CP4-6	0.0	11.6	7.3	81.1
TGP-76	0.0	3.7	9.7	86.6
TGP-68	0.0	6.3	13.6	80.1
TGP-53	0.0	9.8	6.6	83.6
TGP-75	0.3	8.9	9.1	81.7

Notes: (1) Sampling instrument used is a calibrated Landtec GEM 5000 or equivalent multi-gas meter;
(2) Balance gas (Bal) is assumed to be mostly nitrogen and is a calculated value, not measured.
(3) Additional Probes may be added as needed if CH₄ > 5% is detected.

VALLEYCREST WEEKLY PROBE REPORT FOR SHUTDOWN TEST
(% Gas by Volume)

Date:	September 12, 2021			
Weekly Probes	CH4	O2	CO2	Bal
CP1-3	0.0	8.9	11.1	80.0
CP1-11	0.0	15.7	5.9	78.4
GP-02 (for CP1b-1R)	0.0	10.9	10.1	79.0
TGP1b-A	0.0	17.2	4.6	78.2
TGP1b-C	2.2	0.0	19.7	78.1
GP-04	0.0	18.1	3.8	78.1
CP2-1	0.0	20.1	0.1	79.8
CP2-4R	0.0	16.8	4.1	79.1
CP2-5R	0.0	16.8	4.2	79.0
CP3-1RR	0.8	12.3	15.4	71.5
CP3-5R	0.0	19.8	1.3	78.9
CP3-9	0.0	16.1	9.1	74.8
CP3-13R	0.0	19.5	1.7	78.8
TGP-89	0.0	16.4	4.3	79.3

	September 12, 2021			
Weekly Probes	CH4	O2	CO2	Bal
CP4-1	1.2	3.7	19.6	75.5
CP4-6	0.0	10.2	7.6	82.2
TGP-76	0.0	2.8	10.1	87.1
TGP-68	0.0	15.3	5.6	79.1
TGP-53	0.0	9.2	7.6	83.2
TGP-75	0.0	9.7	12.6	77.7

Notes: (1) Sampling instrument used is a calibrated Landtec GEM 5000 or equivalent multi-gas meter;
(2) Balance gas (Bal) is assumed to be mostly nitrogen and is a calculated value, not measured.
(3) Additional Probes may be added as needed if CH4 > 5% is detected.

VALLEYCREST WEEKLY PROBE REPORT FOR SHUTDOWN TEST
(% Gas by Volume)

Date:	September 20, 2021			
Weekly Probes	CH4	O2	CO2	Bal
CP1-3	0.0	11.5	9.1	79.4
CP1-11	0.0	13.6	7.1	79.3
GP-02 (for CP1b-1R)	0.0	11.0	10.6	78.4
TGP1b-A	0.0	16.7	4.2	79.1
TGP1b-C	0.0	3.1	17.1	79.8
GP-04	0.0	17.3	4.1	78.6
CP2-1	0.0	19.6	1.2	79.2
CP2-4R	0.0	17.3	3.5	79.2
CP2-5R	0.0	17.7	3.1	79.2
CP3-1RR	0.0	14.1	5.7	80.2
CP3-5R	0.0	19.4	1.0	79.6
CP3-9	0.0	17.3	3.5	79.2
CP3-13R	0.0	19.0	1.6	79.4
TGP-89	0.0	18.1	2.9	79.0

	September 20, 2021			
Weekly Probes	CH4	O2	CO2	Bal
CP4-1	0.0	8.8	10.9	80.3
CP4-6	0.0	14.3	6.0	79.7
TGP-76	0.0	3.3	10.6	86.1
TGP-68	0.0	16.8	4.8	78.4
TGP-53	0.0	10.9	7.4	81.7
TGP-75	0.0	13.6	8.7	77.7

Notes: (1) Sampling instrument used is a calibrated Landtec GEM 5000 or equivalent multi-gas meter;
(2) Balance gas (Bal) is assumed to be mostly nitrogen and is a calculated value, not measured.
(3) Additional Probes may be added as needed if CH₄ > 5% is detected.

