

GEI Consultants

Consulting
Engineers and
Scientists

Environmental Management Plan

Quantum Place South, First Energy Sage Substation

Quantum Loophole, Frederick Maryland

Submitted to:
Quantum Maryland, LLC
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Austin, Texas 78701

Submitted by:
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Project 2304769



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Transmittal

Quantum Maryland, LLC
500 E. 4th Street, Suite 333
Austin, Texas 78701

Attn: Mr. AD Robison

Re: Environmental Management Plan
First Energy Substation
Quantum Maryland, Inc.
Frederick County, Maryland

Dear Mr. Robison,

GEI Consultants, Inc. (GEI) has prepared this Environmental Management Plan (EMP) for utility construction work related to roadway and utility construction at the Quantum Maryland property (former Eastalco property) in Frederick Maryland.

This EMP relates to disturbance of soil and groundwater within the limits of the area of the Environmental Covenant (EC) during the construction of:

- The First Energy Electrical Substation including Low Mobility Grouting of karst geologic formations, sediment control, deep foundations for electrical equipment, a proposed gravel drive with access from Clean Energy Lane, and final site grading including stormwater drainage swales draining to pond DA-11.

Construction activities associated with the First Energy Electrical Substation (and the associated LOD) are located outside the SMA. Stormwater within the Substation LOD does drain to basin DA-11, which is to be constructed under EMP-2 and is located partially within the SMA. Details of the work, including the specific construction elements to be constructed under CHS oversight which are located within the EC, and those which are outside the EC are provided in the EMP.

We appreciate the continued opportunity to be of assistance on this project. Should you have any questions regarding this information, or should you require additional information, please contact the GEI office in Washington, D.C. at (202) 828-9510.

cc: Ms. Anuradha Mohanty / Maryland Department of the Environment Land and Materials Administration
Ms. Barbara Brown / MDE LMA
Ms. Kate Ansalvish / MDE Water and Science Administration

1. Introduction

1.1 Overview and Purpose

At the request of Quantum Maryland, LLC (QL), GEI Consultants, Inc. (GEI) has prepared this Environmental Management Plan #4 (EMP 4 or abbreviated in this document as EMP) for the following portion of the development infrastructure for the Former Alcoa Eastalco Works project (the "Site"). The construction area covered in this EMP 4 is:

- First Energy Electrical Substation (also referred to as the FE Substation or Sage Substation) – *Combined SWM Development and Improvement plan, Lot 112A Substation, PW#275268,* (submitted for Frederick County approval and awaiting approval of EMP-2 and this EMP-4).

The overall Eastalco property ("overall property") comprises over 2,200 acres. The central portion of the overall property formerly contained the Eastalco Aluminum Works. The remaining portions of the overall property were primarily used for agricultural purposes. An MDE-approved Environmental Covenant (EC) was recorded by the previous owner in 2017. The EC provides restrictions to the land use, including restrictions to residential use and groundwater use, and the associated Soil Management Plan (SMP) describes requirements associated with construction disturbances to soil and groundwater within the EC. Within the EC is a Soil Management Area (SMA), which includes the central former plant area, two closed/permitted industrial landfills, former waste disposal sites (WDS), and other areas containing constituents of potential concern (COPCs).

The specific work elements covered by this EMP are described below and include the construction of an electrical substation with low mobility grouting of the karst geologic features, deep and shallow foundations, installation of electrical equipment, and final site grading including stormwater management drainage swales connected to pond DA-11. Note that primary grading of the substation area and development of stormwater pond DA-11 are within the scope of the Quantum Place South (QPS) Improvement Plan and have been submitted for MDE CHS approval as part of EMP 2. The substation development has its own *Combined SWM Development and Improvement plan* referenced above which sits within the limit of disturbance (LOD) of the QPS development. In the same manner the horizontal limits of this EMP 4 lie within the limits of EMP 2. There are no proposed changes to the Improvement Plan or the associated LOD.

This EMP 4 applies only to specific identified work elements for construction of the First Energy Electrical substation which is located within the EC. A Site Location Map is presented as **Figure 1** and the work area is shown in **Figure 2**. **Figure 1** shows the

approximate boundary of the overall property and the Limits of Disturbance (LOD) for Sage Substation work. Due to the association with (building upon) the QPS work, **Figure 1** also shows the LODs for EMP 2 work elements including QPS, Sewer Line B, and East Water Line Improvement Plans as approved by Frederick County and associated with the MDE construction stormwater permits (20-CP and previous 14-GP) described in **Section 3.2**. Additional detail of the work area including an outline of the Substation EMP-4 Boundary in relation to the EMP-2 boundary is shown in **Figure 2**. **Figure 3** shows an enlarged view of the Substation LOD boundary (which is also the EMP-4 boundary) and identifies the specific areas and construction elements included in the improvement plan that is subject to this EMP-4. The entire First Energy Electrical Substation and its associated LOD is located within the EC area, while stormwater drains to basin DA-11 which is to be constructed under EMP-2 and is partially within the SMA (**Figure 3**).

In 2021, the QL team requested that the Maryland Department of the Environment (MDE) Land and Materials Administration (LMA) participate in the review of the environmental conditions of the overall property and the proposed remedies. The proposed remedies included additional evaluation of the Site prior to the installation of roadways, utilities, and sediment erosion control basins; capping; general soil screening and management during excavation; removal of waste (if encountered); and the use of appropriate health and safety measures during construction. An expedited Inculpable Person (IP) status was requested and was received by Quantum Maryland, LLC on June 22, 2021. On behalf of Quantum Maryland, LLC, Geo Technology Associates, Inc. (GTA), the environmental consultant for QL at the time, submitted an application to the MDE Voluntary Cleanup Program (VCP) for the overall property on September 28, 2021. On May 4, 2022, QL withdrew the site from the VCP and remedial oversight was engaged with the MDE Controlled Hazardous Substances (CHS) Enforcement Division. On September 26, 2023 Quantum Maryland further removed areas outside the EC from CHS oversight. Construction activities within the EC area and/or SMA remain subject to CHS oversight and require preparation and approval of an EMP.

As part of the ongoing CHS oversight agreement between the project team and MDE, this EMP was prepared to establish proposed management of soils and groundwater encountered during the planned installation of the First Energy Electrical Substation construction elements.

For the FE Electrical Substation proposed plans, the proposed activities include:

- Low mobility grout stabilization of the karst geologic formation under the foundation elements of the substation.
- Containerization of ground water from deep and shallow foundation elements in frac tanks for characterization and off-site disposal or use for on-site dust control (if supported by the laboratory analytical data collected and specifically authorized by MDE after review of data).

- Trenching, installation and backfill for deep and shallow foundations under the substation footprint.
- Final grading of the site with stockpiled material from the deep and shallow foundations, and low mobility grout drill spoils.

Additional activities required for the installation of this construction include:

- Soil screening and management/stockpiling during excavation;
- Stockpiling of excavated soil and testing of any excess soil which cannot be reused within the substation LOD (due to excess quantity, geotechnical qualities, etc);
- Off-site disposal of soil (or soil re-use as backfill only if supported by the laboratory analytical data collected, and specifically authorized by MDE after review of data);
- Removal of existing concrete or asphalt during trenching, and off-site disposal;
- Removal, containerization and testing of water from dewatering activities;
- Off-site disposal of water or use for on-site dust control if supported by the laboratory analytical data collected and specifically authorized by MDE after review of data;
- Import of an estimated 13,125 tons of quarry stone with clean fill certification;
- Import of soil from an on-site borrow area outside the EC after testing and approval by MDE (such import may be needed for rough grading under EMP-2 and is not anticipated after that point under the EMP-4 construction); and
- Use of appropriate health and safety measures during construction.

Once the EMP is approved, this construction effort will be performed as part of the ongoing CHS oversight.

2. BACKGROUND

2.1 First Energy Electrical Substation Site Description

The Site is located on a larger property ("overall property") that comprises over 2,200 acres and is located southeast of Ballenger Creek Pike, north and south of Manor Woods Road, west of New Design Road, northwest of Mountville Road, and north of Adamstown Road. The Site is being developed as a data center community, and near-term construction consists generally of construction of roads and utilities including water, sewer and cooling water.

The central portion of the overall property formerly contained the Eastalco Aluminum Works. The remaining portions of the overall property were primarily used for agricultural purposes. An MDE-approved Environmental Covenant (EC) was recorded by the previous owner in 2017. The EC provides restrictions to the land use, including restrictions to residential use and groundwater use, and the associated Soil Management Plan (SMP) describes requirements associated with construction disturbances to soil and groundwater within the EC. Within the EC is a Soil Management Area (SMA), which includes the central former plant area, two closed/permitted industrial landfills, former waste disposal sites (WDS), and other areas containing constituents of potential concern (COPCs). The Sage Substation will be within the EC, outside the SMA, although substation drainage will flow to basin DA-11 which will be constructed as part of EMP-2 and is located partially within the SMA.

This EMP applies only to specific identified work elements for construction of Frederick County approved Improvement Plans identified as the First Energy Electrical Substation which is located within the EC area. A Site Location Map is presented as **Figure 1** and the EMP boundary encompassing these work elements is shown in **Figure 2. Figure 1** shows the approximate boundary of the overall property and the Limit of Disturbance (LOD) for the First Energy Substation associated with the MDE construction stormwater permits (20-CP [applied for]) described in **Section 3.2**. Additional detail of the work area including an outline of the EMP-4 Boundary in relation to the EMP-2 boundary is shown in **Figure 2**. On **Figure 2**, the EMP-2 boundary is shown in orange and the EMP-4 boundary is shown in red. Figure 2 also shows a small a small "Aerial Work Area" outlined in green to the west of the substation LOD. This aerial work area is related to utility line work to feed the substation from existing aerial towers. There is no proposed soil disturbance or water management in this area and it is not included in the EMP-4 boundary. **Figure 3** shows the individual LOD for the electrical substation and identifies the specific area and construction elements included in the improvement plans that are subject to this EMP. The entire First Energy Electrical Substation is located within the EC area. **Figure 3** shows the portion of the SMA

boundary near the substation; the EC boundary is shown on **Figure 1** and **Figure 2** and does not show on **Figure 3** because the entire figure is inside the EC.

The specific work elements covered by this EMP are described below and include the construction of an electrical substation including low mobility grouting of the karst geologic features, deep and shallow foundations, installation of electrical equipment, final site grading including stormwater management drainage swales draining into DA-11.

All soil and water from within the electrical substation will be managed as "inside the EC" material. Soil/Rock and water generated will be staged on-Site in stockpiles and frac tanks respectively. **Figure 3** shows the location of frac tanks for water storage and the location of soil/rock stockpiles. Both of these are located inside the EC but outside the floodplain. The stored water and soil are subject to regulation under this EMP-4 as follows. These soil piles will be labelled (as to contents) and surrounded with silt fence. The LOD submitted to Frederick County SCD also includes this area.

Groundwater and any stormwater pumped from open construction elements (excavations) will be containerized and tested prior to disposal or reuse as dust control (all subject to results of the testing and MDE approval). A full description of soil and groundwater management procedures is located in **Section 6** and the water management/testing procedures in **Appendix G. Tables 4 through 7** provide the example EMP-4 Soil Stockpile Log, EMP-4 Tank Status Log, EMP-4 Tank Volume Log, and EMP-4 Tank Testing Log.

As shown on **Figure 2**, the south side of the First Energy Substation is near the SMA and the South Landfill, both within the EC boundary. The North Landfill is located within the SMA to the west of the substation LOD. The EMP-4 boundary is coincident with the LOD boundary and will be demarcated by silt fence. The SMA boundary will also be clearly marked in the field using segments of temporary/construction fence and temporary signage to ensure that workers/equipment performing construction work under this EMP do not unknowingly cross into the SMA.

2.2 Environmental Site History

The central portion of the overall property was historically developed as an aluminum smelting plant (Alcoa Eastalco Works) that was in operation from 1969 through 2005, with formal closure in March 2010. The plant was demolished between 2011 and 2016. Since 2005, the plant area has undergone extensive environmental evaluation and is currently subject to an EC and MDE-approved Site Management Plan (SMP). The former plant area is subject to the EC due to environmental impacts associated with the historic use of the Site.

The EC provides restrictions to the land use, including restrictions to residential use and groundwater use, and the associated Soil Management Plan (SMP) describes requirements

associated with construction disturbances to soil and groundwater within the EC. Within the EC is a Soil Management Area (SMA), which includes the central former plant area, two closed/permitted industrial landfills, former waste disposal sites (WDS), and other areas containing constituents of potential concern (COPCs). The boundaries of the EC and SMA are both depicted on **Figures 1 and 2**.

Historic plant operations resulted in impacts to groundwater, surface water, surface soils, and subsurface soils in the former plant area (now included within the entire EC area and a portion of the SMA). COPCs in the SMA primarily include fluoride in groundwater, cyanide in surface water, and polychlorinated biphenyls (PCBs) and polycyclic aromatic hydrocarbons (PAHs) in soils. Total chromium in surface and subsurface soil has also exceeded total chromium standards, (which are actually based on hexavalent chromium toxicity) and speciation for hexavalent chromium has generally not exceeded standards.

Prior sampling efforts have indicated that on-site lands surrounding the former plant area (within the EC boundary) have sustained limited impacts to soil by arsenic and several PAH compounds.

Land use is limited to restricted commercial (Tier 2B) and restricted industrial (Tier 3B) land uses.

- Groundwater use is prohibited.
- A Health and Safety Plan (HASP) must be prepared in accordance with the SMP and maintained on-site during site work.
- A HASP must also address areas where groundwater is proposed to be encountered.
- Water encountered in/removed from excavations within the EC area must be containerized and tested before disposal or reuse as dust control.

With regard to water management, page 3 of the EC states:

> "**Excavation Encountering Groundwater**: When conducting any excavation activities on the Property extending to the ground water table, the Property Owner shall implement the requirements of a site-specific health and safety plan in accordance with the Site Management Plan to ensure that worker protection measures are met. The encountered ground water shall be containerized during all dewatering activities at the property and shall be analyzed before disposal. The analytical results shall be the basis for appropriate disposition of the ground water in accordance with applicable local, State and federal laws and regulations."

In addition to the requirements of the EC, work conducted within the scope of this EMP (and all construction within the EC area) is subject to CHS oversight and as such, requires approval of the MDE CHS case manager.

Remaining areas of the Site and overall property (outside the EC) consist of agricultural land and former farming operations. Railroad tracks were previously located in the eastern portion of the overall property (these tracks also led into the EC and SMA) and were recently removed.

GTA performed sampling in accordance with a Phase II ESA Work Plan – Initial Infrastructure Phase, as approved by MDE on September 28, 2022. This sampling plan was performed specifically to evaluate the proposed utility and roadway corridors and utility abandonment areas. Sampling was conducted within the SMA, EC, and former agricultural areas of the Site outside the EC, and additional information concerning these sampling activities in the vicinity of the work area covered by this EMP is presented in **Section 4.2** and **Appendix A**. During this investigation one surface sample was collected from 0-1 foot depth at each sample location. Sub-surface evaluation then consisted of the collection and analysis of one composite sample from 1 foot through up to 20 feet depth. Fill material was observed in all samples collected from within the SMA, but no biased samples were collected to characterize the fill since the excavated soil from the utility corridors is generally intended to be returned to the excavation pits as backfill, with the excess to be managed as described in **Section 6.4**. Phase II data specific to the construction elements covered by this EMP are described in **Section 4** and **Appendix A**.

3. Future Land Use

The Site will require the construction/installation of low mobility grout, deep and shallow foundation elements, and electrical equipment to complete the development of the First Energy Electrical Substation. The proposed low mobility grout construction will consist of jet grouting from below the foundation elements bottom elevation throughout the footprint of the electrical substation. The deep foundation elements such as caissons of varying diameters will be drilled to design depths and filled with concrete. Shallow foundation elements will be excavated where necessary. On-site soils displaced by proposed deep and shallow foundations are anticipated to be reused as compacted fill on-site within the substation LOD and therefore will not require testing to remain within the same area. Any excess soils generated during low mobility grouting and foundation installation (excess based on quantity or geotechnical properties) will be stockpiled and tested prior to any off-site disposal.

For the construction activities located within the EC, excavated soils will be stockpiled and managed as specified in **Section 6**. Groundwater encountered in subsurface work will be managed in accordance with **Section 6.6** and **Appendix G**.

3.1 Construction of Electrical Substation

The First Energy electrical substation will be located in the central portion of the Site just north of the SMA and pond DA-11. A combination of deep and shallow foundations will be used to support the components of the electrical substation. The Improvement Plan has been submitted to Frederick County for approval and Frederick County is awaiting MDE review of this EMP-4 prior to IP approval. There are no proposed changes to the IP plans. The construction will be completed in three phases and the elements include the following:

Phase 1:

- Low Mobility Grouting
- Foundation Installation
- Substation Fencing Installation
- Construction of the Substation Phase 1 foundations and surface equipment
- Final site grading of the substation pad including drainage swales

Phases 2 and 3 consist of similar construction elements, with the exception of fencing installation which will be completed for the entire substation in Phase 1. Also, the low mobility grouting will continue across the substation area (Phases 2 and 3) as subsequent construction steps continue in Phase 1 (foundations and surface equipment installation). All of these elements are located within the EC and will require soil and groundwater management. Additionally, aerial work connecting the substation to the existing towers to the west of the substation will be required for the transmission and distribution lines (**Figure 2**).

This work does not involve subsurface disturbance, and is therefore not discussed further in this EMP.

3.2 Plans and Permits

Several permits have been submitted to various issuing authorities for aspects of the work subject to this EMP.

Documents planned to be submitted to Frederick County Maryland for permitting includes the following Site and Improvement Plans

- First Energy Substation Plan. *Combined SWM Development and Improvement plan, Lot 112A Substation, PW#275268,* (submitted for Frederick County approval and awaiting approval of EMP-2 and this EMP-4).

A copy of the submitted First Energy Electrical Substation Improvement Plan is provided in **Appendix C**.

QL and its prime contractor for QPS including substation pad construction (Structure Tone [STO]) have each submitted an NOI (notice of intent) for coverage under the General Permit for Discharges of Stormwater Associated with Construction Activity (Maryland General Permit No. 20-CP) and are awaiting processing by MDE WSA (anticipated to be in coordination with EMP-2 approval). The permit numbers associated with QPS/substation pad construction under Quantum Place South IPs PW #275128 are as follows:

Site Name	**14-GP Permit Number**	**20-CP Permit Number**	**Status**	**Applicant**
QPS	MDRCK06FO	MDRCK06FO	Conversion NOI submitted	QL
QPS	N/A	MDRCK07BH	New NOI submitted	STO

First Energy will separately submit an NOI for coverage under the General Permit 20-CP for its construction of the substation IP, *PW#275268* after County approval of that plan.

An application for Water Appropriation and Water Use for construction dewatering for the Pump Station was submitted on 10/17/2023 and based on discussion with MDE WSA, the WAP application was subsequently modified to incorporate phase 1 infrastructure including all dewatering elements described in this EMP. The Water Appropriation and Use Permit FR2023G001(01) was issued by WSA December 28, 2023 (effective December 29).

Wetlands: No impacts to wetlands are authorized at this time. Identified wetlands are shown on **Figure 2** and are not located within the EMP boundary.

Temporary and permanent impacts to the 100-year Floodplain have been authorized by 202260706/ 22-NT-3094 and 20226097/ 22-NT-3124, respectively for other elements of the overall site. The First Energy Electrical Substation is not located within the floodplain.

A small trapezoidal channel tributary to the unnamed tributary to Tuscarora Creek is located north and west of the substation LOD. This is the ultimate discharge location for Basin DA-11. There are no separate permitting requirements identified.

4. Recent Site Activities

4.1 Impacted Media Evaluations

GTA performed a Phase II ESA of the Site to provide project-specific data along utility and roadway alignments in order to determine the proper management of material that will be excavated during roadway installation and utility installation/abandonment. The Phase II ESA was also prepared in consideration of a Work Plan that was submitted to the MDE LMA for review and approval. The sampling locations and sampling parameters were determined on September 1, 2022. The Work Plan was approved with some alterations and additional sampling parameters on September 28, 2022. This section describes the Phase II ESA in general, followed by specific Phase II samples in the vicinity of the work subject to this EMP. **Section 4.2** further describes COPCs in soil and groundwater in the area subject to this EMP.

The Phase II ESA was conducted in September and August 2022 and consisted of sediment, surface water, groundwater, and soil sampling on the Site. Sediment samples were obtained from the north and south sides of the (former) rainwater pond 102 located in the proposed location of Sediment Basin DA-11. Surface water samples were obtained from three stream crossing locations and from the former rainwater pond 102 located in the location of Sediment Basin DA-11. Groundwater samples were collected from two temporary groundwater monitoring wells that were installed near proposed stream crossings; however, these were not in the vicinity of the area covered by this EMP. Soil samples were collected from 86 soil borings that were situated at approximate 300-foot intervals along the Site's roadway or utility alignments or within the Site's proposed sediment traps, sewage pumping station, and electrical sub-station. The approximate sample locations are depicted on **Figure 4**.

Section 4.3.1 describes the results of Phase II soil samples which are located closest to the areas subject to this EMP (samples SA4-E through SA4-N). The analytes that were requested for analysis for samples at these locations were either not detected above the laboratory reporting limits or the applicable comparison values. Please refer to the *Phase II Environmental Site Assessment, Initial Infrastructure Phase* (GTA, October 11, 2022) and *Phase II ESA Initial Infrastructure Phase Addendum* (GTA, November 2, 2022) for specific details regarding the Phase II ESA. Figure 4, Figure 8, and Table 2 of the Phase II ESA are reproduced in **Appendix A** of this EMP.

Section 6.3 describes additional soil and water sampling which has been proposed in conjunction with EMP-2. Those sampling plans will be implemented under their own respective approvals or as part of EMP-2. The plan relevant to this EMP-4 is the proposed

shallow soil sampling within the substation pad and Clean Energy Lane. During initial grading of the substation pad in May 2023, soil from the western portion of the substation pad was graded to the eastern portion, with some used as fill on Clean Energy Lane. Soil from the North Borrow Area (outside the EC to the North) was used as road construction fill on Quantum Place south, with visual indication that some of this redder soil is also present on the surface of the substation and Clean Energy Lane fill areas. Therefore, a sampling plan has been submitted to verify the material meets MDE fill guidelines.

4.2 Contaminants of Potential Concern

4.2.1 Soil

Prior evaluations, as summarized in the Environmental Background Summary of the SMP, indicated PAHs (including benzo(a)anthrancene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenz(a,h)anthrancene, and indeno(1,2,3-c,d)pyrene) and PCB (Aroclor 1016, Aroclor 1242, and Aroclor 1248) concentrations exceed the NRCS in portions of the SMA. Prior evaluations also indicated that arsenic concentrations exceed the NRCS and the Anticipated Typical Concentration (ATCs) values in the SMA. However, these prior evaluations indicated the detections of arsenic are considered naturally occurring and do not pose a risk. Additionally, GTA's 2022 Phase II ESA – Initial Infrastructure Phase, identified benzo(a)pyrene at concentrations that exceeded the NRCS in the SMA. See **Appendix A** for Phase II ESA – Initial Infrastructure Phase data tables. As such, PAHs, PCBs, and arsenic are considered COPCs in the SMA.

Outside the SMA, PAHs, PCBs, and arsenic are conservatively identified as COPCs in soil within EC areas; however, these COPCs were not detected above laboratory reporting limits and/or respective NRCS values outside the SMA at the locations sampled as part of GTA's 2022 Phase II ESA – Initial Infrastructure Phase. See **Appendix A** for Phase II ESA – Initial Infrastructure Phase data tables.

Areas Covered by this EMP

The work covered by this EMP-4 will be located within the EC, and no portion of that work will be in the SMA. As shown on **Figure 4** numerous samples were collected along the utility alignments of work elements covered by this EMP (specifically soil samples within the substation area).

PAHs were detected at sample locations within the future substation. PAHs detected were below applicable MDE NCRS values. The PAHs detected included 2-methylnaphthalene, acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h)Anthracene, fluoranthene, fluorene, indeno(1,2,3-c,d)pyrene, naphthalene, phenanthrene, and pyrene.

Metals were detected at all sample locations and included arsenic, beryllium, chromium, copper, lead, nickel, and zinc. With the exception of chromium, no metals were detected above MDE NRCS or the Anticipated Typical Concentrations (ATC) for soils in Eastern Maryland. Chromium (total) was detected in numerous samples above the 30 mg/kg ATC. These samples (and others referenced in this section) were not speciated for hexavalent chromium. However, as described in the Phase II Addendum, 7 samples with total chromium over 30 mg/kg from across the site were analyzed for hexavalent chromium and (per the Phase II Addendum) "Hexavalent chromium was not detected above the laboratory's reporting limits in the submitted samples. As such, it appears that the chromium detection was associated with the more benign trivalent chromium." The non-residential trivalent chromium standard is 150,000 mg/kg. Of the seven samples that were speciated for hexavalent chromium, five were collected within the area covered by EMP-2 and included samples from the future substation (EMP-4 area).

4.2.2 Surface Water

Prior evaluations, as summarized in the Environmental Background Summary of the SMP, indicated low-level detections of cyanide that slightly exceeded MDE's criteria for ambient surface waters of 0.0052 mg/L, set forth by an Administrative Consent Order between Eastalco Aluminum Company and the MDE. The USEPA maximum contaminant level (MCL) for cyanide is 0.2 mg/L and detections of cyanide in surface water at the site are orders of magnitude below that level. GTA's 2022 Phase II ESA – Initial Infrastructure Phase included surface water sampling in locations where utilities are proposed to cross surface waters and in the former rainwater pond 102 (now DA-11). Collected surface water samples did not identify cyanide concentrations above the USEPA MCL both within and outside of the SMA. See **Appendix A** for Phase II ESA – Initial Infrastructure Phase data tables. According to the SMP, "exposure by on-site workers and off-site receptors to surface water does not require mitigation." Conservatively, cyanide is considered a COPC in surface water at stream crossings and within the basins of the proposed development. Additionally, fluoride was detected in the sample collected from the former rainwater pond 102 location at 3.3 mg/L; however, this is below the USEPA MCL of 4.0 mg/L. None of the proposed construction work covered by this EMP is proposed to discharge water directly into surface water.

EMP-2 also presents and describes additional data from DA-11 collected by GTA (May 2023) which did exceed the fluoride standard and Tetra Tech (March 2024) which did not exceed the fluoride standard. These results are not re-reported here as DA-11 is outside the EMP-2 boundary and scope of work (although the substation will shed stormwater to DA-11).

4.2.3 Groundwater

Prior evaluations, as summarized in the Environmental Background Summary of the SMP, indicated that fluoride exceeded the USEPA MCL on portions of the Site, primarily within the SMA and EC.

Groundwater data in the vicinity of the areas covered by this EMP is available from several sources including current and historic sample results from the North and South Landfill monitoring programs (Tetra Tech 1988, 2005, 2022, 2023), and from supplemental groundwater sampling at the basins conducted by GTA (**Appendix B1**).

The existing monitoring well network is generally located on the western and southern portions of the Site. Below is a table of current wells which are located near or within the area covered by this EMP, as well as a summary of the most recent analytical data (Tetra Tech, 2022/2023):

Well ID	Location	Fluoride (mg/L) (2022/2023)	Metals (2022)
MW-4	Near DA-11	2.4/2.6	NA
MW-45		**26/24**	NA
MW-56		NA/NA	NA
MW-103		3.9/3.8	NA
MW-74	Near Substation Pad	0.69/NA	<MCLs
MW-75		0.15/NA	<MCLs

Data presented in mg/L
Bolded results are above the fluoride MCL of 4.0 mg/L

Fluoride was detected above the applicable MCL at one location, south of DA-11. Additionally, GTA conducted supplemental sampling for fluoride at DA-11 and DA-2 on May 23, 2023 (**Appendix B2**). EMP-GW2, collected from DA-11, had a fluoride concentration of 5.6 mg/L which is slightly higher than the MCL of 4.0 mg/L. The concentration at DA-2 (sample EMP-GW3) was 0.36 mg/L which is well below the MCL. It is anticipated that groundwater will be encountered during these construction activities.

As shown on **Figure 5**, eight additional abandoned monitoring wells (MWs 34, 37, 38, 43, 46, and 97) were formerly located south of the proposed substation. These wells were last sampled in 2005 and then abandoned in 2017 because groundwater concentrations for the parameters listed above were routinely non-detect or below standards. A table with the historic data is included in **Appendix B3**.

The landfill monitoring network is no longer sampled for VOCs. VOC data was collected in selected wells (shown on **Appendix B4**) between 1988 and 2016. A table of the most recent VOC data from the current and abandoned wells is provided in **Appendix B4**. When tested, VOCs were either non-detect or were detected at levels below applicable MCLs.

Groundwater samples were also collected near the portion of the site subject to this EMP by a potential purchaser as part of due diligence under a workplan approved by MDE. QL has not received a report documenting the results of that work. However, there was one groundwater result in excess of the MDE groundwater standard for TPH, which was reportable (and reported) under MDE rules. Therefore, TPH is added to the COPC's in **Table 1** below.

4.3 Exposure Pathway Evaluation

Based on the Phase II ESA performed on the initial infrastructure phase of construction and the existing SMP, potential environmental exposure risks to future occupants and construction workers may exist at the Site. However, with institutional controls and the EC itself serving as deed notice and prohibiting use of groundwater, there is not a complete exposure pathway after construction activities.

Specific to this EMP and the construction elements covered, potential soil exposure is described in **Section 4.3.1** and exposure to groundwater is described in **Section 4.3.2**.

The identified exposure pathways, potentially exposed populations, and COPCs are summarized in **Table 1** below.

Table 1: Potential Exposure Pathways

Media	Potential Exposed Population	Exposure Pathway	COPCs
Soil (SMA, Explicitly) EC Soils are assumed to have the potential to provide the same pathways	Adult On-Site Construction Worker Child Visitor Youth Visitor Adult Visitor Adult On-Site Worker	Dermal Exposure Incidental Ingestion Inhalation of Volatiles/TPH constituents and Fugitive Dust	PAHs (benzo(a)anthrancene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenz(a,h)anthrancene, and indeno(1,2,3-c,d)pyrene), PCBs (Aroclor 1016, Aroclor 1242, and Aroclor 1248), Arsenic, and TPH
Groundwater	Adult On-Site Construction Worker	Dermal Exposure Incidental Ingestion	Fluoride
Surface Water	Adult On-Site Construction Worker	Dermal Exposure Incidental Ingestion	Cyanide

4.3.1 Direct Contact to Soil Contamination

There is a potential for site construction workers to come into contact with the COPCs during grading activities, drilling of caissons for deep foundations, excavating soil for shallow foundations, excavation of soil and rock, and management of soil stockpiles including loading for disposal. Some of the site soil COPCs listed above (such as PCBs) are related to specific areas of the site and within the SMA. With the exception of benzo(a)pyrene which was detected in one sample near the former Sewer Line B route at concentrations that exceeded the NRCS, soil COPCs were not detected above standards in the Phase II soil samples along the specific alignments of roadways and utilities covered by this EMP (**Section 4.2**). However, for planning and safety purposes, the listed site soil COPCs are addressed in the HASP.

This contact will be limited by implementing a site-specific HASP. Future capping within the SMA will eliminate the direct contact exposure risk to construction worker and future adult, youth, and child populations. The substation work in EMP-4 is not within the SMA and does not require a cap. However, most of the substation as designed will incorporate a gravel surface and security fence, both further limiting contact. The proposed remedies for the soil contamination (HASP) are protective of human health because they are designed to prevent exposure to contamination.

4.3.2 Exposure to Groundwater Contamination

Groundwater has generally been identified at elevations at the site ranging from 5 to 25 feet below ground surface (bgs), with some apparent perched water conditions present on portions of the Site. Groundwater at the site is not currently used for any purpose, and the EC prevents its use within the area encumbered by the EC. The groundwater at the Site will be prohibited from being used for any purpose via restrictions recorded in the property deeds for areas within the EC and SMA. There is a potential for site construction workers to come into contact with groundwater from within the area encumbered by the EC during the construction activities covered by this EMP.

Construction worker contact with groundwater will be limited by implementing typical construction practices to keep ground water in the deep foundation elements, as well as water management actions including containerizing the groundwater for testing and proper disposal.

Based on the dewatering estimates conducted as part of the water appropriation permit application and subsequent foundation design (see **Appendix E**), the estimated water generation rate at the First Energy Electrical Substation is an average of 6,893 gallons per day (GPD). The dewatering at the electrical substation pad is expected to take 50 days for a

total of up to 344,667 gallons. The area of dewatering associated with the electrical substation is located within the EC.

Dewatered groundwater will be containerized and tested before it is discharged reused for dust control or disposed of at a facility (based on testing results) in accordance with the procedures described in **Section 6.6** and **Appendix G**.

The site-specific HASP will address worker contact with the groundwater.

4.3.3 Inhalation of Fugitive Dust

During construction activities, it is possible for soil impacted by COPCs to become airborne. There is a potential for site construction workers to breathe this fugitive dust. The inhalation of fugitive dust will be limited by implementing the site-specific HASP and construction practices that prevent dust generation (e.g., implementation of dust control methodologies), as well as air monitoring for dust concentrations to assure no hazardous exposure can occur for workers. Details of this monitoring is provided in **Section 6.2.1**.

The proposed remedy for inhalation of fugitive dust is protective of human health as exposure to contamination above regulatory limits will be prevented.

5. Cleanup Criteria

The cleanup criteria for the Site are summarized in the table below. The cleanup criteria for the Site soil COPCs generally reflect the MDE NRCS values, which are the generic risk-based guidance values in MDE's Cleanup Standards for Soil and Groundwater; October 2018; Interim Final Guidance (Update No. 3). MDE cleanup standards are derived from USEPA Region III Reginal Screening Levels (RSLs), which assume a 1E-6 cancer risk; generally speaking, MDE modifies these values to reflect a 1E-5 cancer risk in the NRCS values. The cleanup criteria for fluoride and cyanide are derived from the USEPA National Primary Drinking Water Regulations (NPWDR); May 2009.

Table 2: Cleanup Criteria

Media	COPC	Cleanup Criteria	Basis
Soil	Benzo(a)anthracene	21 mg/kg	NRCS
	Benzo(a)pyrene	2.1 mg/kg	NRCS
	Benzo(b)fluoranthene	21 mg/kg	NRCS
	Benzo(k)fluoranthene	210 mg/kg	NRCS
	Dibenz(a,h)anthrancene	2.1 mg/kg	NRCS
	Ideno(1,2,3-c,d)pyrene	21 mg/kg	NRCS
	Aroclor 1016	5.1 mg/kg	NRCS
	Aroclor 1242	0.95 mg/kg	NRCS
	Aroclor 1248	0.95 mg/kg	NRCS
	Arsenic	26.8 mg/kg	RCV
Groundwater	Fluoride	4.0 mg/L	NPWDR
Surface Water	Cyanide	0.2 mg/L	NPWDR

Notes:
Arsenic is proposed to be compared to the MDE risk-based comparison value (RCV) of 26.8 mg/kg for commercial properties.
Cyanide value listed above is based on NPWDR (human health). MDE's ambient surface water criteria for cyanide in fresh water (aquatic life, chronic) based on (COMAR 26.08.02.03-2) is 0.0052 mg/l.

If other COPCs are identified, the cleanup criteria will be re-evaluated. Generally, the cleanup criteria that will be applied to any additional COPCs will be the published MDE NRCS values, or site-specific values calculated using the appropriate frequency exposure parameters, as the need arises.

6. Remedies and Institutional Controls

This EMP-4 presents proposed actions to protect against exposure to potentially contaminated soil and groundwater in conjunction with construction and improvement on the Site. Potentially complete exposure pathways have been identified between contaminated soil and groundwater and construction worker and future on-site worker and visitor populations at the Site. These potential exposure pathways will be eliminated through implementation of a site-specific HASP by FE and its contractors, construction observation for health and safety measures, proper management of impacted materials encountered during construction activities, and engineering and land use controls (deed restrictions on use of groundwater in the EC).

The HASP presented in **Appendix F** primarily addresses construction safety. First Energy and each subcontractor will submit a HASP addressing COPCs and requirements of the EC and SMP at the time of submittal of their EMP Certification per **Section 8.2** of this EMP.

During implementation of the work under this EMP there will be an environmental professional familiar with the authorized scope of work on-site during working hours. Typically, there are two - an employee of GEI Consultants, Inc. under contract to STO and an employee of Tetra Tech under contract directly to QL. These inspectors are responsible to be familiar with approved environmental plans and scopes of work (including this EMP) and have the authority to stop work if necessary or otherwise direct concerns to appropriate client or contractor personnel.

Specific elements which will be observed and documented by the environmental professional or delegates include:

- Daily beginning of each work element (to verify equipment/work areas), including site prep, first LMG drilling, first excavation;
- Start and completion daily of any water movement (log source, destination, label the tank, and once moved the amount);
- Start, periodically during work and at completion of any soil movement daily for work area prep, LMG drilling, excavation, backfill (log source, destination, and quantity). If an import, document quarry fill cert or reference to MDE approval;
- As needed to verify continued EMP compliance and document daily water/soil/fill volumes for items which continue more than one day; and
- All environmental samples collected (water sampled for disposal or dust control, soil sampled for disposal or reuse).

In addition, the EMP will be distributed to and signed by representatives of FE (the entity responsible for substation construction) and its construction subcontractors, QL (site owner), STO (responsible for overall site access control), and the GEI and Tetra Tech representatives (see **Section 8.2**).

6.1 Site Security

The SMA portions of the Site are currently secured with fencing to prevent trespassing during non-working hours. Excavations in the SMA resulting from redevelopment work must be secured with perimeter fencing if they are to be left open for more than one workday. The existing fence is proposed to remain in place. Breaches to the fence required by construction activities must be re-secured at the close of each workday. The proposed EMP-4 substation construction will not impact the SMA fence. However, additional security fencing will be constructed around the substation (outside the SMA and not required per the SMP).

6.2 Health and Safety Measures

A site-specific construction safety HASP has been produced by First Energy and is included in **Appendix F.** FE and each subcontractor will submit its construction and environmental safety HASP at the time of signing the EMP Certification.

The primary action taken to mitigate potential exposures to construction workers will be the avoidance of direct contact with potentially impacted soil and groundwater, and the appropriate use of personal protective equipment (PPE) during construction activities. Any subcontractors working for First Energy will also produce a HASP that provides the administrative and engineering controls and PPE that will be used to confirm workers are protected.

HASPs will be provided by the contractors covering the work of that company's workers involved in construction activities potentially encountering impacted media, for their information. The contractors should independently assess the available information and implement appropriate measures to protect the health and safety of their employees and subcontractors. Information and recommendations contained in First Energy's HASP should not in any way be construed as relieving its subcontractors of their responsibilities for site health and safety.

6.2.1 Dust Control

The potential for worker exposure to site contaminants is primarily via direct contact, ingestion, or inhalation of nuisance dust. The primary action taken to mitigate potential exposures to construction workers will be the avoidance of direct contact with potentially

impacted soil and the appropriate use of standard construction site personal protective equipment (work gloves, safety glasses, etc.) during construction activities.

Using the maximum detected on-site concentrations of COPCs in soil, the OSHA Permissible Exposure Limits (PELs) for the individual COPCs could only be exceeded if the nuisance dust PEL is exceeded by several to many orders of magnitude. Therefore, airborne dust will be used as a real-time surrogate to prevent potential exposure to contaminant; with nuisance dust controlled to below the worker protection limits, construction workers are protected from COPCs.