VALLEYCREST WEEKLY PROBE REPORT FOR SHUTDOWN TEST
(% Gas by Volume)

Date:	September 27, 2021			
Weekly Probes	CH4	O2	CO2	Bal
CP1-3	0.0	9.9	10.0	80.1
CP1-11	0.0	16.4	5.5	78.1
GP-02 (for CP1b-1R)	0.0	14.5	8.1	77.4
TGP1b-A	0.0	17.1	4.0	78.9
TGP1b-C	3.7	2.4	19.9	74.0
GP-04	0.0	19.0	1.2	79.8
CP2-1	0.0	20.0	2.1	77.9
CP2-4R	0.0	18.4	3.8	77.8
CP2-5R	0.0	17.7	3.2	79.1
CP3-1RR	0.0	14.3	6.5	79.2
CP3-5R	0.0	20.4	0.9	78.7
CP3-9	0.0	16.0	4.6	79.4
CP3-13R	0.0	17.5	3.6	78.9
TGP-89	0.0	17.5	3.6	78.9

	September 27, 2021			
Weekly Probes	CH4	O2	CO2	Bal
CP4-1	0.1	3.3	13.5	83.1
CP4-6	0.0	11.3	8.2	80.5
TGP-76	0.0	3.1	9.6	87.3
TGP-68	0.0	15.7	4.8	79.5
TGP-53	0.0	8.6	7.5	83.9
TGP-75	0.0	14.9	7.7	77.4

Notes: (1) Sampling instrument used is a calibrated Landtec GEM 5000 or equivalent multi-gas meter;
(2) Balance gas (Bal) is assumed to be mostly nitrogen and is a calculated value, not measured.
(3) Additional Probes may be added as needed if CH₄ > 5% is detected.

VALLEYCREST WEEKLY PROBE REPORT FOR SHUTDOWN TEST
(% Gas by Volume)

Date:	October 4, 2021			
Weekly Probes	CH4	O2	CO2	Bal
CP1-3	0.0	10.0	9.8	80.2
CP1-11	0.0	14.4	6.7	78.9
GP-02 (for CP1b-1R)	0.0	13.7	8.8	77.5
TGP1b-A	0.0	18.0	3.6	78.4
TGP1b-C	1.8	0.0	20.7	77.5
GP-04	0.0	18.5	3.4	78.1
CP2-1	0.0	20.3	0.7	79.0
CP2-4R	0.0	18.3	3.4	78.3
CP2-5R	0.0	18.2	3.2	78.6
CP3-1RR	0.0	15.5	5.5	79.0
CP3-5R	0.0	19.9	1.3	78.8
CP3-9	0.0	17.7	3.6	78.7
CP3-13R	0.0	19.8	1.5	78.7
TGP-89	0.0	19.3	2.1	78.6

	October 4, 2021			
Weekly Probes	CH4	O2	CO2	Bal
CP4-1	0.0	8.7	11.0	80.3
CP4-6	0.0	13.9	6.5	79.6
TGP-76	0.0	3.1	10.6	86.3
TGP-68	0.0	15.9	5.1	79.0
TGP-53	0.0	10.3	0.7	89.0
TGP-75	0.0	15.2	7.1	77.7

Notes: (1) Sampling instrument used is a calibrated Landtec GEM 5000 or equivalent multi-gas meter;
(2) Balance gas (Bal) is assumed to be mostly nitrogen and is a calculated value, not measured.
(3) Additional Probes may be added as needed if CH₄ > 5% is detected.

VALLEYCREST WEEKLY PROBE REPORT FOR SHUTDOWN TEST
(% Gas by Volume)

Date:	October 10, 2021			
Weekly Probes	CH4	O2	CO2	Bal
CP1-3	0.0	10.3	9.6	80.1
CP1-11	0.0	14.4	9.6	76.0
GP-02 (for CP1b-1R)	0.0	14.3	8.4	77.3
TGP1b-A	0.0	17.6	3.2	79.2
TGP1b-C	1.8	1.6	18.1	78.5
GP-04	0.0	18.1	3.4	78.5
CP2-1	0.0	19.9	1.0	79.1
CP2-4R	0.0	18.3	2.8	78.9
CP2-5R	0.0	17.7	3.1	79.2
CP3-1RR	0.0	14.5	6.3	79.2
CP3-5R	0.0	19.4	1.3	79.3
CP3-9	0.0	17.1	3.4	79.5
CP3-13R	0.0	19.4	1.3	79.3
TGP-89	0.0	17.3	3.4	79.3

	October 10, 2021			
Weekly Probes	CH4	O2	CO2	Bal
CP4-1	0.0	4.9	12.7	82.4
CP4-6	0.0	13.4	6.5	80.1
TGP-76	0.0	3.5	10.4	86.1
TGP-68	0.0	14.6	5.9	79.5
TGP-53	0.0	9.9	7.9	82.2
TGP-75	0.0	15.3	6.4	78.3

Notes: (1) Sampling instrument used is a calibrated Landtec GEM 5000 or equivalent multi-gas meter;
(2) Balance gas (Bal) is assumed to be mostly nitrogen and is a calculated value, not measured.
(3) Additional Probes may be added as needed if CH₄ > 5% is detected.

VALLEYCREST WEEKLY PROBE REPORT FOR SHUTDOWN TEST
(% Gas by Volume)

Date:	October 15, 2021			
Weekly Probes	CH4	O2	CO2	Bal
CP1-3	0.0	9.7	10.3	80.0
CP1-11	0.0	14.5	6.4	79.1
GP-02 (for CP1b-1R)	0.0	15.1	7.3	77.6
TGP1b-A	0.0	18.0	3.1	78.9
TGP1b-C	0.0	1.7	18.3	80.0
GP-04	0.0	18.3	3.5	78.2
CP2-1	0.0	19.2	1.0	79.8
CP2-4R	0.0	18.3	2.7	79.0
CP2-5R	0.0	18.5	2.6	78.9
CP3-1RR	0.0	13.9	7.4	78.7
CP3-5R	0.0	19.3	1.7	79.0
CP3-9	0.0	17.7	3.4	78.9
CP3-13R	0.0	17.0	4.1	78.9
TGP-89	0.0	17.0	4.1	78.9

	October 15, 2021			
Weekly Probes	CH4	O2	CO2	Bal
CP4-1	0.0	5.8	12.5	81.7
CP4-6	0.0	11.0	8.8	80.2
TGP-76	0.0	3.7	11.1	85.2
TGP-68	0.0	15.9	6.9	77.2
TGP-53	0.0	10.1	8.3	81.6
TGP-75	0.0	15.7	6.3	78.0

Notes: (1) Sampling instrument used is a calibrated Landtec GEM 5000 or equivalent multi-gas meter;
(2) Balance gas (Bal) is assumed to be mostly nitrogen and is a calculated value, not measured.
(3) Additional Probes may be added as needed if CH4 > 5% is detected.

VALLEYCREST WEEKLY PROBE REPORT FOR SHUTDOWN TEST
(% Gas by Volume)

Date:	October 25, 2021			
Weekly Probes	CH4	O2	CO2	Bal
CP1-3	0.0	10.6	9.9	79.5
CP1-11	0.0	14.5	6.7	78.8
GP-02 (for CP1b-1R)	0.0	16.0	6.4	77.6
TGP1b-A	0.0	18.0	3.2	78.8
TGP1b-C	1.1	0.0	20.3	78.6
GP-04	0.0	18.6	3.4	78.0
CP2-1	0.0	20.2	1.1	78.7
CP2-4R	0.0	17.7	3.7	78.6
CP2-5R	0.0	17.5	3.1	79.4
CP3-1RR	0.0	16.2	5.9	77.9
CP3-5R	0.0	18.9	1.8	79.3
CP3-9	0.0	17.2	3.1	79.7
CP3-13R	0.0	19.5	1.6	78.9
TGP-89	0.0	16.7	4.3	79.0

Date:	October 25, 2021			
Weekly Probes	CH4	O2	CO2	Bal
CP4-1	0.0	4.6	13.5	81.9
CP4-6	0.0	12.3	7.8	79.9
TGP-76	0.0	5.2	11.1	83.7
TGP-68	0.0	15.9	4.2	79.9
TGP-53	0.0	10.6	8.2	81.2
TGP-75	0.0	16.5	5.9	77.6

Notes: (1) Sampling instrument used is a calibrated Landtec GEM 5000 or equivalent multi-gas meter;
(2) Balance gas (Bal) is assumed to be mostly nitrogen and is a calculated value, not measured.
(3) Additional Probes may be added as needed if CH4 > 5% is detected.