Accordingly, the nuisance dust PEL of 15 mg/m^3 can be used as a conservative guideline for air monitoring. The nuisance dust concentration of 15 mg/m^3 can be visually identified without active dust monitoring equipment. If airborne dust is visually observed during activities involving known or potentially contaminated soils, dust suppression measures (e.g., wetting, misting, etc.) will be implemented. If such efforts do not effectively suppress visible dust, then dust monitoring will be initiated to confirm nuisance dust does not exceed the OSHA PEL of 15 mg/m^3. The nuisance dust PEL of 15 mg/m^3 will be used as a stop work action level, and earthwork will cease until dust is no longer visible and dust concentrations are below the 15 mg/m^3 stop work action level.

Visual indications of dust will be observed and recorded, and dust suppression activities will be implemented during earth moving activities at the Site.

A water truck is routinely present on-site during construction activities and available for use. Hydroseed equipment can also be used to spray water as a backup or where more appropriate to reach a particular area. Potable water is used for dust control.

Where water collected through site dewatering (after containerization and testing) meets parameters suitable for on-site dust control following the procedures described in **Appendix G**, FE may request MDE approval of use of such water for dust control as an alternate to potable water.

6.2.2 Volatile Organic Vapors

This work elements described within this EMP are located within the EC area as well as within the SMA, which represents the area of the site with the greatest extent of industrial activity and a known source of historic VOC contamination. Although VOC remediation of groundwater was conducted, recent due diligence sampling by a prospective purchaser has also shown presence of VOCs and TPH in groundwater. If organic odors are detected in borings or excavations during the work, FE will stop work, notify MDE, and will direct an investigation of the presumed impacts. This EMP will be amended to describe the risks present and protections to enact if this situation occurs.

6.3 Additional Proposed Sampling

Additional soil sampling of areas covered by this EMP will be conducted to determine soil re-use or disposal specifics. Below is a list of sampling plans that have been previously submitted. The various sampling plans include evaluation of existing stockpiles to determine potential future uses, evaluation of fill previously placed in the QPS and Clean Energy Lane roadways and substation pad, and other soil and water evaluations described below.

- North Borrow Area 1A – This sampling plan for an expansion of the North Borrow Area was prepared by Tetra Tech. The additional material will be used as fill in completion of QPS, Clean Energy Lane, and the substation pad if the material meets MDE fill guidelines (after approval by MDE). North Borrow Area 1A work Plan-Rev 2 (March 15, 2024) was approved by MDE March 19, 2024. Samples were collected April 5, 2024 and results are awaited from the laboratory.

- Substation and Clean Energy Lane – Tetra Tech has prepared this sampling plan for the substation and Clean Energy Lane because soil from the North Borrow was used as a veneer of fill in these areas without prior sampling. The plan was originally submitted to MDE in January 2024. Tetra Tech preemptively revised this work plan to conform to recent MDE guidance on the other now-approved work plans and submitted a revised plan April 16, 2024. Sampling is to confirm that the material meets MDE fill guidelines.

Sampling of excess soils generated during construction will at a minimum meet the requirements of a potential disposal facility. If observed soil quality (lack of visible contamination/waste/debris) and/or disposal sample results suggest the material may be considered for reuse, QL may elect to sample the material in accordance with the MDE Fill Material and Soil Management in Maryland fact sheet and related regulation. If sampled soils meet criteria for Category 1 – Residential Unrestricted Use Soil and Fill Material or Category 2 – Non-Residential Restricted Use Soil and Fill Material, QL may request authorization for reuse of the material as site backfill, capping materials or other use.

6.4 Construction-Related Soil Management

Soils excavated within the EC area are subject to the requirements spelled out in the recorded EC and MDE-approved SMP. Construction activities associated with the First Energy Electrical Substation are located outside the SMA. Basin DA-11 is partially located within the SMA.

To the extent practicable, soils excavated from the low mobility grouting, the deep foundation elements, and shallow foundation elements will be placed on the ground surface for final grading. However, due to the volume of soil displaced by the deep foundation elements or removal of geotechnically unsuitable materials (organic topsoil, rock) excess

material must be managed in most areas. Stockpiles will be labeled with information regarding their source/contents (such as Stockpile SS-1 – Substation foundation excavations/EC soil).

Figure 3 provides temporary stockpile locations in the northwest corner of the LOD for soils managed during construction of the Electrical Substation Plan. Stockpile locations shown on this figure are temporary locations during construction. Materials not needed for (or not geotechnically acceptable for) site grading at the point of generation, will be disposed off-site.

Excess EC soils excavated or moved from Electrical Substation will be stockpiled within the EC in areas depicted in the Soil Movement Plans in **Figure 3**. Excess soils not directly re-used as backfill where generated will be stockpiled and sampled for chemical and geotechnical testing to determine the suitability of the soil to be used as fill.

Most excess soil generated on-site is intended to remain on-site. Materials which are intended to be disposed off-site include asphalt or any grossly contaminated (visual or odor) soils (however any such materials would be encountered and managed in the rough site grading under EMP-2 and will not be present at the start of EMP-4 construction). For materials slated for disposal, soil sampling will at a minimum meet the requirements of the selected disposal facility. If observed soil quality (lack of visible contamination/waste/debris) and/or disposal sample results suggest the material may be considered for reuse, QL may elect to sample the material in accordance with the MDE Fill Material and Soil Management in Maryland fact sheet and related regulation. If sampled soils meet criteria for Category 1 – Residential Unrestricted Use Soil and Fill Material or Category 2 – Non-Residential Restricted Use Soil and Fill Material, QL may request authorization for use of the material as backfill.

All excess materials intended to remain on-site (if not directly reused as backfill where generated) will also be tested per the Fill Material guidance listed above, with the results submitted to and approved by MDE prior to movement to the final location. Depending on the results, material will be classified as Category 1 or Category 2 fill available for construction use or cap construction, or soils subject to further review based on COPCs detected.

If field observations, field screening, unusual odors, odd coloration, or other factors indicate environmental impacts in significant quantities, the suspect impacted soils will be segregated from non-impacted soils so that additional characterization can be performed. This soil will be placed on and covered with plastic sheeting. Soil samples will be collected from the suspect impacted materials to evaluate whether it should be classified as regulated and requiring off-site disposal.

Impacted soils/waste (as determined by sampling results) may be disposed at an appropriate disposal facility. The potential disposal facilities will be contacted to establish the necessary sampling and analysis requirements. The likely facilities for disposal of soil include:

Soil Safe, Inc. (Soil Safe)	or	Clean Earth Inc. (Clean Earth)
16001 Mattawoman Drive		1469 Oak Ridge Place
Brandywine, Maryland 20613-3027		Hagerstown, Maryland 21740
(301) 782-3036		(215) 734-1400

Additionally, completion of basin DA-2 and utilities which cross roadways may require removal of existing asphalt paving. This material will be disposed of at the following facility:

F.O Day Asphalt Plant – Recycling Area
4118 Buckeystown Pike
Frederick, MD 21704

6.5 Clean Fill Materials

Materials such as open-graded aggregate to be used within the construction (such as road base, utility bedding, or basin liner ballast will be documented to be clean, either through certification from the supplier (for quarry stone) or by testing and approval by MDE prior to use. Additionally, clean structural fill will be obtained from the North Borrow Area (subject to testing and approval by MDE in accordance with MDE clean fill guidelines). An eastern expansion of the North Borrow Area will be sampled in-situ to determine suitability as fill as described in **Section 6.3**. Fill from that area may be imported subject to CHS approval for the rough grading of the substation under EMP-2. Fill import under this EMP-4 is anticipated to be clean quarry stone only, and a clean fill certification will be obtained by FE or its contractors.

6.6 Groundwater Management

6.6.1 Source, Quantity and General Description

A groundwater use restriction is recorded in the property deeds by way of the existing EC. As such, the use of public water utilities is planned. It is anticipated that groundwater will be encountered during construction the Electrical Substation. **Appendix E** includes a memorandum presenting the Electrical Substation Seepage Analysis with deep and shallow foundation elements.

Based on the groundwater seepage analysis conducted in conjunction with the foundation design (see table in **Appendix E**), the estimated water generation rate at the substation pad is up to 344,667 gallons over the course of drilling 88 shallow shafts and 49 deep shafts. The

substation foundation construction is estimated to take approximately 50 days requiring of dewatering at for the foundation elements.

The following sections describe 1) the water management requirements of the EC, 2) quantities and locations of groundwater anticipated, 3) details of construction methods, and 4) disposition of water.

Water Management Requirements of the EC

With regard to water management, page 3 of the EC states:

> ”Excavation Encountering Groundwater: When conducting any excavation activities on the Property extending to the ground water table, the Property Owner shall implement the requirements of a site-specific health and safety plan in accordance with the Site Management Plan to ensure that worker protection measures are met. The encountered ground water shall be containerized during all dewatering activities at the property and shall be analyzed before disposal. The analytical results shall be the basis for appropriate disposition of the ground water in accordance with applicable local, State and federal laws and regulations.

Since the areas of work covered by this EMP are within or abut/cross into the EC and site construction workers may come in contact with groundwater during the work, contractors are required to assure appropriate health and safety precautions presented in the contractors' HASPs are followed.

All water collected will be containerized and tested prior to disposition which may include off-site disposal or on-site dust control. Water will either be determined through testing to be appropriate for on-site dust control or will be disposed at a commercial off-site facility. The specific water and sediment sampling and management procedures to be followed are described after this introductory section. Quantities and Locations of Groundwater Anticipated

Water is expected to be managed at the following locations:

- Caisson boreholes at the substation pad during deep foundation installation;
- Groundwater encountered during trenching of shallow foundation elements.

The groundwater volume estimates presented in the **Appendix E** seepage analysis serve as part of the application basis for the MDE Water Appropriation and Use Authorization (issued December 2023).

Details of Construction Methods

Low Mobility Grouting

The electrical substation site is underlain by the Frederick Formation with karst features. Low mobility grouting is needed to lower the permeability of the fractured limestone and karst features within the footprint of the foundation system of the substation equipment and the barrier fence to be installed around the perimeter of the substation. Grouting withing the foundation system will significantly limit the amount of seepage into the caissons during drilling.

Deep Foundation Elements

The deep foundation elements need to be dewatered in order to complete the steel reinforcement and concrete placement. Water will be pumped out of the caissons prior to concrete placement. All water pumped out of the caissons will be containerized as described below.

Shallow Foundation Elements

The trenches for the shallow foundations may require some dewatering to place steel reinforcement and concrete. Water will be pumped from a small sump area at either end or the center of the shallow foundation trench. All water pumped from the shallow foundation trenches will be containerized as described below.

Disposition of Water

The water extracted during construction activities covered by this EMP at will be containerized and tested for COPCs to assure proper handling and disposal. Frac tanks will be staged within the substation LOD where shown on **Figure 3**, and therefore outside the floodplain.

All tanks will be labelled as to their contents (e.g. EC water from QPS), frac tank unique number, position as described in the **Appendix G** Process Flow Diagram (e.g. Frac Tank #1 Separator Tank" or "Frac Tank 3 Secondary Tank") and status (e.g. Empty, Filling, Full Awaiting Approval, Approved for Dust Control, Approved for Disposal, Empty/Hold for Reuse Approval). Any tank containing any EC area water will be so labelled. The status of each tank will be recorded on an EMP-4 Tank Status Log following the example in **Table 5**.

Water will either be determined through testing to be appropriate for on-site dust control or will be disposed at a commercial off-site facility. The specific water and sediment sampling and management procedures to be followed are described after this introductory section. When results are received from the laboratory, they will be provided to the disposal facility

(if slated for disposal) for waste acceptance approval and will be sent to MDE for information.

For any water not suitable for in-site reuse or discharge, potential disposal facilities will be contacted to establish the necessary sampling and analysis requirements. Water recently collected from manhole MH-4 (groundwater seepage into a partially constructed sewer line) was tested and shipped to Valicor Environmental Services under contract to Capitol Environmental Services, Inc. Some water from Pump Station construction (outside the EC) has been shipped to VLS Recovery Services, Baltimore MD. Water with a heavier sediment load has been transported to VLS in Lancaster PA. It is anticipated that any water not approved for on-site dust control will go to the same facilities.:

Valicor Environmental Services
17551 Power House Road
Williamsport, MD 21795
(410) 463-7662

Capitol Environmental Services, Inc.
PO Box 37143
Baltimore, MD 21297-3143
Attn: Ben Sisti
(732) 672-9476

VLS Recovery Services
3300 Childs St, Baltimore, MD 21226
(833) 342-5372

6.6.2 Specific Testing/Management Procedures

All water generated during the work (collected stormwater, groundwater, seepage water, and grout/cement contact water) is intended to be pumped via temporary surface lines (or trucked as needed) to a commercial rental solids separator tank (Separator Tank #1). From there, water will be pumped to the first of several 20,000-gallon frac tanks staged adjacent to the separator. The tank in the separator "Tank #1" position is intended to accumulate sediment. Water from "Tank #1" will then be decanted to subsequent frac tanks #2 (or 3, 4, etc) to be held for testing and MDE approval prior to use for dust control or off-site disposal.

The procedure outlined below and in **Appendix G** is intended to demonstrate that containerized water is clean and appropriate for MDE approval for use as dust control. Should FE decide for project efficiency (such as to reduce time, cost, or complexity) that water will be shipped off-site for disposal, any such water is subject to testing for fluoride,

pH and any requirements of the disposal facility on a one-time basis rather than performing the testing in paragraph 3 below on a once-per-tank basis.

A detailed water Process Flow Diagram and associated notes regarding water and sediment management, neutralization (if needed) testing and decision-making is provided in **Appendix G**. The procedure is briefly described below.

1. As water is placed in the first frac tank (identified by its unique ID number and its position as "Frac Tank #1"), it will be labelled as to contents (e.g. EC water from Substation), position as described in the **Appendix G** Process Flow Diagram (e.g. Frac Tank #1 Feeder Tank") and status (e.g. Accumulation) and a log with the frac tank number and water addition records (as well as volume measurements, sediment measurements and field water quality measurements of pH) will be initiated. Example water tracking logs are provided in **Table 5** (Tank Status Log)**, Table 6** (Tank Volume Log), and **Table 7** (Tank Testing Log).
2. After settling of any sediment (on a flow-through basis in the separator tank or taking advantage of periods of low/no water generation including overnight), water will be decanted to a subsequent frac tank #2 (or 3, 4, etc.), which will be labelled as to contents (e.g. EC water from QPS), position as described in the **Appendix G** Process Flow Diagram (e.g. "Frac Tank 3 Secondary Tank") and status (e.g. Empty, Filling, Full Awaiting Approval, Approved for Dust Control, Approved for Disposal, Empty/Hold for Reuse Approval.
3. When each of these tanks #2, 3, 4 is full, it will be tagged as full and subsequent water will go to the next tank. The full tank will be sampled by the environmental team and submitted for laboratory analysis for a "worst-case" parameter list based on site COCs listed in **Table 1** and **Table 2** plus additional parameters which have been identified by LRP. These parameters include: pH, fluoride, free cyanide, priority pollutant (PP) metals (dissolved), VOCs, PAHs, PCBs, and TPH (DRO/GRO).
4. Sample results will be tabulated and be compared to drinking water standards and provided to MDE for review with a recommendation as to whether the water is suitable for use for on-site dust control.
5. If approved for use, no additional water will be added to the same (tested) frac tank until the tested water has been used (or in the alternative disposed off-site).
6. The second tank filled will follow the same process and parameter list.
7. Prior to sampling the third tank, FE will propose a shorter parameter list based on the first two results. For example, it is considered very unlikely that PCBs would be present this far from the SMA. At a minimum, pH and fluoride will be retained in any proposed shortened list.

In addition to potential groundwater COCs, it is known from current construction at MH-2/pump station that contact with grout/cement has the potential to generate either water or

solids with an elevated pH. It is also important that the sample is representative of the tank contents in order to avoid collecting a low-solids sample from a settled tank and then having sediment stirred up during water removal (such as for dust control use). Therefore, with appropriate tracking entries on frac tank logs, the contractor may elect to decant water from a tank with significant solids accumulation into a clean tank prior to testing and holding for approval.

Sediment will be generated in the separator tank, and it is possible that finer material may also carry over into frac tanks. The amount of sediment generated will vary throughout the construction, with SOE seep water likely to be relatively sediment free, while SOE drilling-generated water likely contains the most sediment. It is up to the contractor to determine when to remove sediment to maintain tank capacity or when to rent an additional tank (so water can be tested in a relatively sediment-free state per the requirements of **Appendix G**).

The selected management method for sediment removal is to vacuum/pump sediment-laden water from the base of the tank for off-site shipment to a facility that accepts high-solids aqueous streams such as VLS Lancaster, PA. Removal of sediment from a frac tank will be logged in the same way as addition or removal of water. Any water or (aqueous) sediment loads shipped off-site will be tested for pH prior to leaving the Site. Any water or sediment that has an elevated pH can be placed back into the tank and neutralized (under MDE hazardous waste rules elementary neutralization treatment exemption) using citric acid. If neutralization is done, it is important to circulate the water or sediment for thorough mixing and re-test pH to confirm reagent is not consumed by alkalinity of contained sediment. The neutralization procedure is described in **Appendix G**.

Appendix G also describes sediment testing and management.

6.7 Capping

No activities for work covered by this EMP will be conducted within the SMA. Therefore, no capping activities are required for this work at this time.

6.8 Land Use Controls

Land use controls currently exist in the form of an EC that includes the area comprising the electrical substation, and closure documentation issued by the MDE LMA for the successful completion of EMP activities will also list land use controls. The existing land use controls for the area within the EC include but are not limited to the soil excavation controls and restrictions, as well as restrictions on the use of groundwater beneath the property. These land use controls are recorded in the local land records.

7. Contingencies

If site conditions observed during construction and/or remediation differ substantially from those described herein, modifications to this EMP may be necessary. Such differing conditions may warrant an adjustment of sampling procedures, analytical methods, remedial activities, etc. and such modifications will be addressed in an addendum or revision to this EMP. MDE will be notified of any newly discovered contamination, proposed changes to this EMP, or citations from other regulatory agencies.

Specifically, if newly discovered contamination is identified during site development, the following contingency measures will be taken:

- Notify MDE within 24 hours (verbally and written/email);
- Postpone implementation of the EMP;
- Evaluate new site conditions identified; and
- Amend EMP to address new site conditions identified.

Any amendments to the EMP must be approved by MDE prior to implementation.

Notified departments will include:

MDE Land Restoration Program
Land and Materials Administration
1800 Washington Boulevard
Baltimore, Maryland 21230
(410) 537-3466
Attention: Anuradha Mohanty

In addition to the above, if there is evidence of an oil discharge at the Site in violations of applicable regulations, it must be reported within two hours as specified in COMAR 26.10.08.01, to the OCP (410-537-3442) or, if after normal business hours, to the 24-hour Spill Reporting Hotline (1-866-633-4646). The MDE will be verbally notified within 48 hours (72 hours in writing /email) of changes (planned or emergency) to the EMP implementation schedule, previously undiscovered contamination, and citations from regulatory entities related to health and safety practices. Notifications shall be made to the MDE project manager at 410-537-3466.

Any violations of State or Local permit requirements during implementation of the EMP in the EMP area must be reported to the CHS project manager by email within 24 hours of receipt of the violation notification.

8. ADMINISTRATIVE

8.1 Schedule

The preliminary schedule to implement the EMP is presented below. Note that this preliminary schedule is subject to change based on unforeseen conditions that are beyond the development team's control. Deviations from this proposed schedule will be communicated to MDE.

Table 3: Estimated Construction Schedule Relevant to EMP

Milestone	Estimated Schedule
EMP Review/Approval	March 2024
Submission of Weekly EMP Progress Reports	Weekly following initiation of work (due Tuesday of the following week))
Substation Low Mobility Grouting	June - September 2024
Phase 1 – Substation Foundations	October-November 2024
Substation Fencing (Phase 1 only)	late November2024
Phase 1 – Substation Electrical Equipment (Above Grade)	December 2024 – February 2025
Testing and Commissioning	March-April 2025 – Project ISD early May 2025
Phase 2 – Construction	April 2025 – Nov. 2025
Phase 1/2 Partial Completion Report	November 2025
Phase 3 – Construction	Jan. 2027 – Oct. 2027
EMP Completion Report Submittal	October 2027
MDE review completed	November 2027

Per the EC, any activity within the EC/SMP requires 30 day prior notification. This allows MDE to review the work elements and ask questions as needed prior to the beginning of field work. MDE is provided notice of these activities via submittal of this EMP-4 (April 19, 2024) as well as prior submittals. The MDE project manager will be additionally notified in writing within five calendar days prior to the beginning of EMP field implementation activities via the EMP Progress Report process. Schedule updates will be provided when needed, during preparation of the progress reports discussed in **Section 8.2**.