VALLEYCREST WEEKLY PROBE REPORT FOR SHUTDOWN TEST
(% Gas by Volume)

Date:	November 1, 2021			
Weekly Probes	CH4	O2	CO2	Bal
CP1-3	0.0	12.9	8.6	78.5
CP1-11	0.0	14.6	6.6	78.8
GP-02 (for CP1b-1R)	0.0	17.3	5.3	77.4
TGP1b-A	0.0	18.0	3.4	78.6
TGP1b-C	0.2	2.3	18.0	79.5
GP-04	0.0	19.8	2.5	77.7
CP2-1	0.0	20.3	0.5	79.2
CP2-4R	0.0	15.3	4.7	80.0
CP2-5R	0.0	17.7	3.5	78.8
CP3-1RR	0.0	19.4	2.7	77.9
CP3-5R	0.0	20.0	1.3	78.7
CP3-9	0.0	18.0	3.1	78.9
CP3-13R	0.0	20.3	1.3	78.4
TGP-89	0.0	19.2	2.2	78.6

Date:	November 1, 2021			
Weekly Probes	CH4	O2	CO2	Bal
CP4-1	0.0	11.1	9.5	79.4
CP4-6	0.0	14.7	6.2	79.1
TGP-76	0.0	5.1	10.4	84.5
TGP-68	0.0	18.8	3.8	77.4
TGP-53	0.0	11.2	7.4	81.4
TGP-75	0.0	15.8	5.7	78.5

Notes: (1) Sampling instrument used is a calibrated Landtec GEM 5000 or equivalent multi-gas meter;
(2) Balance gas (Bal) is assumed to be mostly nitrogen and is a calculated value, not measured.
(3) Additional Probes may be added as needed if CH₄ > 5% is detected.

VALLEYCREST WEEKLY PROBE REPORT FOR SHUTDOWN TEST
(% Gas by Volume)

Date:	November 8, 2021			
Weekly Probes	CH4	O2	CO2	Bal
CP1-3	0.0	11.7	8.2	80.1
CP1-11	0.0	14.6	6.6	78.8
GP-02 (for CP1b-1R)	0.0	17.6	4.0	78.4
TGP1b-A	0.0	17.4	2.9	79.7
TGP1b-C	2.1	1.2	20.0	76.7
GP-04	0.0	19.5	2.2	78.3
CP2-1	0.0	18.7	0.4	80.9
CP2-4R	0.0	18.3	3.4	78.3
CP2-5R	0.0	18.1	2.4	79.5
CP3-1RR	0.0	18.7	2.6	78.7
CP3-5R	0.0	20.3	0.8	78.9
CP3-9	0.0	16.7	3.3	80.0
CP3-13R	0.0	19.9	1.3	78.8
TGP-89	0.0	19.5	1.6	78.9

Date:	November 8, 2021			
Weekly Probes	CH4	O2	CO2	Bal
CP4-1	0.0	7.9	10.0	82.1
CP4-6	0.0	14.8	4.9	80.3
TGP-76	0.0	6.3	9.3	84.4
TGP-68	0.0	15.0	5.5	79.5
TGP-53	0.0	11.2	7.3	81.5
TGP-75	0.0	16.1	5.1	78.8

Notes: (1) Sampling instrument used is a calibrated Landtec GEM 5000 or equivalent multi-gas meter;
(2) Balance gas (Bal) is assumed to be mostly nitrogen and is a calculated value, not measured.
(3) Additional Probes may be added as needed if CH₄ > 5% is detected.