If site conditions or other factors lead to a change in the scope of work or procedures MDE will be notified and an EMP modification will be provided to MDE for review and approval prior to implementation.

8.2 Documentation

After approval of the EMP and prior to the start of work under this EMP, QL, FE, and all site contractors working under this EMP (including the on-site environmental professionals) will review the EMP and sign the certification on the following page stating that they have received and read the EMP. All contractor certifications are to be submitted to the CHS project manager prior to EMP implementation.

During implementation of this EMP, QL will prepare weekly progress reports summarizing the remedial activities occurring during that week and volume of groundwater collected and disposed of off-Site. These weekly progress reports will be submitted to the Client and to MDE by Tuesday of the following week, to demonstrate implementation of this EMP. At the conclusion of EMP implementation, QL will prepare an EMP Completion Report.

First Energy Sage Substation EMP-4 Certification

By signing below, I certify that I have read and understand the terms and conditions of the EMP for the above designated project and agree to follow the practices described in the EMP.

Name	Company	Signature

Tables

Table 4

EMP-4 Stockpile Tracking

Stockpile Number: EMP4-S1
Location: Sage Substation NW
Contents: Foundation excavation soil

Date & Time	Volume added (CY)	Source	Sample Number(s)	Approval	Volume Reused (CY) or Disposed (tons)	Comments
1/1/2024 16:00	600	Foundation excavations				
1/2/2024 16:45	400	Foundation excavations				
2/5/2024 8:00			S-EMP4S1-Comp-20240205			
2/10/2024 15:00				Approved for reuse site grading		
2/15/2024 0:00					200 CY	Substation grading
2/16/2024 0:00					300 CY	Substation grading

Example

Notes: Each soil movement will be recorded at completion or minimum daily.
Maintan copy with associated docuentation including stockpile location map, sample data, disposal tickets

Table 5

EMP-4 Tank Status Log

Location: Sage Substation N side

Tank ID	Tank Type	Date On-Site	Tank Position (per Flow Diagram)	Contents	Sample Number(s) (includes date)	Approval (include date)	Status	Comments
XXXX456	20K Separator Tank	1/5/2024	Tank #1 - Feeder Tank	Deep foudation drilling EC water			In Service	
XXXX789	20K Frac Tank	1/5/2024	Tank #2 - Secondary	Deep foudation drilling EC water	W-XXXX789-20240205	Approved Dust Control 20240210	Approved Dust Control	
XXXX135	20K Frac Tank	1/10/2024	Tank #3 - Secondary	Deep foudation drilling EC water	W-XXXX135-20240205		Hold for Analysis	
XXXX246	20K Frac Tank	1/15/2024	Tank #4 - Secondary	Deep foudation drilling EC water			Filling	
XXXX357	20K Frac Tank	1/20/2024	Tank #5 - Secondary	Empty/Clean			Empty/Clean	

Example

Notes: Status may include Empty/Clean, In Service, Filling, Full Awaiting Approval, Approved for Dust Control, Approved for Disposal, Empty/Hold for Reuse Approval
Refer to Table 6 Tank Volume Log and Table 7 Tank Testing Log

Table 6

EMP-4 Tank Volume Log

Frac Tank Volume Tracking																		
	Related EMP	EMP-2																
	Related SWPPP	TBD																
	vessel type	Separator tanks					Secondary tanks											
	Vessel name	Separator Tank 1			Water Influent		Frac Tank 2		Frac Tank 3		Frac Tank 4		Water Destination					
	Tank ID	TBD					TBD		TBD		TBD							
	Tank Location	EC Sage Substatio					EC Sage Substatio		EC Sage Substatio		EC Sage Substatio							
	Water Source Area	EC Sage Substatio		Sediment Volume (Gal)	Incremental Vol Generated for WAP permit	***WAP permit running total***	EC Sage Substatio		EC Sage Substatio		EC Sage Substatio		Total Volume since last reading used as dust control	Total Volume since last reading disposed off-site	Incremental Volume for 20CP permit	***Discharge Total for 20CP permit***		
	Water Source Location	TBD	Notes				TBD	Notes	TBD	Notes	TBD	Notes						
Date and Time	**Event Description**																	
1/27/24 7:00	Total Volume measurement	5000	GW	0	5,000	5,000	0				0		0	0	0	-		
1/27/24 13:00	Total Volume measurement	9000	GW+STW	500	4,000	9,000	0				0		0	0	0	-		
1/27/24 16:00	Total Volume measurement	16000	STW	600	7,000	16,000	0				0		0	0	0	-		
1/28/24 7:00	Total Volume measurement	18000	STW	1000	2,000	18,000	0				0		0	0	0	-		
1/28/24 13:00	Total Volume measurement	4000	xfer 14000 to #2	1000	-	18,000	14000	xfer 14000 from #1A			0		0	0	0	-		
1/28/24 16:00	Total Volume measurement	5000	GW	1100	1,000	19,000	14000				0		0	0	0	-		
1/29/24 16:00	Total Volume measurement	7000	GW	1500	2,000	21,000	14000				0		0	0	0	-		
1/29/24 16:00	Total Volume measurement	10000	GW+STW	2000	3,000	24,000	14000				0		0	0	0	-		
1/30/24 14:00	Total Volume measurement	3000	xfer 7000 to #2	2000		24,000	21000	xfer 7000 from #1A			0		0	0	0	-		
1/30/24 16:00	Total Volume measurement						15000	5000 gal disposed per Ticket ID #			0		0	5000	5000	5,000		

Example

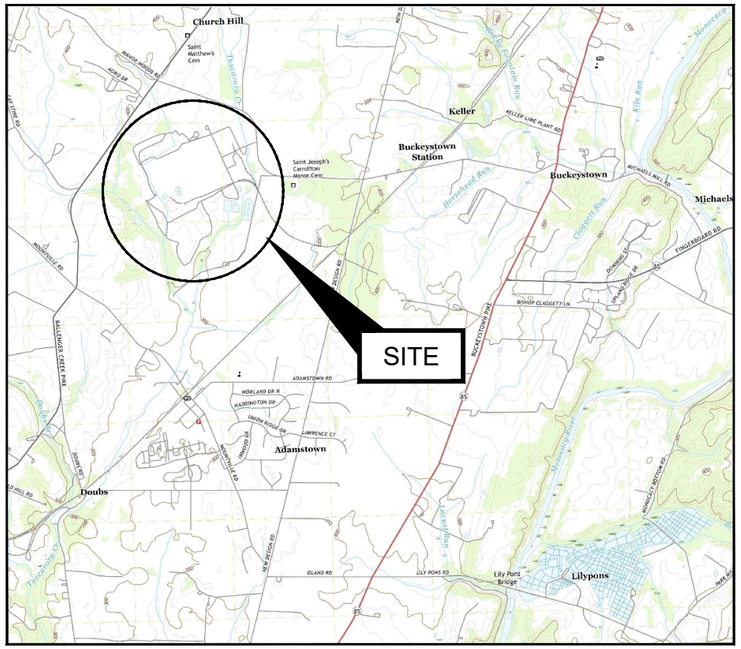
Table 7

EMP-4 Tank Testing Log

Process, Field Testing, Lab Testing Tracking Table					
	Related EMP	EMP-2			
	Related SWPPP	TBD			
	vessel type	Separator tank	Secondary tank		
	Vessel name	Separator Tank 1	Frac Tank 2	Frac Tank 3	Frac Tank 4
	Tank ID	TBD	TBD	TBD	TBD
	Tank Location	EC Sage Sub north	EC Sage Sub north	EC Sage Sub north	EC Sage Sub north
	Water Source Area	EC Sage Sub north	EC Sage Sub north	EC Sage Sub north	EC Sage Sub north
	Water Source Location	TBD	TBD	TBD	TBD
Date and Time	**Event Description**				
1/27/24 7:00	pH measurement	7.2	Empty		
1/27/24 13:00	pH measurement	7.5	7.5		
1/27/24 16:00	pH measurement	8.0	8.1		
1/28/24 7:00	pH measurement	10.0	9.5		
1/28/24 13:00	pH measurement	9.8	8.5		
1/28/24 16:00	pH measurement	11.3			
1/28/24 16:00	Alk measurement	250.0			
1/29/24 16:00	Date and amount for N-1 (lbs)	20.0	--	Empty	
1/29/24 16:00	pH measurement	7.5	--	7.5	
1/30/24 16:00	W-1 Lab samples submitted	--	W-XXXX456-20240205		
2/4/24 13:00	pH measurement	8.2		8.2	
2/3/24 16:00	***Date and use MDE approved W-1***	--	***Dust Control***	--	
2/10/24 16:00	pH measurement	7.2	8.3	8.4	
2/11/24 16:00	pH measurement	8.5	8.5	8.7	
2/4/24 16:00	sediment depth (inches)	5	Empty	--	
2/4/24 16:00	S-2 Lab samples submitted	2/4/2024	--	--	
2/9/24 16:00	**Date and use MDE approved for S-2**	**disposal**	--	--	
2/10/24 16:00	pH measurement	7.2		7.8	
2/11/24 16:00	pH measurement	8.5		8.2	

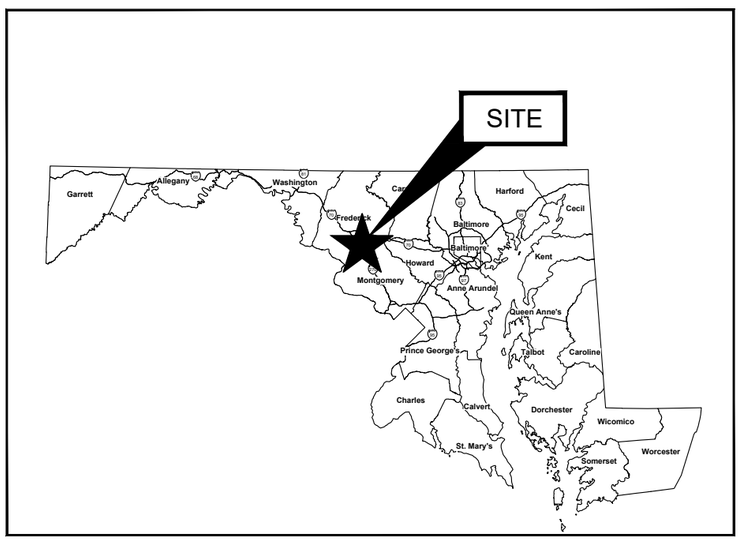
Example

Figures



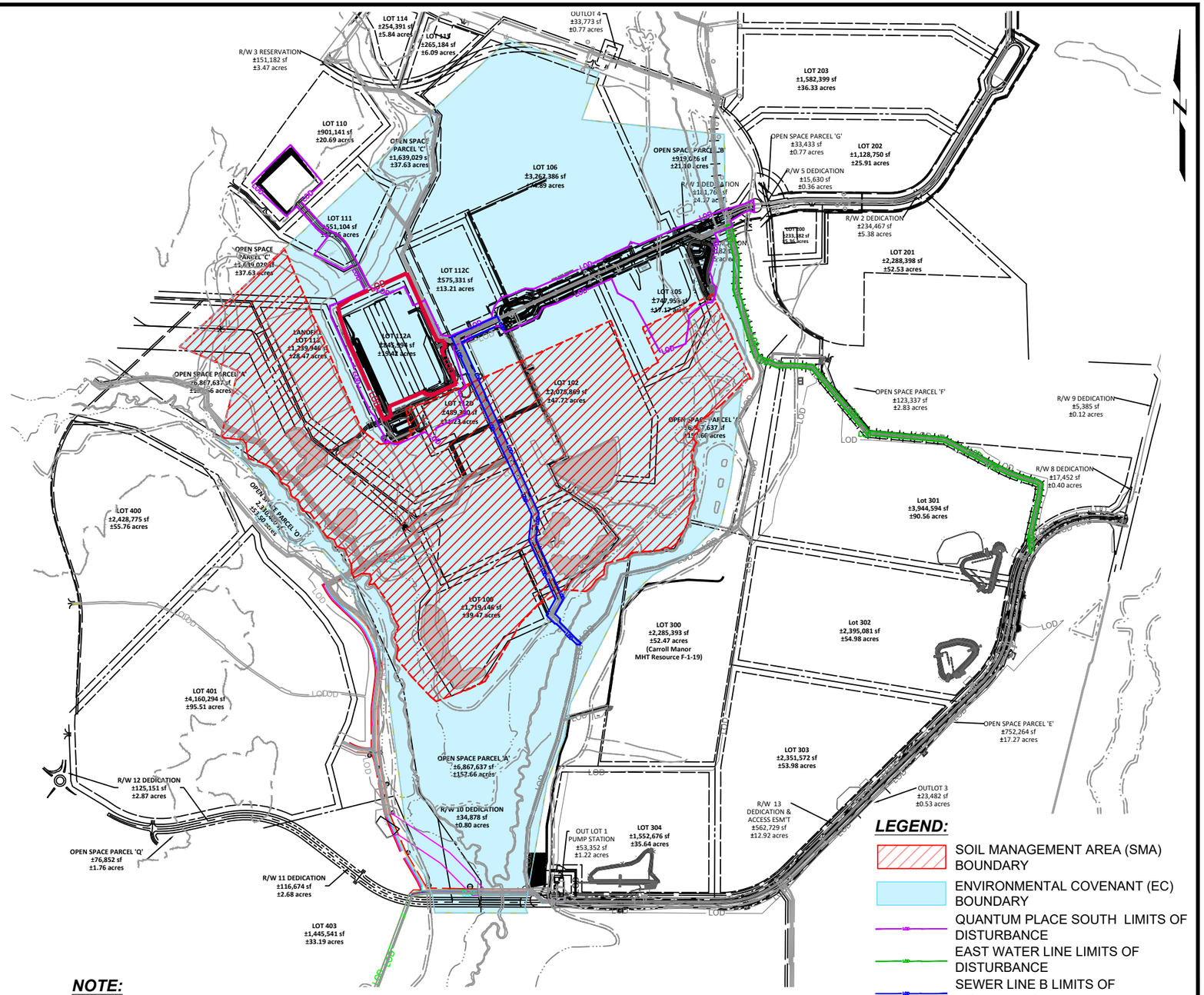
SOURCE:

MAP TAKEN FROM USGS.GOV.



STATE or COUNTY MAP

(NOT TO SCALE)



NOTE:

1. LOD = LIMITS OF DISTURBANCE.

LEGEND:

- SOIL MANAGEMENT AREA (SMA) BOUNDARY
- ENVIRONMENTAL COVENANT (EC) BOUNDARY
- QUANTUM PLACE SOUTH LIMITS OF DISTURBANCE
- EAST WATER LINE LIMITS OF DISTURBANCE
- SEWER LINE B LIMITS OF DISTURBANCE
- SUBSTATION AND EMP-4 BOUNDARY LIMITS OF DISTURBANCE (LOD)

0 1000 2000

SCALE, FEET

Environmental Management Plan
Quantum Loophole
Frederick, MD

Quantum Maryland
Austin, TX

GEI Consultants

ENVIRONMENTAL MANAGEMENT PLAN FIRST ENERGY SUBSTATION SITE LOCATION PLAN

Project 2302756

February 2024 Fig. 1

NORTH BORROW AREA
STOCKPILE 2
(BA #1 IN PERMIT PLANS)

STOCKPILE 1
(STOCKPILE AND STAGING AREA #3 IN PERMIT PLANS)

NORTH LANDFILL

STAGING AREA
(STOCKPILE SP #1 IN PERMIT PLANS)

SUBSTATION LOD AND EMP-4 BOUNDARY

CLEAN ENERGY LANE

QPS WATER LINES STREAM CROSSING

BASIN DA-2

MANOR WOODS ROAD (MWR)

EAST WATER LINE (OR EAST WATER LOOP)

SUBSTATION PAD

AERIAL WORK AREA

STOCKPILE 2
(STOCKPILE AND STAGING AREA #2 IN PERMIT PLANS)

WDS-1

WDS-3

SEWER LINE B (OR OUTFALL B)

QUANTUM PLACE SOUTH (QPS)

HAPPY LANDING ROAD (HLR)

BASIN DA-11

WDS-4

STOCKPILE 3
(EXISTING STOCKPILE AREA IN PERMIT PLANS)

WDS-6N

WDS-5

WDS-2

WDS-7

WDS-9

SOUTH LANDFILL COVER BOUNDARY

SOUTH LANDFILL EASEMENT BOUNDARY

WDS-8

WDS-6S

SEWER LINE B STREAM CROSSING

0 500 1000
SCALE, FEET

LEGEND:

- SOIL MANAGEMENT AREA (SMA) BOUNDARY
- ENVIRONMENTAL COVENANT (EC) BOUNDARY
- QUANTUM PLACE SOUTH LIMITS OF DISTURBANCE
- EAST WATER LINE LIMITS OF DISTURBANCE
- SEWER LINE B LIMITS OF DISTURBANCE
- FORMER RAILROAD
- WETLAND BOUNDARY
- 100 YEAR FLOOD BOUNDARY
- TUSCARORA CREEK
- EMP-2 LOD
- SUBSTATION AND EMP-4 BOUNDARY

NOTE:
1. LOD = LIMITS OF DISTURBANCE.
2. WDS = WASTE DISPOSAL SITE.

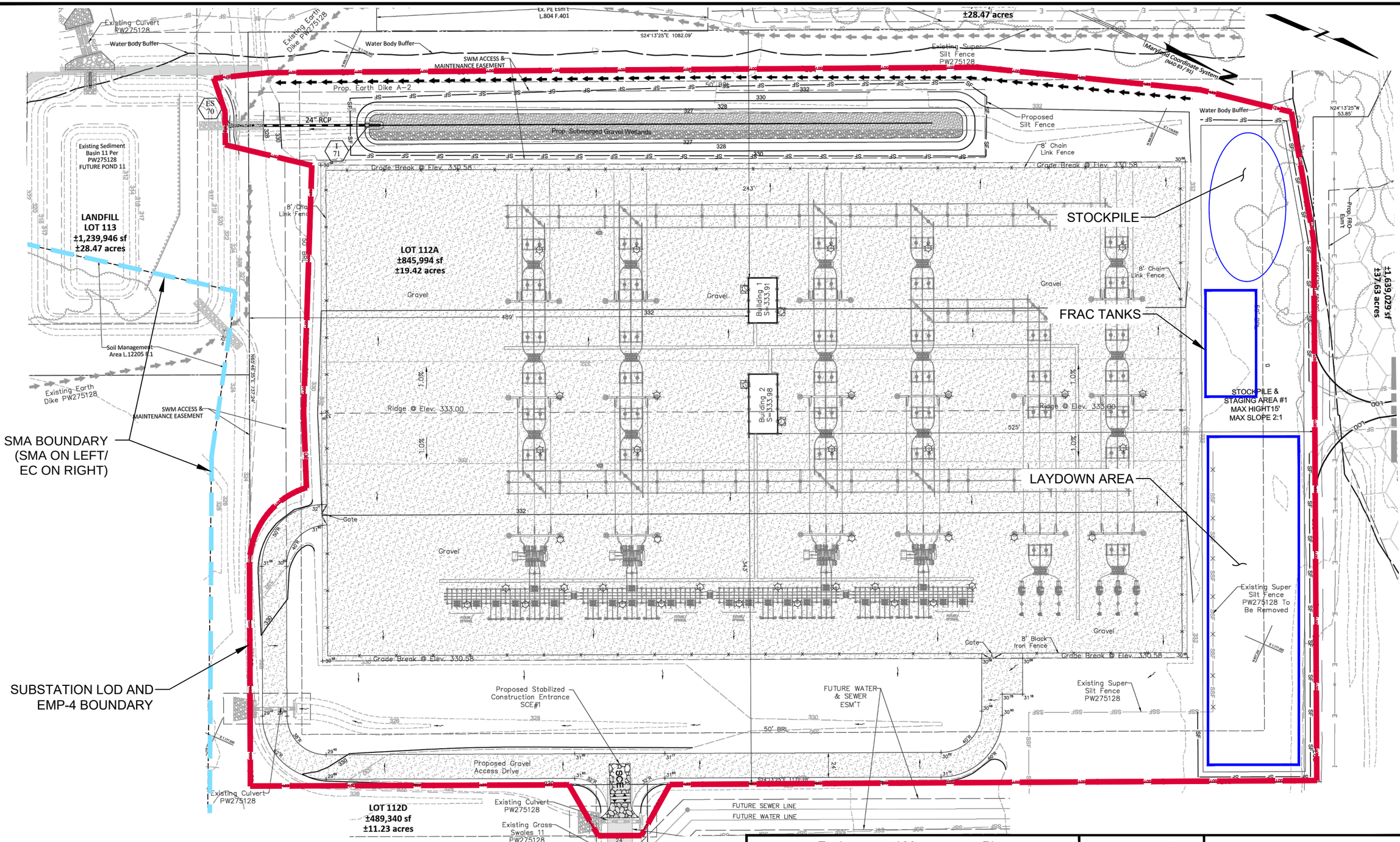
Environmental Management Plan
Quantum Loophole
Frederick, MD

Quantum Maryland
Austin, TX

GEI Consultants

ENVIRONMENTAL MANAGEMENT PLAN FIRST ENERGY SUBSTATION LOD AND EMP BOUNDARY

Project 2302756 | April 2024 | Fig. 2



SOURCE:

1. PLAN BASED ON PDF FILE PREPARED BY ROGERS DATED MAY 17, 2023, RECEIVED FROM FIRST ENERGY FEBRUARY 2024.

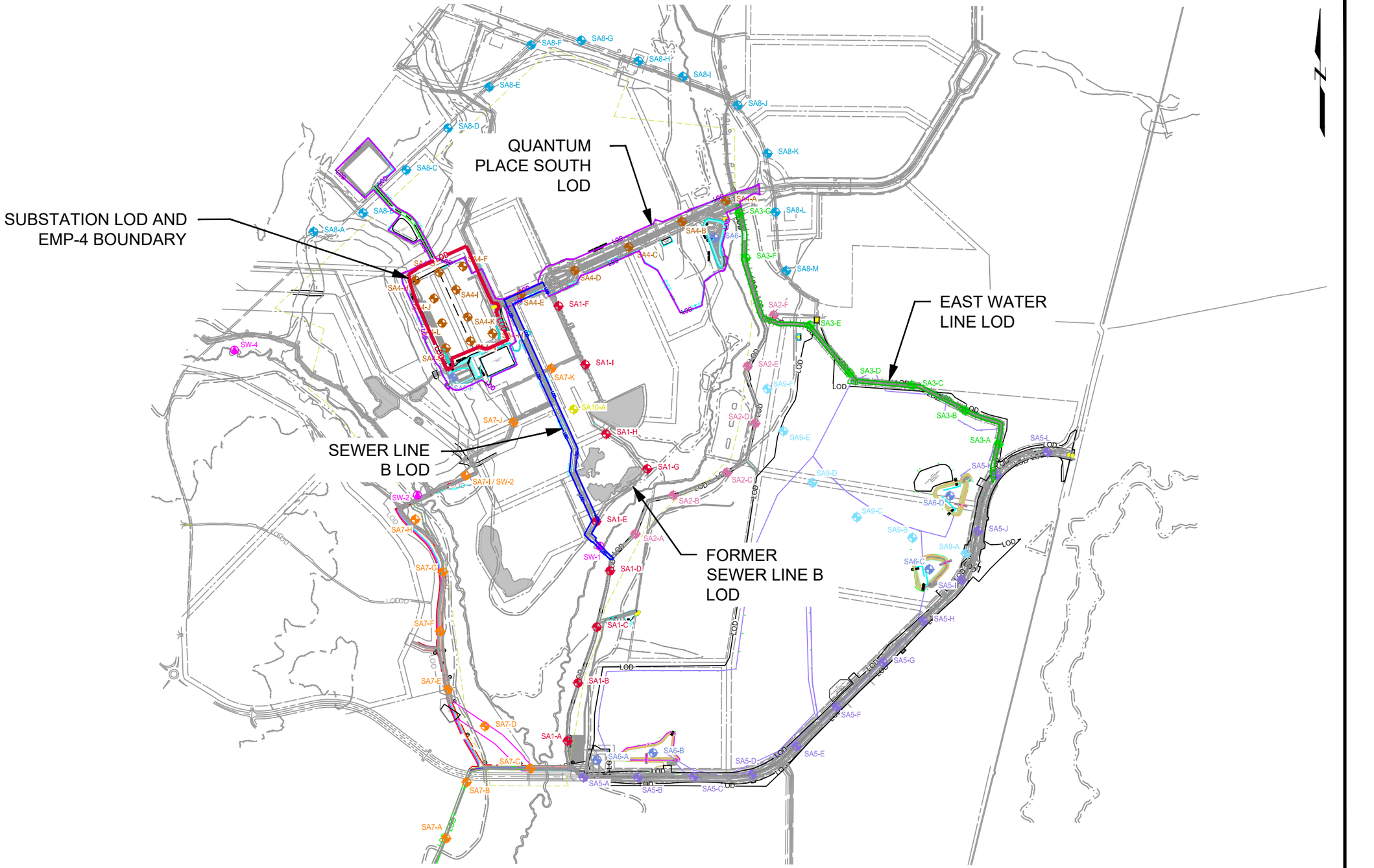
Environmental Management Plan
Quantum Loophole
Frederick, MD

Quantum Maryland
Austin, TX

GEI Consultants

SUBSTATION DETAIL AND SOIL AND WATER MANAGEMENT PLAN

Project 2302756 | February 2023 | Fig. 3



LEGEND:

- SA 1 Boring Locations
- SA 2 Boring Locations
- SA 3 Boring Locations
- SA 4 Boring Locations
- SA 5 Boring Locations
- SA 6 Boring Locations
- SA 7 Boring Locations
- SA 8 Boring Locations
- SA 10 Boring Locations

SOURCE:

1. BORING LOCATION PLAN BASED ON 2022 PHASE II DRAWING PROVIDED BY GEO-TECHNOLOGY ASSOCIATES, INC., DATED OCTOBER 2022.

0 1000 2000

SCALE, FEET

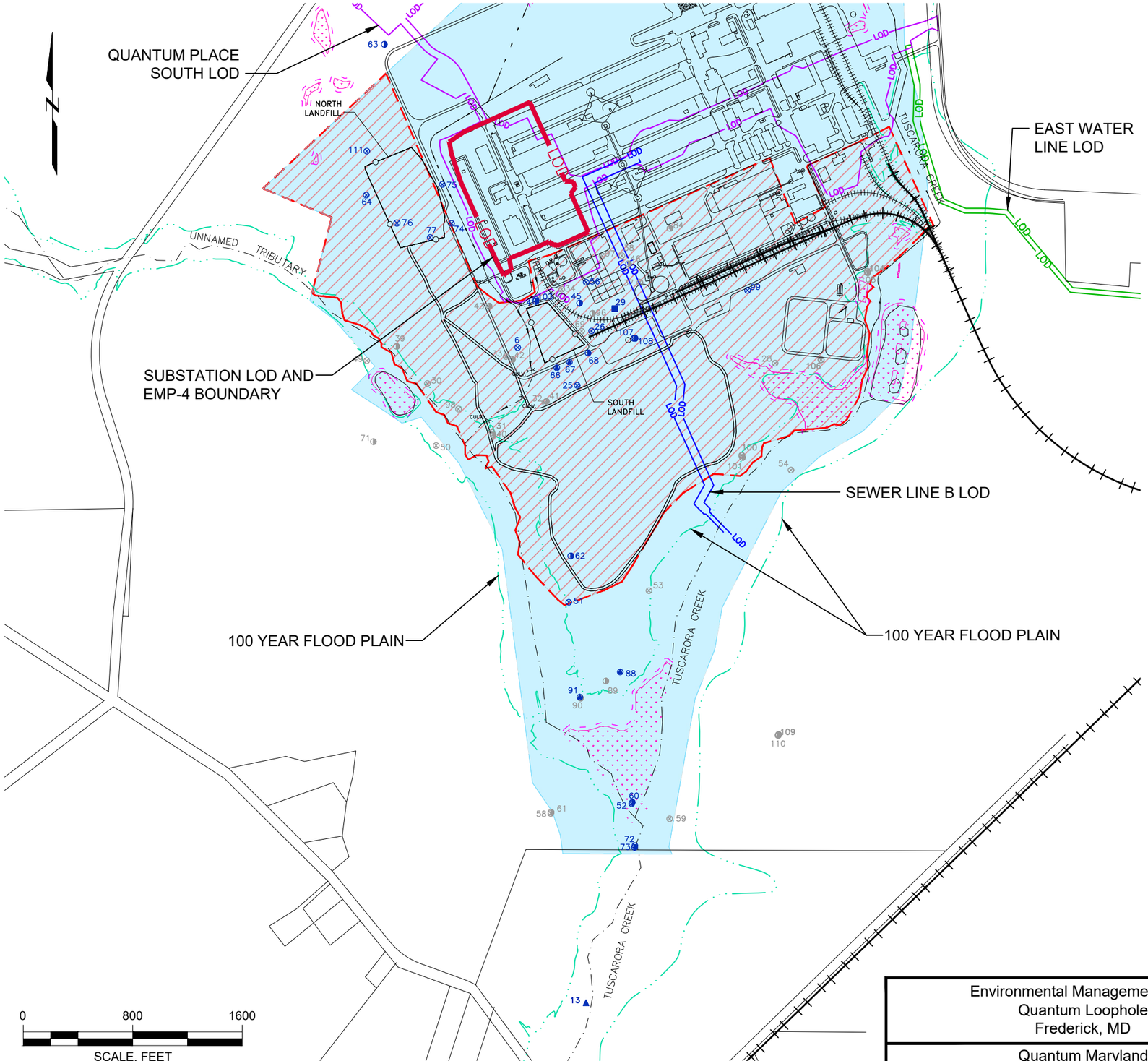
Environmental Management Plan
Quantum Loophole
Frederick, MD

Quantum Maryland
Austin, TX

GEI Consultants

ENVIRONMENTAL MANAGEMENT PLAN FIRST ENERGY SUBSTATION FROM PHASE II EMP-4

Project 2302756 | February 2023 | Fig. 4



LEGEND:

- ABANDONED OVERBURDEN MONITORING WELL
- ABANDONED OVERBURDEN / BEDROCK MONITORING WELL
- ABANDONED BEDROCK MONITORING WELL
- OVERBURDEN MONITORING WELL LOCATION (MAINTAINED FOR MONITORING)
- OVERBURDEN / BEDROCK MONITORING WELL LOCATION (MAINTAINED FOR MONITORING)
- BEDROCK MONITORING WELL (MAINTAINED FOR MONITORING)
- OFF-PROPERTY / BEDROCK MONITORING WELL LOCATION (NOT OWNED BY QL)
- RECOVERY WELL
- PROPERTY LINE
- STREAM COURSE
- SOIL MANAGEMENT AREA (SMA) BOUNDARY
- ENVIRONMENTAL COVEANT (EC) BOUNDARY
- WETLAND
- WETLAND BUFFER
- LOD — QUANTUM PLACE SOUTH LIMITS OF DISTURBANCE (LOD)
- LOD — SEWER LINE B LIMITS OF DISTURBANCE (LOD)
- LOD — EAST WATER LINE LIMITS OF DISTURBANCE (LOD)
- SUBSTATION AND EMP-4 BOUNDARY LIMITS OF DISTURBANCE (LOD)

NOTES:

1. THE SITE FEATURES ARE BASED ON PRE-DEMOLITION/CURTAILMENT PLANT CONDITIONS.
2. MONITORING WELL STATUS BASED ON THE 2018 TETRA TECH WELL ABANDONMENT REPORT AND THE 2023 CLOSED NORTH INDUSTRIAL LANDFILL SEMIANNUAL WATER QUALITY REPORT.

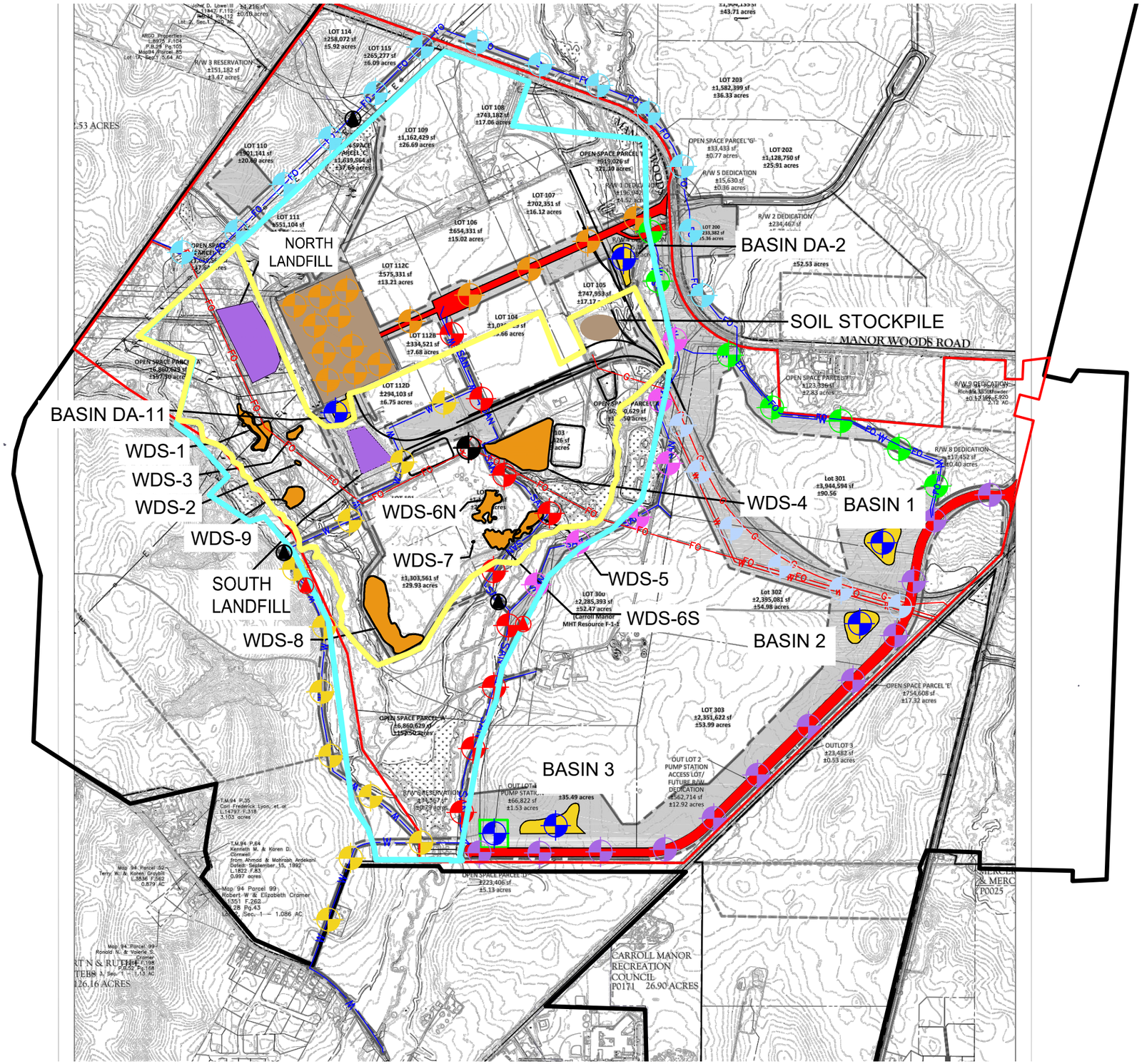
SOURCE:

BASE MAP TAKEN FROM THE DRAWING, FIGURE 1 PLANNED MONITORING WELL ABANDONMENT LOCATIONS, PROVIDED BY TETRA TECH, DATED AUGUST 2017.

Environmental Management Plan Quantum Loophole Frederick, MD	GEI Consultants	MONITORING WELL LOCATIONS
Quantum Maryland Austin, TX	Project 2302756	February 2024 Fig. 5

Appendix A

Phase II Environmental Site Assessment – Initial Infrastructure Phase – Figures 4 and 5 and Table 2



Legend

- SA 1 Boring Locations
- SA 2 Boring Locations
- SA 3 Boring Locations
- SA 4 Boring Locations
- SA 5 Boring Locations
- SA 6 Boring Locations
- SA 7 Boring Locations
- SA 8 Boring Locations
- SA 9 Boring Locations
- SA 10 Boring Locations
- Surface Water Locations
- Groundwater Locations

- Site Boundary
- SMP Boundary
- UEC Boundary
- Utilities to be installed permantly
- Utilities to be abandoned in place or removed
- Roadways
- Substation Pad
- Limit of Disturbance
- Landfills
- Waste Disposal Sites
- Basins
- W — Water lines
- SAN — Sanitary Lines
- G — Gas Lines
- FO — Dry Utlities

Notes

Base image obtained from "Quantum Frederick - Initial Infrastructure Grading Limits of Disturbance", drawn by Rodgers Consulting on 08-01-2022

0 400 800

Approximate Scale
1 inch = 800 feet

North

GEO-TECHNOLOGY ASSOCIATES, INC.
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FORMER ALCOA EASTALCO WORKS PROPERTY
INITIAL INFRASTRUCTURE PHASE
FREDERICK COUNTY, MARYLAND

PROPOSED SAMPLING AREAS

PROJECT: 201536	DATE: AUGUST 2022	SCALE: 1" = 800'
DRAWN BY: NMT	REVIEW BY: PHH	FIGURE: 4

SA8-F SA8-G SA8-H SA8-I SA8-J SA8-K SA8-L SA8-M SA8-E SA8-D SA8-C SA8-B SA8-A

SA4-A SA4-B SA4-C SA4-D SA4-E SA4-F SA4-G SA4-H SA4-I SA4-J SA4-K SA4-L SA4-M SA4-N SA4-O

SA3-G SA3-F SA3-E SA3-D SA3-C SA3-B SA3-A

SA2-F SA2-E SA2-D SA2-C SA2-B SA2-A

SA1-F SA1-I SA1-H SA1-G SA1-E SA1-D SA1-C SA1-B SA1-A

SA7-K SA7-J SA7-I SA7-H SA7-G SA7-F SA7-E SA7-D SA7-C SA7-B SA7-A

SA6-E SA6-F SA6-D SA6-C SA6-A SA6-B

SA9-F SA9-E SA9-D SA9-C SA9-B SA9-A

SA10-A

SA5-L SA5-K SA5-J SA5-I SA5-H SA5-G SA5-F SA5-E SA5-C SA5-D SA5-A SA5-B

SW-4 SW-2 SW-1

GTA-DA11-E GTA-DA11-W

See Inset 1

See Inset 2

Inset 1

0 75 150

Approximate Scale
1 inch = 150 feet

NORTH

Inset 2

0 25 50

Approximate Scale
1 inch = 50 feet

NORTH

Legend

- SA 1 Boring Locations
- SA 2 Boring Locations
- SA 3 Boring Locations
- SA 4 Boring Locations
- SA 5 Boring Locations
- SA 6 Boring Locations
- SA 7 Boring Locations
- SA 8 Boring Locations
- SA 9 Boring Locations
- SA 10 Boring Locations
- Surface Water Locations
- Groundwater Locations

Notes:

1. Base map obtained from MD iMap (2020 Western Shore Collection).
2. Sample locations were field located using a Trimble Geo 7x global positioning system (GPS) unit with sub-meter capable accuracy.