VALLEYCREST WEEKLY PROBE REPORT FOR SHUTDOWN TEST
(% Gas by Volume)

Date:	November 15, 2021			
Weekly Probes	CH4	O2	CO2	Bal
CP1-3	0.0	12.6	5.5	81.9
CP1-11	0.0	15.0	6.4	78.6
GP-02 (for CP1b-1R)	0.0	18.2	4.2	77.6
TGP1b-A	0.0	17.3	3.7	79.0
TGP1b-C	3.4	0.0	21.0	75.6
GP-04	0.0	20.0	2.2	77.8
CP2-1	0.0	20.7	0.4	78.9
CP2-4R	0.0	13.9	8.9	77.2
CP2-5R	0.0	17.6	2.8	79.6
CP3-1RR	0.0	19.3	3.0	77.7
CP3-5R	0.0	20.0	1.1	78.9
CP3-9	0.0	19.0	3.1	77.9
CP3-13R	0.0	20.2	1.4	78.4
TGP-89	0.0	19.2	2.5	78.3

Date:	November 15, 2021			
Weekly Probes	CH4	O2	CO2	Bal
CP4-1	0.0	10.1	10.2	79.7
CP4-6	0.0	10.4	9.7	79.9
TGP-76	0.0	7.3	9.4	83.3
TGP-68	0.0	16.3	5.7	78.0
TGP-53	0.0	11.2	7.8	81.0
TGP-75	0.0	14.8	6.1	79.1

Notes: (1) Sampling instrument used is a calibrated Landtec GEM 5000 or equivalent multi-gas meter;
(2) Balance gas (Bal) is assumed to be mostly nitrogen and is a calculated value, not measured.
(3) Additional Probes may be added as needed if CH₄ > 5% is detected.

VALLEYCREST WEEKLY PROBE REPORT FOR SHUTDOWN TEST
(% Gas by Volume)

Date:	November 21, 2021			
Weekly Probes	CH4	O2	CO2	Bal
CP1-3	0.0	7.1	12.8	80.1
CP1-11	0.0	14.1	6.7	79.2
GP-02 (for CP1b-1R)	0.0	17.4	4.5	78.1
TGP1b-A	0.0	17.2	3.2	79.6
TGP1b-C	4.4	1.0	20.1	74.5
GP-04	0.0	19.5	2.2	78.3
CP2-1	0.0	20.0	1.2	78.8
CP2-4R	0.0	17.0	5.1	77.9
CP2-5R	0.0	17.7	2.1	80.2
CP3-1RR	0.0	18.4	2.6	79.0
CP3-5R	0.0	19.8	0.8	79.4
CP3-9	0.0	18.2	2.8	79.0
CP3-13R	0.0	19.1	1.6	79.3
TGP-89	0.0	18.2	2.6	79.2

Date:	November 21, 2021			
Weekly Probes	CH4	O2	CO2	Bal
CP4-1	0.0	11.6	7.2	81.2
CP4-6	0.0	12.4	7.8	79.8
TGP-76	0.0	8.2	9.3	82.5
TGP-68	0.0	15.1	5.6	79.3
TGP-53	0.0	11.7	7.4	80.9
TGP-75	0.0	14.6	6.2	79.2

Notes: (1) Sampling instrument used is a calibrated Landtec GEM 5000 or equivalent multi-gas meter;
(2) Balance gas (Bal) is assumed to be mostly nitrogen and is a calculated value, not measured.
(3) Additional Probes may be added as needed if CH₄ > 5% is detected.

VALLEYCREST WEEKLY PROBE REPORT FOR SHUTDOWN TEST
(% Gas by Volume)

Date:	November 28 and 29, 2021			
Weekly Probes	CH4	O2	CO2	Bal
CP1-3	0.0	11.1	9.4	79.5
CP1-11	0.0	15.0	6.0	79.0
GP-02 (for CP1b-1R)	0.0	17.2	4.3	78.5
TGP1b-A	0.0	15.7	4.1	80.2
TGP1b-G	0.0	18.2	2.6	79.2
TGP1b-C	10.5	1.0	20.1	68.4
TGP1b-H	0.0	19.5	1.9	78.6
GP-04	0.0	19.7	1.9	78.4
CP2-1	0.0	20.4	0.3	79.3
CP2-4R	0.0	15.1	5.7	79.2
CP2-5R	0.0	16.9	3.2	79.9
CP3-1RR	0.0	18.7	3.0	78.3
CP3-5R	0.0	20.1	0.9	79.0
CP3-9	0.0	16.2	4.0	79.8
CP3-13R	0.0	19.4	1.7	78.9
TGP-89	0.0	17.5	3.3	79.2

Date:	November 28 and 29, 2021			
Weekly Probes	CH4	O2	CO2	Bal
CP4-1	0.0	5.0	12.7	82.3
CP4-6	0.0	12.2	7.6	80.2
TGP-76	0.0	7.6	8.0	84.4
TGP-68	0.0	12.8	6.9	80.3
TGP-53	0.0	17.1	4.0	78.9
TGP-75	0.0	13.0	7.1	79.9

Notes: (1) Sampling instrument used is a calibrated Landtec GEM 5000 or equivalent multi-gas meter;
(2) Balance gas (Bal) is assumed to be mostly nitrogen and is a calculated value, not measured.
(3) Additional Probes may be added as needed if CH4 > 5% is detected.