0 150 300

Approximate Scale
1 inch = 300 feet

NORTH

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FORMER ALCOA EASTALCO WORKS PROPERTY
INITIAL INFRASTRUCTURE PHASE
FREDERICK COUNTY, MARYLAND

BORING LOCATION PLAN

PROJECT: 31201536	DATE: October 2022	SCALE: 1" = 300'	DESIGN BY: CMM	REVIEW BY: KPP	FIGURE: 8

Table 2
Soil Analysis Summary

Sample Identification	MDE NRCS	ATC Central	GTA-SA1-A	GTA-SA1-A	GTA-SA1-B	GTA-SA1-B
Sample Interval			0-1	1-6.5	0-1	1-5.5
Sample Type			Grab	Composite	Grab	Composite
Sampling Date			9/12/2022	9/12/2022	9/12/2022	9/12/2022
Polycyclic Aromatic Hydrocarbons (PAHs)						
2-Methylnaphthalene	300	--	<0.0097	<0.011	<0.010	<0.011
Acenaphthene	4,500	--	<0.0097	<0.011	<0.010	<0.011
Acenaphthylene	NE	--	<0.0097	<0.011	<0.010	<0.011
Anthracene	23,000	--	<0.0097	<0.011	<0.010	<0.011
Benzo(a)anthracene	21	--	<0.0097	<0.011	<0.010	<0.011
Benzo(a)pyrene	2	--	<0.0097	<0.011	<0.010	<0.011
Benzo(b)fluoranthene	21	--	<0.0097	<0.011	<0.010	<0.011
Benzo(g,h,i)perylene	NE	--	<0.0097	<0.011	<0.010	<0.011
Benzo(k)fluoranthene	210	--	<0.0097	<0.011	<0.010	<0.011
Chrysene	2,100	--	<0.0097	<0.011	<0.010	<0.011
Dibenz(a,h)Anthracene	2.1	--	<0.0097	<0.011	<0.010	<0.011
Fluoranthene	3,000	--	<0.0097	<0.011	<0.010	<0.011
Fluorene	3,000	--	<0.0097	<0.011	<0.010	<0.011
Indeno(1,2,3-c,d)Pyrene	21	--	<0.0097	<0.011	<0.010	<0.011
Naphthalene	17	--	<0.0097	<0.011	<0.010	<0.011
Phenanthrene	2,300	--	<0.0097	<0.011	<0.010	<0.011
Pyrene	2,300	--	<0.0097	<0.011	<0.010	<0.011
Priority Pollutant (PP) Metals						
Antimony	47	6.8	<2.0	<2.3	<2.3	<2.6
Arsenic	3.0/26.8*	4.9	2.7	7.5	5.4	4.0
Beryllium	230	1.6	<0.39	2.4	1.5	1.8
Cadmium	98	1.1	<0.39	<0.46	<0.47	<0.52
Chromium [3]	6.3	30	20	**44**	**36**	**45**
Copper	4,700	42	6.4	30	15	19
Lead	550	61	10	22	16	15
Mercury	4.6	0.14	<0.079	0.19	<0.094	<0.10
Nickel	2,200	22	8.1	52	25	37
Selenium	580	1.0	<0.39	<0.46	<0.47	<0.52
Silver	580	1.0	<0.39	<0.46	<0.47	<0.52
Thallium	1.2	1.5	<0.39	<0.46	<0.47	<0.52
Zinc	35,000	73	22	90	38	64
Organochlorine Pesticides						
4,4-DDD	2.5	--	<0.0047	--	<0.0049	--
4,4-DDE	9.3	--	<0.0047	--	<0.0049	--
4,4-DDT	8.5	--	<0.0047	--	<0.0049	--
Aldrin	0.18	--	<0.0047	--	<0.0049	--
Chlordane (n.o.s.)	7.7	--	<0.12	--	<0.12	--
Dieldrin	7.7	--	<0.0047	--	<0.0049	--
Endosulfan I	0.14	--	<0.0047	--	<0.0049	--
Endosulfan II	700	--	<0.0047	--	<0.0049	--
Endosulfan Sulfate	NE	--	<0.0047	--	<0.0049	--
Endrin	NE	--	<0.0047	--	<0.0049	--
Endrin Aldehyde	25	--	<0.0047	--	<0.0049	--
Endrin ketone	NE	--	<0.0047	--	<0.0049	--
Gamma-BHC (Lindane)	NE	--	<0.0047	--	<0.0049	--
Heptachlor	2.5	--	<0.0047	--	<0.0049	--
Heptachlor Epoxide	7.7	--	<0.0047	--	<0.0049	--
Methoxychlor	0.63	--	<0.0047	--	<0.0049	--
Toxaphene	0.33	--	<0.12	--	<0.12	--
alpha-BHC	410	--	<0.0047	--	<0.0049	--
beta-BHC	2.1	--	<0.0047	--	<0.0049	--
cis-Chlordane	0.36	--	<0.0047	--	<0.0049	--
delta-BHC	1.3	--	<0.0047	--	<0.0049	--
trans-Chlordane	NE	--	<0.0047	--	<0.0049	--
Chlorinated Herbicides						
2,4,5-T		--	<0.021	--	<0.023	--
2,4,5-TP (Silvex)		--	<0.021	--	<0.023	--
2,4-D		--	<0.21	--	<0.23	--
2,4-DB		--	<0.22	--	<0.24	--
Dalapon		--	<0.51	--	<0.56	--
Dicamba		--	<0.021	--	<0.023	--
Dichloroprop		--	<0.21	--	<0.23	--
Dinoseb		--	<0.11	--	<0.12	--
MCPA		--	<21	--	<23	--
MCPP		--	<21	--	<23	--
Total Petroleum Hydrocarbons (TPH)						
TPH DRO	620	--	--	--	--	--

Notes:
This table is only to be used in conjunction with the report for which it was prepared. See the report text for background information, assumptions, limitations, e
Samples collected Between September 8, 2022 and September 15, 2022
Results in milligrams per kilogram (mg/kg), equivalent to parts per million (ppm)
NRCS = MDE Non Residential Cleanup Standards for soil as presented in MDE's Cleanup Standards for Soil and Groundwater; October 2018; Interim Final Guidanc
ATC = Anticipated Typical Concentration for soils in Eastern Maryland
Shaded and bold values represent exceedance of MDE RCS
NA = Not applicable
NE = MDE standard not established
* = Risk-based calculated value
The comparison value for mercury is referenced as the elemental mercury RCS/NRCS.

Sample Identification	MDE NRCS	ATC Central	GTA-SA1-C	GTA-SA1-C	GTA-SA1-D	GTA-SA1-D
Sample Interval			0-1	1-7	0-1	1-7
Sample Type			Grab	Composite	Grab	Composite
Sampling Date			9/12/2022	9/12/2022	9/12/2022	9/12/2022
Polycyclic Aromatic Hydrocarbons (PAHs)						
2-Methylnaphthalene	300	--	<0.010	<0.0098	<0.010	<0.010
Acenaphthene	4,500	--	<0.010	<0.0098	<0.010	<0.010
Acenaphthylene	NE	--	<0.010	<0.0098	<0.010	<0.010
Anthracene	23,000	--	<0.010	<0.0098	<0.010	<0.010
Benzo(a)anthracene	21	--	<0.010	<0.0098	<0.010	<0.010
Benzo(a)pyrene	2	--	<0.010	<0.0098	<0.010	<0.010
Benzo(b)fluoranthene	21	--	<0.010	<0.0098	<0.010	<0.010
Benzo(g,h,i)perylene	NE	--	<0.010	<0.0098	<0.010	<0.010
Benzo(k)fluoranthene	210	--	<0.010	<0.0098	<0.010	<0.010
Chrysene	2,100	--	<0.010	<0.0098	<0.010	<0.010
Dibenz(a,h)Anthracene	2.1	--	<0.010	<0.0098	<0.010	<0.010
Fluoranthene	3,000	--	<0.010	<0.0098	<0.010	<0.010
Fluorene	3,000	--	<0.010	<0.0098	<0.010	<0.010
Indeno(1,2,3-c,d)Pyrene	21	--	<0.010	<0.0098	<0.010	<0.010
Naphthalene	17	--	<0.010	<0.0098	<0.010	<0.010
Phenanthrene	2,300	--	<0.010	<0.0098	<0.010	<0.010
Pyrene	2,300	--	<0.010	<0.0098	<0.010	<0.010
Priority Pollutant (PP) Metals						
Antimony	47	6.8	<3.1	<2.6	<2.5	<2.9
Arsenic	3.0/26.8*	4.9	4.2	2.3	5.6	12
Beryllium	230	1.6	1.7	1.4	0.87	0.97
Cadmium	98	1.1	<0.62	<0.53	<0.51	<0.57
Chromium [3]	6.3	30	**38**	**31**	**39**	**33**
Copper	4,700	42	18	13	10	17
Lead	550	61	14	13	19	25
Mercury	4.6	0.14	<0.12	<0.11	<0.10	<0.11
Nickel	2,200	22	29	19	13	25
Selenium	580	1.0	<0.62	<0.53	<0.51	<0.57
Silver	580	1.0	<0.62	<0.53	<0.51	<0.57
Thallium	1.2	1.5	<0.62	<0.53	<0.51	<0.57
Zinc	35,000	73	48	47	34	39
Organochlorine Pesticides						
4,4-DDD	2.5	--	<0.0050	--	<0.0050	--
4,4-DDE	9.3	--	<0.0050	--	<0.0050	--
4,4-DDT	8.5	--	<0.0050	--	<0.0050	--
Aldrin	0.18	--	<0.0050	--	<0.0050	--
Chlordane (n.o.s.)	7.7	--	<0.12	--	<0.13	--
Dieldrin	7.7	--	<0.0050	--	<0.0050	--
Endosulfan I	0.14	--	<0.0050	--	<0.0050	--
Endosulfan II	700	--	<0.0050	--	<0.0050	--
Endosulfan Sulfate	NE	--	<0.0050	--	<0.0050	--
Endrin	NE	--	<0.0050	--	<0.0050	--
Endrin Aldehyde	25	--	<0.0050	--	<0.0050	--
Endrin ketone	NE	--	<0.0050	--	<0.0050	--
Gamma-BHC (Lindane)	NE	--	<0.0050	--	<0.0050	--
Heptachlor	2.5	--	<0.0050	--	<0.0050	--
Heptachlor Epoxide	7.7	--	<0.0050	--	<0.0050	--
Methoxychlor	0.63	--	<0.0050	--	<0.0050	--
Toxaphene	0.33	--	<0.12	--	<0.13	--
alpha-BHC	410	--	<0.0050	--	<0.0050	--
beta-BHC	2.1	--	<0.0050	--	<0.0050	--
cis-Chlordane	0.36	--	<0.0050	--	<0.0050	--
delta-BHC	1.3	--	<0.0050	--	<0.0050	--
trans-Chlordane	NE	--	<0.0050	--	<0.0050	--
Chlorinated Herbicides						
2,4,5-T		--	<0.024	--	<0.024	--
2,4,5-TP (Silvex)		--	<0.024	--	<0.024	--
2,4-D		--	<0.23	--	<0.23	--
2,4-DB		--	<0.24	--	<0.24	--
Dalapon		--	<0.57	--	<0.56	--
Dicamba		--	<0.023	--	<0.023	--
Dichloroprop		--	<0.23	--	<0.23	--
Dinoseb		--	<0.12	--	<0.12	--
MCPA		--	<23	--	<23	--
MCPP		--	<23	--	<23	--
Total Petroleum Hydrocarbons (TPH)						
TPH DRO	620	--	--	--	--	--

Notes:
This table is only to be used in conjunction with the report for which it was prepared. See t±tc.
Samples collected Between September 8, 2022 and September 15, 2022
Results in milligrams per kilogram (mg/kg), equivalent to parts per million (ppm)
NRCS = MDE Non Residential Cleanup Standards for soil as presented in MDE's Cleanup Stane (Update No. 3)
ATC = Anticipated Typical Concentration for soils in Eastern Maryland
Shaded and bold values represent exceedance of MDE RCS
NA = Not applicable
NE = MDE standard not established
* = Risk-based calculated value
The comparison value for mercury is referenced as the elemental mercury RCS/NRCS.

Sample Identification	MDE NRCS	ATC Central	GTA-SA1-E	GTA-SA1-E	GTA-SA1-F	GTA-SA1-F
Sample Interval			0-1	1-8	0-1	1-17
Sample Type			Grab	Composite	Grab	Composite
Sampling Date			9/15/2022	9/15/2022	9/9/2022	9/9/2022
Polycyclic Aromatic Hydrocarbons (PAHs)						
2-Methylnaphthalene	300	--	<0.011	<0.011	<0.0085	<0.0094
Acenaphthene	4,500	--	0.012	<0.011	<0.0085	<0.0094
Acenaphthylene	NE	--	<0.011	<0.011	<0.0085	<0.0094
Anthracene	23,000	--	0.015	<0.011	<0.0085	<0.0094
Benzo(a)anthracene	21	--	0.11	<0.011	<0.0085	<0.0094
Benzo(a)pyrene	2	--	0.15	<0.011	<0.0085	<0.0094
Benzo(b)fluoranthene	21	--	0.14	<0.011	<0.0085	<0.0094
Benzo(g,h,i)perylene	NE	--	0.11	<0.011	<0.0085	<0.0094
Benzo(k)fluoranthene	210	--	0.11	<0.011	<0.0085	<0.0094
Chrysene	2,100	--	0.13	<0.011	<0.0085	<0.0094
Dibenz(a,h)Anthracene	2.1	--	0.034	<0.011	<0.0085	<0.0094
Fluoranthene	3,000	--	0.16	<0.011	0.0092	<0.0094
Fluorene	3,000	--	<0.011	<0.011	<0.0085	<0.0094
Indeno(1,2,3-c,d)Pyrene	21	--	0.11	<0.011	<0.0085	<0.0094
Naphthalene	17	--	<0.011	<0.011	<0.0085	<0.0094
Phenanthrene	2,300	--	0.055	<0.011	<0.0085	<0.0094
Pyrene	2,300	--	0.16	<0.011	0.0088	<0.0094
Priority Pollutant (PP) Metals						
Antimony	47	6.8	<2.9	<2.8	<2.1	<2.2
Arsenic	3.0/26.8*	4.9	7.9	7.0	2.7	4.8
Beryllium	230	1.6	1.5	1.3	<0.42	1.3
Cadmium	98	1.1	<0.57	<0.57	<0.42	<0.43
Chromium [3]	6.3	30	26	27	14	**33**
Copper	4,700	42	25	24	6.6	18
Lead	550	61	19	14	4.9	8.5
Mercury	4.6	0.14	<0.11	<0.11	<0.085	<0.087
Nickel	2,200	22	37	37	16	38
Selenium	580	1.0	<0.57	<0.57	<0.42	<0.43
Silver	580	1.0	<0.57	<0.57	<0.42	<0.43
Thallium	1.2	1.5	<0.57	<0.57	<0.42	<0.43
Zinc	35,000	73	75	65	41	57
Organochlorine Pesticides						
4,4-DDD	2.5	--	<0.0059	--	<0.0042	--
4,4-DDE	9.3	--	<0.0059	--	<0.0042	--
4,4-DDT	8.5	--	<0.0059	--	<0.0042	--
Aldrin	0.18	--	<0.0059	--	<0.0042	--
Chlordane (n.o.s.)	7.7	--	<0.15	--	<0.10	--
Dieldrin	7.7	--	<0.0059	--	<0.0042	--
Endosulfan I	0.14	--	<0.0059	--	<0.0042	--
Endosulfan II	700	--	<0.0059	--	<0.0042	--
Endosulfan Sulfate	NE	--	<0.0059	--	<0.0042	--
Endrin	NE	--	<0.0059	--	<0.0042	--
Endrin Aldehyde	25	--	<0.0059	--	<0.0042	--
Endrin ketone	NE	--		--	<0.0042	--
Gamma-BHC (Lindane)	NE	--	<0.0059	--	<0.0042	--
Heptachlor	2.5	--	<0.0059	--	<0.0042	--
Heptachlor Epoxide	7.7	--	<0.0059	--	<0.0042	--
Methoxychlor	0.63	--		--	<0.0042	--
Toxaphene	0.33	--	<0.15	--	<0.10	--
alpha-BHC	410	--	<0.0059	--	<0.0042	--
beta-BHC	2.1	--	<0.0059	--	<0.0042	--
cis-Chlordane	0.36	--	<0.0059	--	<0.0042	--
delta-BHC	1.3	--	<0.0059	--	<0.0042	--
trans-Chlordane	NE	--	<0.0059	--	<0.0042	--
Chlorinated Herbicides						
2,4,5-T		--	<0.023	--	<0.020	--
2,4,5-TP (Silvex)		--	<0.023	--	<0.020	--
2,4-D		--	<0.23	--	<0.20	--
2,4-DB		--	<0.24	--	<0.21	--
Dalapon		--	<0.56	--	<0.49	--
Dicamba		--	<0.023	--	<0.020	--
Dichloroprop		--	<0.23	--	<0.20	--
Dinoseb		--	<0.12	--	<0.10	--
MCPA		--	<23	--	<20	--
MCPP		--	<23	--	<20	--
Total Petroleum Hydrocarbons (TPH)						
TPH DRO	620	--	--	--	--	--

Notes:
This table is only to be used in conjunction with the report for which it was prepared. See t
Samples collected Between September 8, 2022 and September 15, 2022
Results in milligrams per kilogram (mg/kg), equivalent to parts per million (ppm)
NRCS = MDE Non Residential Cleanup Standards for soil as presented in MDE's Cleanup Stan
ATC = Anticipated Typical Concentration for soils in Eastern Maryland
Shaded and bold values represent exceedance of MDE RCS
NA = Not applicable
NE = MDE standard not established
* = Risk-based calculated value
The comparison value for mercury is referenced as the elemental mercury RCS/NRCS.