VALLEYCREST WEEKLY PROBE REPORT FOR SHUTDOWN TEST
(% Gas by Volume)

Date:	December 6, 2021			
Weekly Probes	CH4	O2	CO2	Bal
CP1-3	0.0	11.4	9.6	79.0
CP1-11	0.0	15.2	5.5	79.3
GP-02 (for CP1b-1R)	0.0	16.6	4.7	78.7
TGP1b-A	0.0	17.4	3.3	79.3
TGP1b-C	0.0	13.3	8.9	77.8
GP-04	0.0	19.2	2.2	78.6
CP2-1	0.0	20.8	0.2	79.0
CP2-4R	0.0	14.5	4.0	81.5
CP2-5R	0.0	18.0	2.9	79.1
CP3-1RR	0.0	20.0	1.9	78.1
CP3-5R	0.0	19.8	1.2	79.0
CP3-9	0.0	18.4	3.3	78.3
CP3-13R	0.0	18.9	1.6	79.5
TGP-89	0.0	19.7	1.8	78.5

Date:	December 6, 2021			
Weekly Probes	CH4	O2	CO2	Bal
CP4-1	0.0	7.7	11.2	81.1
CP4-6	0.0	12.1	8.1	79.8
TGP-76	0.0	8.3	8.0	83.7
TGP-68	0.0	15.7	4.7	79.6
TGP-53	0.0	13.5	6.6	79.9
TGP-75	0.0	13.6	7.7	78.7

Notes: (1) Sampling instrument used is a calibrated Landtec GEM 5000 or equivalent multi-gas meter;
(2) Balance gas (Bal) is assumed to be mostly nitrogen and is a calculated value, not measured.
(3) Additional Probes may be added as needed if CH₄ > 5% is detected.

VALLEYCREST WEEKLY PROBE REPORT FOR SHUTDOWN TEST
(% Gas by Volume)

Date:	December 13, 2021			
Weekly Probes	CH4	O2	CO2	Bal
CP1-3	0.0	4.9	12.1	83.0
CP1-11	0.0	14.9	5.3	79.8
GP-02 (for CP1b-1R)	0.0	16.6	4.4	79.0
TGP1b-A	0.0	17.0	3.2	79.8
TGP1b-G	0.0	19.6	1.3	79.1
TGP1b-C	0.0	14.8	7.2	78.0
TPG1b-H	0.0	19.9	1.2	78.9
GP-04	0.0	19.6	1.8	78.6
CP2-1	0.0	20.8	0.2	79.0
CP2-4R	0.0	19.7	2.4	77.9
CP2-5R	0.0	19.0	2.0	79.0
CP3-1RR	0.0	19.1	1.6	79.3
CP3-5R	0.0	20.5	0.7	78.8
CP3-9	0.0	16.4	3.9	79.7
CP3-13R	0.0	18.9	1.8	79.3
TGP-89	0.0	18.8	1.9	79.3

Date:	December 13, 2021			
Weekly Probes	CH4	O2	CO2	Bal
CP4-1	0.0	10.3	8.6	81.1
CP4-6	0.0	12.0	7.3	80.7
TGP-76	0.0	8.0	8.8	83.2
TGP-68	0.0	15.7	5.2	79.1
TGP-53	0.0	12.7	6.0	81.3
TGP-75	0.0	11.1	8.5	80.4

Notes: (1) Sampling instrument used is a calibrated Landtec GEM 5000 or equivalent multi-gas meter;
(2) Balance gas (Bal) is assumed to be mostly nitrogen and is a calculated value, not measured.
(3) Additional Probes may be added as needed if CH₄ > 5% is detected.