Table 2
Soil Analysis Summary

Sample Identification	MDE NRCS	ATC Central	GTA-SA1-G	GTA-SA1-G	GTA-SA1-H	GTA-SA1-H
Sample Interval			0-1	1-19	0-1	1-19
Sample Type			Grab	Composite	Grab	Composite
Sampling Date			9/9/2022	9/9/2022	9/9/2022	9/9/2022
Polycyclic Aromatic Hydrocarbons (PAHs)						
2-Methylnaphthalene	300	--	1.0	<0.010	<0.0095	<0.011
Acenaphthene	4,500	--	2.2	<0.010	<0.0095	<0.011
Acenaphthylene	NE	--	<0.094	<0.010	<0.0095	<0.011
Anthracene	23,000	--	3.0	<0.010	<0.0095	<0.011
Benzo(a)anthracene	21	--	6.1	<0.010	0.013	<0.011
Benzo(a)pyrene	2	--	**6.0**	<0.010	0.015	<0.011
Benzo(b)fluoranthene	21	--	6.3	<0.010	0.014	<0.011
Benzo(g,h,i)perylene	NE	--	3.7	<0.010	0.011	<0.011
Benzo(k)fluoranthene	210	--	4.9	<0.010	0.012	<0.011
Chrysene	2,100	--	5.9	<0.010	0.012	<0.011
Dibenz(a,h)Anthracene	2.1	--	1.3	<0.010	<0.0095	<0.011
Fluoranthene	3,000	--	16	<0.010	0.016	<0.011
Fluorene	3,000	--	2.7	<0.010	<0.0095	<0.011
Indeno(1,2,3-c,d)Pyrene	21	--	3.7	<0.010	0.011	<0.011
Naphthalene	17	--	0.77	<0.010	<0.0095	<0.011
Phenanthrene	2,300	--	15	<0.010	<0.0095	<0.011
Pyrene	2,300	--	11	<0.010	0.016	<0.011
Priority Pollutant (PP) Metals						
Antimony	47	6.8	<2.1	<2.6	<2.5	<2.9
Arsenic	3.0/26.8*	4.9	5.4	2.9	5.6	6.6
Beryllium	230	1.6	1.2	0.93	1.7	1.5
Cadmium	98	1.1	<0.41	<0.51	<0.49	<0.58
Chromium [3]	6.3	30	**33**	**46**	**32**	16
Copper	4,700	42	20	21	20	22
Lead	550	61	12	14	12	11
Mercury	4.6	0.14	<0.083	<0.10	<0.099	<0.12
Nickel	2,200	22	37	40	40	34
Selenium	580	1.0	<0.41	<0.51	<0.49	<0.58
Silver	580	1.0	<0.41	<0.51	<0.49	<0.58
Thallium	1.2	1.5	<0.41	<0.51	<0.49	<0.58
Zinc	35,000	73	65	72	75	50
Organochlorine Pesticides						
4,4-DDD	2.5	--	<0.0044	--	<0.0044	--
4,4-DDE	9.3	--	<0.0044	--	<0.0044	--
4,4-DDT	8.5	--	<0.0044	--	<0.0044	--
Aldrin	0.18	--	<0.0044	--	<0.0044	--
Chlordane (n.o.s.)	7.7	--	<0.11	--	<0.11	--
Dieldrin	7.7	--	<0.0044	--	<0.0044	--
Endosulfan I	0.14	--	<0.0044	--	<0.0044	--
Endosulfan II	700	--	<0.0044	--	<0.0044	--
Endosulfan Sulfate	NE	--	<0.0044	--	<0.0044	--
Endrin	NE	--	<0.0044	--	<0.0044	--
Endrin Aldehyde	25	--	<0.0044	--	<0.0044	--
Endrin ketone	NE	--	<0.0044	--	<0.0044	--
Gamma-BHC (Lindane)	NE	--	<0.0044	--	<0.0044	--
Heptachlor	2.5	--	<0.0044	--	<0.0044	--
Heptachlor Epoxide	7.7	--	<0.0044	--	<0.0044	--
Methoxychlor	0.63	--	<0.0044	--	<0.0044	--
Toxaphene	0.33	--	<0.11	--	<0.11	--
alpha-BHC	410	--	<0.0044	--	<0.0044	--
beta-BHC	2.1	--	<0.0044	--	<0.0044	--
cis-Chlordane	0.36	--	<0.0044	--	<0.0044	--
delta-BHC	1.3	--	<0.0044	--	<0.0044	--
trans-Chlordane	NE	--	<0.0044	--	<0.0044	--
Chlorinated Herbicides						
2,4,5-T		--	<0.021	--	<0.022	--
2,4,5-TP (Silvex)		--	<0.021	--	<0.022	--
2,4-D		--	<0.20	--	<0.22	--
2,4-DB		--	<0.21	--	<0.23	--
Dalapon		--	<0.49	--	<0.54	--
Dicamba		--	<0.020	--	<0.022	--
Dichloroprop		--	<0.20	--	<0.22	--
Dinoseb		--	<0.10	--	<0.11	--
MCPA		--	<20	--	<22	--
MCPP		--	<20	--	<22	--
Total Petroleum Hydrocarbons (TPH)						
TPH DRO	620	--	--	--	--	--

Notes:
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Samples collected Between September 8, 2022 and September 15, 2022
Results in milligrams per kilogram (mg/kg), equivalent to parts per million (ppm)
NRCS = MDE Non Residential Cleanup Standards for soil as presented in MDE's Cleanup Stan
ATC = Anticipated Typical Concentration for soils in Eastern Maryland
Shaded and bold values represent exceedance of MDE RCS
NA = Not applicable
NE = MDE standard not established
* = Risk-based calculated value
The comparison value for mercury is referenced as the elemental mercury RCS/NRCS.

Table 2
Soil Analysis Summary

Sample Identification	MDE NRCS	ATC Central	GTA-SA1-I	GTA-SA1-I	GTA-SA2-A	GTA-SA2-A	GTA-SA2-B	GTA-SA2-B	GTA-SA2-C
Sample Interval			0-1	1-12.5	0-1	1-18	0-1	1-18	0-1
Sample Type			Grab	Composite	Grab	Composite	Grab	Composite	Grab
Sampling Date			9/9/2022	9/9/2022	9/12/2022	9/12/2022	9/12/2022	9/12/2022	9/12/2022
Polycyclic Aromatic Hydrocarbons (PAHs)									
2-Methylnaphthalene	300	--	<0.0090	<0.044	<0.010	<0.011	<0.0099	<0.012	<0.010
Acenaphthene	4,500	--	<0.0090	<0.044	<0.010	<0.011	<0.0099	<0.012	<0.010
Acenaphthylene	NE	--	<0.0090	<0.044	<0.010	<0.011	<0.0099	<0.012	<0.010
Anthracene	23,000	--	0.013	<0.044	<0.010	<0.011	<0.0099	<0.012	<0.010
Benzo(a)anthracene	21	--	0.032	0.096	<0.010	<0.011	<0.0099	<0.012	<0.010
Benzo(a)pyrene	2	--	0.028	0.092	<0.010	<0.011	<0.0099	<0.012	<0.010
Benzo(b)fluoranthene	21	--	0.033	0.19	<0.010	<0.011	<0.0099	<0.012	<0.010
Benzo(g,h,i)perylene	NE	--	0.020	0.085	<0.010	<0.011	<0.0099	<0.012	<0.010
Benzo(k)fluoranthene	210	--	0.025	0.080	<0.010	<0.011	<0.0099	<0.012	<0.010
Chrysene	2,100	--	0.036	0.18	<0.010	<0.011	<0.0099	<0.012	<0.010
Dibenz(a,h)Anthracene	2.1	--	<0.0090	<0.044	<0.010	<0.011	<0.0099	<0.012	<0.010
Fluoranthene	3,000	--	0.075	0.081	<0.010	<0.011	<0.0099	<0.012	<0.010
Fluorene	3,000	--	<0.0090	<0.044	<0.010	<0.011	<0.0099	<0.012	<0.010
Indeno(1,2,3-c,d)Pyrene	21	--	0.019	0.074	<0.010	<0.011	<0.0099	<0.012	<0.010
Naphthalene	17	--	<0.0090	<0.044	<0.010	<0.011	<0.0099	<0.012	<0.010
Phenanthrene	2,300	--	0.070	<0.044	<0.010	<0.011	<0.0099	<0.012	<0.010
Pyrene	2,300	--	0.060	0.14	<0.010	<0.011	<0.0099	<0.012	<0.010
Priority Pollutant (PP) Metals									
Antimony	47	6.8	<2.5	<2.1	<2.6	<2.4	<2.1	<2.6	<2.4
Arsenic	3.0/26.8*	4.9	3.2	3.2	6.8	8.3	5.9	4.6	5.6
Beryllium	230	1.6	0.65	0.45	0.83	0.90	0.99	1.1	0.76
Cadmium	98	1.1	<0.51	<0.43	<0.52	<0.48	<0.42	<0.53	<0.48
Chromium [3]	6.3	30	24	18	**43**	26	**33**	16	**31**
Copper	4,700	42	13	13	19	16	17	31	17
Lead	550	61	18	27	16	22	16	11	15
Mercury	4.6	0.14	<0.10	<0.085	<0.10	<0.096	<0.084	<0.11	<0.095
Nickel	2,200	22	19	14	19	21	24	46	24
Selenium	580	1.0	<0.51	<0.43	<0.52	<0.48	<0.42	<0.53	<0.48
Silver	580	1.0	<0.51	<0.43	<0.52	<0.48	<0.42	<0.53	<0.48
Thallium	1.2	1.5	<0.51	<0.43	<0.52	<0.48	<0.42	<0.53	<0.48
Zinc	35,000	73	53	41	46	36	50	50	43
Organochlorine Pesticides									
4,4-DDD	2.5	--	<0.0043	--	<0.0050	--	<0.0048	--	<0.0048
4,4-DDE	9.3	--	<0.0043	--	<0.0050	--	<0.0048	--	<0.0048
4,4-DDT	8.5	--	<0.0043	--	<0.0050	--	<0.0048	--	<0.0048
Aldrin	0.18	--	<0.0043	--	<0.0050	--	<0.0048	--	<0.0048
Chlordane (n.o.s.)	7.7	--	<0.11	--	<0.12	--	<0.12	--	<0.12
Dieldrin	7.7	--	<0.0043	--	<0.0050	--	<0.0048	--	<0.0048
Endosulfan I	0.14	--	<0.0043	--	<0.0050	--	<0.0048	--	<0.0048
Endosulfan II	700	--	<0.0043	--	<0.0050	--	<0.0048	--	<0.0048
Endosulfan Sulfate	NE	--	<0.0043	--	<0.0050	--	<0.0048	--	<0.0048
Endrin	NE	--	<0.0043	--	<0.0050	--	<0.0048	--	<0.0048
Endrin Aldehyde	25	--	<0.0043	--	<0.0050	--	<0.0048	--	<0.0048
Endrin ketone	NE	--	<0.0043	--	<0.0050	--	<0.0048	--	<0.0048
Gamma-BHC (Lindane)	NE	--	<0.0043	--	<0.0050	--	<0.0048	--	<0.0048
Heptachlor	2.5	--	<0.0043	--	<0.0050	--	<0.0048	--	<0.0048
Heptachlor Epoxide	7.7	--	<0.0043	--	<0.0050	--	<0.0048	--	<0.0048
Methoxychlor	0.63	--	<0.0043	--	<0.0050	--	<0.0048	--	<0.0048
Toxaphene	0.33	--	<0.11	--	<0.12	--	<0.12	--	<0.12
alpha-BHC	410	--	<0.0043	--	<0.0050	--	<0.0048	--	<0.0048
beta-BHC	2.1	--	<0.0043	--	<0.0050	--	<0.0048	--	<0.0048
cis-Chlordane	0.36	--	<0.0043	--	<0.0050	--	<0.0048	--	<0.0048
delta-BHC	1.3	--	<0.0043	--	<0.0050	--	<0.0048	--	<0.0048
trans-Chlordane	NE	--	<0.0043	--	<0.0050	--	<0.0048	--	<0.0048
Chlorinated Herbicides									
2,4,5-T		--	<0.020	--	<0.023	--	<0.022	--	<0.023
2,4,5-TP (Silvex)		--	<0.020	--	<0.023	--	<0.022	--	<0.023
2,4-D		--	<0.20	--	<0.23	--	<0.22	--	<0.23
2,4-DB		--	<0.20	--	<0.23	--	<0.22	--	<0.24
Dalapon		--	<0.48	--	<0.55	--	<0.53	--	<0.56
Dicamba		--	<0.020	--	<0.023	--	<0.022	--	<0.023
Dichloroprop		--	<0.20	--	<0.23	--	<0.22	--	<0.23
Dinoseb		--	<0.099	--	<0.12	--	<0.11	--	<0.12
MCPA		--	<19	--	<23	--	<22	--	<23
MCPP		--	<20	--	<23	--	<22	--	<23
Total Petroleum Hydrocarbons (TPH)									
TPH DRO	620	--	--	--	--	--	--	--	--

Notes:
This table is only to be used in conjunction with the report for which it was prepared. See t
Samples collected Between September 8, 2022 and September 15, 2022
Results in milligrams per kilogram (mg/kg), equivalent to parts per million (ppm)
NRCS = MDE Non Residential Cleanup Standards for soil as presented in MDE's Cleanup Stan
ATC = Anticipated Typical Concentration for soils in Eastern Maryland
Shaded and bold values represent exceedance of MDE RCS
NA = Not applicable
NE = MDE standard not established
* = Risk-based calculated value
The comparison value for mercury is referenced as the elemental mercury RCS/NRCS.

Sample Identification	MDE NRCS	ATC Central	GTA-SA2-C	GTA-SA2-D	GTA-SA2-D	GTA-SA2-E	GTA-SA2-E
Sample Interval			1-18	0-1	1-5	0-1	1-5
Sample Type			Composite	Grab	Composite	Grab	Composite
Sampling Date			9/12/2022	9/12/2022	9/12/2022	9/9/2022	9/9/2022
Polycyclic Aromatic Hydrocarbons (PAHs)							
2-Methylnaphthalene	300	--	<0.011	<0.011	<0.010	<0.011	<0.011
Acenaphthene	4,500	--	<0.011	<0.011	<0.010	<0.011	<0.011
Acenaphthylene	NE	--	<0.011	<0.011	<0.010	<0.011	<0.011
Anthracene	23,000	--	<0.011	<0.011	<0.010	<0.011	<0.011
Benzo(a)anthracene	21	--	<0.011	0.086	<0.010	<0.011	<0.011
Benzo(a)pyrene	2	--	<0.011	0.11	<0.010	<0.011	<0.011
Benzo(b)fluoranthene	21	--	<0.011	0.096	<0.010	<0.011	<0.011
Benzo(g,h,i)perylene	NE	--	<0.011	0.077	<0.010	<0.011	<0.011
Benzo(k)fluoranthene	210	--	<0.011	0.082	<0.010	<0.011	<0.011
Chrysene	2,100	--	<0.011	0.090	<0.010	<0.011	<0.011
Dibenz(a,h)Anthracene	2.1	--	<0.011	0.021	<0.010	<0.011	<0.011
Fluoranthene	3,000	--	<0.011	0.12	<0.010	<0.011	<0.011
Fluorene	3,000	--	<0.011	<0.011	<0.010	<0.011	<0.011
Indeno(1,2,3-c,d)Pyrene	21	--	<0.011	0.071	<0.010	<0.011	<0.011
Naphthalene	17	--	<0.011	<0.011	<0.010	<0.011	<0.011
Phenanthrene	2,300	--	<0.011	0.043	<0.010	<0.011	<0.011
Pyrene	2,300	--	<0.011	0.12	<0.010	<0.011	<0.011
Priority Pollutant (PP) Metals							
Antimony	47	6.8	<3.1	<3.1	<2.7	<2.9	<2.9
Arsenic	3.0/26.8*	4.9	2.3	8.1	8.3	7.6	9.6
Beryllium	230	1.6	<0.61	1.4	1.8	1.5	2.3
Cadmium	98	1.1	<0.61	<0.62	<0.54	<0.59	<0.58
Chromium [3]	6.3	30	6.4	**36**	**37**	29	29
Copper	4,700	42	13	17	17	21	31
Lead	550	61	7.2	19	18	19	17
Mercury	4.6	0.14	<0.12	<0.12	<0.11	<0.12	<0.12
Nickel	2,200	22	8.9	32	33	36	34
Selenium	580	1.0	<0.61	<0.62	<0.54	<0.59	<0.58
Silver	580	1.0	<0.61	<0.62	<0.54	<0.59	<0.58
Thallium	1.2	1.5	<0.61	<0.62	<0.54	<0.59	<0.58
Zinc	35,000	73	21	71	61	65	57
Organochlorine Pesticides							
4,4-DDD	2.5	--	--	<0.0053	--	<0.0053	--
4,4-DDE	9.3	--	--	<0.0053	--	<0.0053	--
4,4-DDT	8.5	--	--	<0.0053	--	<0.0053	--
Aldrin	0.18	--	--	<0.0053	--	<0.0053	--
Chlordane (n.o.s.)	7.7	--	--	<0.13	--	<0.13	--
Dieldrin	7.7	--	--	<0.0053	--	<0.0053	--
Endosulfan I	0.14	--	--	<0.0053	--	<0.0053	--
Endosulfan II	700	--	--	<0.0053	--	<0.0053	--
Endosulfan Sulfate	NE	--	--	<0.0053	--	<0.0053	--
Endrin	NE	--	--	<0.0053	--	<0.0053	--
Endrin Aldehyde	25	--	--	<0.0053	--	<0.0053	--
Endrin ketone	NE	--	--	<0.0053	--	<0.0053	--
Gamma-BHC (Lindane)	NE	--	--	<0.0053	--	<0.0053	--
Heptachlor	2.5	--	--	<0.0053	--	<0.0053	--
Heptachlor Epoxide	7.7	--	--	<0.0053	--	<0.0053	--
Methoxychlor	0.63	--	--	<0.0053	--	<0.0053	--
Toxaphene	0.33	--	--	<0.13	--	<0.13	--
alpha-BHC	410	--	--	<0.0053	--	<0.0053	--
beta-BHC	2.1	--	--	<0.0053	--	<0.0053	--
cis-Chlordane	0.36	--	--	<0.0053	--	<0.0053	--
delta-BHC	1.3	--	--	<0.0053	--	<0.0053	--
trans-Chlordane	NE	--	--	<0.0053	--	<0.0053	--
Chlorinated Herbicides							
2,4,5-T		--	--	<0.024	--	<0.025	--
2,4,5-TP (Silvex)		--	--	<0.024	--	<0.025	--
2,4-D		--	--	<0.23	--	<0.24	--
2,4-DB		--	--	<0.24	--	<0.25	--
Dalapon		--	--	<0.57	--	<0.59	--
Dicamba		--	--	<0.023	--	<0.024	--
Dichloroprop		--	--	<0.23	--	<0.24	--
Dinoseb		--	--	<0.12	--	<0.12	--
MCPA		--	--	<23	--	<24	--
MCPP		--	--	<23	--	<24	--
Total Petroleum Hydrocarbons (TPH)							
TPH DRO	620	--	--	--	--	--	--

Notes:
This table is only to be used in conjunction with the report for which it was prepared. See t
Samples collected Between September 8, 2022 and September 15, 2022
Results in milligrams per kilogram (mg/kg), equivalent to parts per million (ppm)
NRCS = MDE Non Residential Cleanup Standards for soil as presented in MDE's Cleanup Stan
ATC = Anticipated Typical Concentration for soils in Eastern Maryland
Shaded and bold values represent exceedance of MDE RCS
NA = Not applicable
NE = MDE standard not established
* = Risk-based calculated value
The comparison value for mercury is referenced as the elemental mercury RCS/NRCS.

Sample Identification	MDE NRCS	ATC Central	GTA-SA2-F	GTA-SA2-F	GTA-SA3-A	GTA-SA3-A
Sample Interval			0-1	1-7	0-1	1-7
Sample Type			Grab	Composite	Grab	Composite
Sampling Date			9/9/2022	9/9/2022	9/13/2022	9/13/2022
Polycyclic Aromatic Hydrocarbons (PAHs)						
2-Methylnaphthalene	300	--	<0.0096	<0.0094	<0.011	<0.011
Acenaphthene	4,500	--	<0.0096	<0.0094	<0.011	<0.011
Acenaphthylene	NE	--	<0.0096	<0.0094	<0.011	<0.011
Anthracene	23,000	--	<0.0096	<0.0094	<0.011	<0.011
Benzo(a)anthracene	21	--	<0.0096	<0.0094	<0.011	<0.011
Benzo(a)pyrene	2	--	<0.0096	<0.0094	<0.011	<0.011
Benzo(b)fluoranthene	21	--	<0.0096	<0.0094	<0.011	<0.011
Benzo(g,h,i)perylene	NE	--	<0.0096	<0.0094	<0.011	<0.011
Benzo(k)fluoranthene	210	--	<0.0096	<0.0094	<0.011	<0.011
Chrysene	2,100	--	<0.0096	<0.0094	<0.011	<0.011
Dibenz(a,h)Anthracene	2.1	--	<0.0096	<0.0094	<0.011	<0.011
Fluoranthene	3,000	--	<0.0096	<0.0094	<0.011	<0.011
Fluorene	3,000	--	<0.0096	<0.0094	<0.011	<0.011
Indeno(1,2,3-c,d)Pyrene	21	--	<0.0096	<0.0094	<0.011	<0.011
Naphthalene	17	--	<0.0096	<0.0094	<0.011	<0.011
Phenanthrene	2,300	--	<0.0096	<0.0094	<0.011	<0.011
Pyrene	2,300	--	<0.0096	<0.0094	<0.011	<0.011
Priority Pollutant (PP) Metals						
Antimony	47	6.8	<2.3	<2.4	<2.8	<2.7
Arsenic	3.0/26.8*	4.9	6.5	7.0	9.9	8.5
Beryllium	230	1.6	<0.47	1.1	2.2	3.7
Cadmium	98	1.1	<0.47	<0.47	<0.57	<0.54
Chromium [3]	6.3	30	**37**	**38**	**74**	**61**
Copper	4,700	42	13	21	34	33
Lead	550	61	15	12	17	14
Mercury	4.6	0.14	<0.094	<0.094	0.19	0.16
Nickel	2,200	22	17	57	56	53
Selenium	580	1.0	<0.47	<0.47	<0.57	<0.54
Silver	580	1.0	<0.47	<0.47	<0.57	<0.54
Thallium	1.2	1.5	<0.47	<0.47	<0.57	<0.54
Zinc	35,000	73	48	73	77	81
Organochlorine Pesticides						
4,4-DDD	2.5	--	<0.0045	--	<0.0051	--
4,4-DDE	9.3	--	<0.0045	--	<0.0051	--
4,4-DDT	8.5	--	<0.0045	--	<0.0051	--
Aldrin	0.18	--	<0.0045	--	<0.0051	--
Chlordane (n.o.s.)	7.7	--	<0.11	--	<0.13	--
Dieldrin	7.7	--	<0.0045	--	<0.0051	--
Endosulfan I	0.14	--	<0.0045	--	<0.0051	--
Endosulfan II	700	--	<0.0045	--	<0.0051	--
Endosulfan Sulfate	NE	--	<0.0045	--	<0.0051	--
Endrin	NE	--	<0.0045	--	<0.0051	--
Endrin Aldehyde	25	--	<0.0045	--	<0.0051	--
Endrin ketone	NE	--	<0.0045	--	<0.0051	--
Gamma-BHC (Lindane)	NE	--	<0.0045	--	<0.0051	--
Heptachlor	2.5	--	<0.0045	--	<0.0051	--
Heptachlor Epoxide	7.7	--	<0.0045	--	<0.0051	--
Methoxychlor	0.63	--	<0.0045	--	<0.0051	--
Toxaphene	0.33	--	<0.11	--	<0.13	--
alpha-BHC	410	--	<0.0045	--	<0.0051	--
beta-BHC	2.1	--	<0.0045	--	<0.0051	--
cis-Chlordane	0.36	--	<0.0045	--	<0.0051	--
delta-BHC	1.3	--	<0.0045	--	<0.0051	--
trans-Chlordane	NE	--	<0.0045	--	<0.0051	--
Chlorinated Herbicides						
2,4,5-T		--	<0.022	--	<0.024	--
2,4,5-TP (Silvex)		--	<0.022	--	<0.024	--
2,4-D		--	<0.21	--	<0.23	--
2,4-DB		--	<0.22	--	<0.24	--
Dalapon		--	<0.52	--	<0.57	--
Dicamba		--	<0.021	--	<0.023	--
Dichloroprop		--	<0.21	--	<0.23	--
Dinoseb		--	<0.11	--	<0.12	--
MCPA		--	<21	--	<23	--
MCPP		--	<21	--	<23	--
Total Petroleum Hydrocarbons (TPH)						
TPH DRO	620	--	--	--	--	--

Notes:
This table is only to be used in conjunction with the report for which it was prepared. See t
Samples collected Between September 8, 2022 and September 15, 2022
Results in milligrams per kilogram (mg/kg), equivalent to parts per million (ppm)
NRCS = MDE Non Residential Cleanup Standards for soil as presented in MDE's Cleanup Stan
ATC = Anticipated Typical Concentration for soils in Eastern Maryland
Shaded and bold values represent exceedance of MDE RCS
NA = Not applicable
NE = MDE standard not established
* = Risk-based calculated value
The comparison value for mercury is referenced as the elemental mercury RCS/NRCS.

Table 2
Soil Analysis Summary

Sample Identification	MDE NRCS	ATC Central	GTA-SA3-B	GTA-SA3-B	GTA-SA3-C
Sample Interval			0-1	1-8	0-1
Sample Type			Grab	Composite	Grab
Sampling Date			9/13/2022	9/13/2022	9/13/2022
Polycyclic Aromatic Hydrocarbons (PAHs)					
2-Methylnaphthalene	300	--	<0.010	<0.011	<0.010
Acenaphthene	4,500	--	<0.010	<0.011	<0.010
Acenaphthylene	NE	--	<0.010	<0.011	<0.010
Anthracene	23,000	--	<0.010	<0.011	<0.010
Benzo(a)anthracene	21	--	<0.010	<0.011	<0.010
Benzo(a)pyrene	2	--	<0.010	<0.011	<0.010
Benzo(b)fluoranthene	21	--	<0.010	<0.011	<0.010
Benzo(g,h,i)perylene	NE	--	<0.010	<0.011	<0.010
Benzo(k)fluoranthene	210	--	<0.010	<0.011	<0.010
Chrysene	2,100	--	<0.010	<0.011	<0.010
Dibenz(a,h)Anthracene	2.1	--	<0.010	<0.011	<0.010
Fluoranthene	3,000	--	<0.010	<0.011	<0.010
Fluorene	3,000	--	<0.010	<0.011	<0.010
Indeno(1,2,3-c,d)Pyrene	21	--	<0.010	<0.011	<0.010
Naphthalene	17	--	<0.010	<0.011	<0.010
Phenanthrene	2,300	--	<0.010	<0.011	<0.010
Pyrene	2,300	--	<0.010	<0.011	<0.010
Priority Pollutant (PP) Metals					
Antimony	47	6.8	<2.4	<3.2	<2.2
Arsenic	3.0/26.8*	4.9	7.5	12	6.3
Beryllium	230	1.6	1.2	1.7	0.99
Cadmium	98	1.1	<0.48	<0.63	<0.44
Chromium [3]	6.3	30	**36**	**40**	31
Copper	4,700	42	24	32	18
Lead	550	61	19	18	16
Mercury	4.6	0.14	<0.097	<0.13	<0.088
Nickel	2,200	22	33	64	22
Selenium	580	1.0	<0.48	<0.63	<0.44
Silver	580	1.0	<0.48	<0.63	<0.44
Thallium	1.2	1.5	<0.48	<0.63	<0.44
Zinc	35,000	73	56	99	49
Organochlorine Pesticides					
4,4-DDD	2.5	--	<0.0048	--	<0.0048
4,4-DDE	9.3	--	<0.0048	--	<0.0048
4,4-DDT	8.5	--	<0.0048	--	<0.0048
Aldrin	0.18	--	<0.0048	--	<0.0048
Chlordane (n.o.s.)	7.7	--	<0.12	--	<0.12
Dieldrin	7.7	--	<0.0048	--	<0.0048
Endosulfan I	0.14	--	<0.0048	--	<0.0048
Endosulfan II	700	--	<0.0048	--	<0.0048
Endosulfan Sulfate	NE	--	<0.0048	--	<0.0048
Endrin	NE	--	<0.0048	--	<0.0048
Endrin Aldehyde	25	--	<0.0048	--	<0.0048
Endrin ketone	NE	--	<0.0048	--	<0.0048
Gamma-BHC (Lindane)	NE	--	<0.0048	--	<0.0048
Heptachlor	2.5	--	<0.0048	--	<0.0048
Heptachlor Epoxide	7.7	--	<0.0048	--	<0.0048
Methoxychlor	0.63	--	<0.0048	--	<0.0048
Toxaphene	0.33	--	<0.12	--	<0.12
alpha-BHC	410	--	<0.0048	--	<0.0048
beta-BHC	2.1	--	<0.0048	--	<0.0048
cis-Chlordane	0.36	--	<0.0048	--	<0.0048
delta-BHC	1.3	--	<0.0048	--	<0.0048
trans-Chlordane	NE	--	<0.0048	--	<0.0048
Chlorinated Herbicides					
2,4,5-T		--	<0.023	--	<0.024
2,4,5-TP (Silvex)		--	<0.023	--	<0.024
2,4-D		--	<0.23	--	<0.24
2,4-DB		--	<0.24	--	<0.25
Dalapon		--	<0.56	--	<0.58
Dicamba		--	<0.023	--	<0.024
Dichloroprop		--	<0.23	--	<0.24
Dinoseb		--	<0.12	--	<0.12
MCPA		--	<23	--	<24
MCPP		--	<23	--	<24
Total Petroleum Hydrocarbons (TPH)					
TPH DRO	620	--	--	--	--

Notes:
This table is only to be used in conjunction with the report for which it was prepared. See t
Samples collected Between September 8, 2022 and September 15, 2022
Results in milligrams per kilogram (mg/kg), equivalent to parts per million (ppm)
NRCS = MDE Non Residential Cleanup Standards for soil as presented in MDE's Cleanup Stan
ATC = Anticipated Typical Concentration for soils in Eastern Maryland
Shaded and bold values represent exceedance of MDE RCS
NA = Not applicable
NE = MDE standard not established
* = Risk-based calculated value
The comparison value for mercury is referenced as the elemental mercury RCS/NRCS.

Table 2
Soil Analysis Summary

Sample Identification	MDE NRCS	ATC Central	GTA-SA3-C	GTA-SA3-D	GTA-SA3-D	GTA-SA3-E
Sample Interval			1-8	0-1	1-8	0-1
Sample Type			Composite	Grab	Composite	Grab
Sampling Date			9/13/2022	9/13/2022	9/13/2022	9/13/2022
Polycyclic Aromatic Hydrocarbons (PAHs)						
2-Methylnaphthalene	300	--	<0.011	<0.011	<0.011	<0.011
Acenaphthene	4,500	--	<0.011	<0.011	<0.011	<0.011
Acenaphthylene	NE	--	<0.011	<0.011	<0.011	<0.011
Anthracene	23,000	--	<0.011	<0.011	<0.011	<0.011
Benzo(a)anthracene	21	--	<0.011	<0.011	<0.011	<0.011
Benzo(a)pyrene	2	--	<0.011	<0.011	<0.011	<0.011
Benzo(b)fluoranthene	21	--	<0.011	<0.011	<0.011	<0.011
Benzo(g,h,i)perylene	NE	--	<0.011	<0.011	<0.011	<0.011
Benzo(k)fluoranthene	210	--	<0.011	<0.011	<0.011	<0.011
Chrysene	2,100	--	<0.011	<0.011	<0.011	<0.011
Dibenz(a,h)Anthracene	2.1	--	<0.011	<0.011	<0.011	<0.011
Fluoranthene	3,000	--	<0.011	<0.011	<0.011	<0.011
Fluorene	3,000	--	<0.011	<0.011	<0.011	<0.011
Indeno(1,2,3-c,d)Pyrene	21	--	<0.011	<0.011	<0.011	<0.011
Naphthalene	17	--	<0.011	<0.011	<0.011	<0.011
Phenanthrene	2,300	--	<0.011	<0.011	<0.011	<0.011
Pyrene	2,300	--	<0.011	<0.011	<0.011	<0.011
Priority Pollutant (PP) Metals						
Antimony	47	6.8	<2.6	<2.7	<2.9	<2.5
Arsenic	3.0/26.8*	4.9	8.8	6.2	6.4	7.4
Beryllium	230	1.6	3.6	1.1	1.0	0.90
Cadmium	98	1.1	<0.53	<0.54	<0.59	<0.51
Chromium [3]	6.3	30	24	19	16	**36**
Copper	4,700	42	30	28	30	18
Lead	550	61	23	16	17	18
Mercury	4.6	0.14	<0.11	<0.11	<0.12	<0.10
Nickel	2,200	22	42	31	36	20
Selenium	580	1.0	<0.53	<0.54	<0.59	<0.51
Silver	580	1.0	<0.53	<0.54	<0.59	<0.51
Thallium	1.2	1.5	<0.53	<0.54	<0.59	<0.51
Zinc	35,000	73	65	59	73	47
Organochlorine Pesticides						
4,4-DDD	2.5	--	--	<0.0052	--	<0.0051
4,4-DDE	9.3	--	--	<0.0052	--	<0.0051
4,4-DDT	8.5	--	--	<0.0052	--	<0.0051
Aldrin	0.18	--	--	<0.0052	--	<0.0051
Chlordane (n.o.s.)	7.7	--	--	<0.13	--	<0.13
Dieldrin	7.7	--	--	<0.0052	--	<0.0051
Endosulfan I	0.14	--	--	<0.0052	--	<0.0051
Endosulfan II	700	--	--	<0.0052	--	<0.0051
Endosulfan Sulfate	NE	--	--	<0.0052	--	<0.0051
Endrin	NE	--	--	<0.0052	--	<0.0051
Endrin Aldehyde	25	--	--	<0.0052	--	<0.0051
Endrin ketone	NE	--	--	<0.0052	--	<0.0051
Gamma-BHC (Lindane)	NE	--	--	<0.0052	--	<0.0051
Heptachlor	2.5	--	--	<0.0052	--	<0.0051
Heptachlor Epoxide	7.7	--	--	<0.0052	--	<0.0051
Methoxychlor	0.63	--	--	<0.0052	--	<0.0051
Toxaphene	0.33	--	--	<0.13	--	<0.13
alpha-BHC	410	--	--	<0.0052	--	<0.0051
beta-BHC	2.1	--	--	<0.0052	--	<0.0051
cis-Chlordane	0.36	--	--	<0.0052	--	<0.0051
delta-BHC	1.3	--	--	<0.0052	--	<0.0051
trans-Chlordane	NE	--	--	<0.0052	--	<0.0051
Chlorinated Herbicides						
2,4,5-T		--	--	<0.026	--	<0.024
2,4,5-TP (Silvex)		--	--	<0.026	--	<0.024
2,4-D		--	--	<0.26	--	<0.23
2,4-DB		--	--	<0.26	--	<0.24
Dalapon		--	--	<0.62	--	<0.57
Dicamba		--	--	<0.026	--	<0.023
Dichloroprop		--	--	<0.26	--	<0.23
Dinoseb		--	--	<0.13	--	<0.12
MCPA		--	--	<25	--	<23
MCPP		--	--	<26	--	<23
Total Petroleum Hydrocarbons (TPH)						
TPH DRO	620	--	--	--	--	--

Notes:
This table is only to be used in conjunction with the report for which it was prepared. See t
Samples collected Between September 8, 2022 and September 15, 2022
Results in milligrams per kilogram (mg/kg), equivalent to parts per million (ppm)
NRCS = MDE Non Residential Cleanup Standards for soil as presented in MDE's Cleanup Stan
ATC = Anticipated Typical Concentration for soils in Eastern Maryland
Shaded and bold values represent exceedance of MDE RCS
NA = Not applicable
NE = MDE standard not established
* = Risk-based calculated value
The comparison value for mercury is referenced as the elemental mercury RCS/NRCS.

Sample Identification	MDE NRCS	ATC Central	GTA-SA3-E	GTA-SA3-F	GTA-SA3-F	GTA-SA3-G	GTA-SA3-G	GTA-SA4-A	GTA-SA4-A	GTA-SA4-B	GTA-SA4-B
Sample Interval			1-8	0-1	1-8	0-1	1-8	0-1	1-15	0-1	1-15
Sample Type			Composite	Grab	Composite	Grab	Composite	Grab	Composite	Grab	Composite
Sampling Date			9/13/2022	9/9/2022	9/9/2022	9/9/2022	9/9/2022	9/8/2022	9/8/2022	9/8/2022	9/8/2022
Polycyclic Aromatic Hydrocarbons (PAHs)											
2-Methylnaphthalene	300	--	<0.011	<0.0097	<0.010	<0.010	<0.012	<0.010	<0.010	<0.0097	<0.011
Acenaphthene	4,500	--	<0.011	<0.0097	<0.010	<0.010	<0.012	<0.010	<0.010	<0.0097	<0.011
Acenaphthylene	NE	--	<0.011	<0.0097	<0.010	<0.010	<0.012	<0.010	<0.010	<0.0097	<0.011
Anthracene	23,000	--	<0.011	<0.0097	<0.010	<0.010	<0.012	<0.010	<0.010	<0.0097	<0.011
Benzo(a)anthracene	21	--	<0.011	<0.0097	<0.010	<0.010	<0.012	<0.010	<0.010	<0.0097	<0.011
Benzo(a)pyrene	2	--	<0.011	<0.0097	<0.010	<0.010	<0.012	<0.010	<0.010	<0.0097	<0.011
Benzo(b)fluoranthene	21	--	<0.011	<0.0097	<0.010	<0.010	<0.012	<0.010	<0.010	<0.0097	<0.011
Benzo(g,h,i)perylene	NE	--	<0.011	<0.0097	<0.010	<0.010	<0.012	<0.010	<0.010	<0.0097	<0.011
Benzo(k)fluoranthene	210	--	<0.011	<0.0097	<0.010	<0.010	<0.012	<0.010	<0.010	<0.0097	<0.011
Chrysene	2,100	--	<0.011	<0.0097	<0.010	<0.010	<0.012	<0.010	<0.010	<0.0097	<0.011
Dibenz(a,h)Anthracene	2.1	--	<0.011	<0.0097	<0.010	<0.010	<0.012	<0.010	<0.010	<0.0097	<0.011
Fluoranthene	3,000	--	<0.011	<0.0097	<0.010	<0.010	<0.012	<0.010	<0.010	<0.0097	<0.011
Fluorene	3,000	--	<0.011	<0.0097	<0.010	<0.010	<0.012	<0.010	<0.010	<0.0097	<0.011
Indeno(1,2,3-c,d)Pyrene	21	--	<0.011	<0.0097	<0.010	<0.010	<0.012	<0.010	<0.010	<0.0097	<0.011
Naphthalene	17	--	<0.011	<0.0097	<0.010	<0.010	<0.012	<0.010	<0.010	<0.0097	<0.011
Phenanthrene	2,300	--	<0.011	<0.0097	<0.010	<0.010	<0.012	<0.010	<0.010	<0.0097	<0.011
Pyrene	2,300	--	<0.011	<0.0097	<0.010	0.010	<0.012	<0.010	<0.010	<0.0097	<0.011
Priority Pollutant (PP) Metals											
Antimony	47	6.8	<3.0	<2.5	<2.9	<3.0	<3.4	<2.7	<2.3	<2.8	<2.3
Arsenic	3.0/26.8*	4.9	7.1	6.7	5.4	6.7	9.2	5.8	7.0	7.0	8.9
Beryllium	230	1.6	3.4	0.82	0.69	0.63	1.7	1.0	0.73	0.83	1.7
Cadmium	98	1.1	<0.60	<0.49	<0.59	<0.59	<0.69	<0.53	<0.45	<0.56	<0.46
Chromium [3]	6.3	30	26	**37**	30	**47**	**32**	28	28	25	**57**
Copper	4,700	42	39	11	16	18	24	11	16	24	28
Lead	550	61	13	19	12	13	24	16	18	14	17
Mercury	4.6	0.14	<0.12	<0.098	<0.12	0.25	<0.14	<0.11	<0.090	<0.11	<0.092
Nickel	2,200	22	77	16	23	22	35	16	17	23	31
Selenium	580	1.0	<0.60	<0.49	<0.59	<0.59	<0.69	<0.53	<0.45	<0.56	<0.46
Silver	580	1.0	<0.60	<0.49	<0.59	<0.59	<0.69	<0.53	<0.45	<0.56	<0.46
Thallium	1.2	1.5	<0.60	<0.49	<0.59	<0.59	<0.69	<0.53	<0.45	<0.56	<0.46
Zinc	35,000	73	130	42	37	43	68	43	45	44	58
Organochlorine Pesticides											
4,4-DDD	2.5	--	--	<0.0048	--	<0.0049	--	<0.0047	--	<0.0046	--
4,4-DDE	9.3	--	--	<0.0048	--	<0.0049	--	<0.0047	--	<0.0046	--
4,4-DDT	8.5	--	--	<0.0048	--	<0.0049	--	<0.0047	--	<0.0046	--
Aldrin	0.18	--	--	<0.0048	--	<0.0049	--	<0.0047	--	<0.0046	--
Chlordane (n.o.s.)	7.7	--	--	<0.12	--	<0.12	--	<0.12	--	<0.11	--
Dieldrin	7.7	--	--	<0.0048	--	<0.0049	--	<0.0047	--	<0.0046	--
Endosulfan I	0.14	--	--	<0.0048	--	<0.0049	--	<0.0047	--	<0.0046	--
Endosulfan II	700	--	--	<0.0048	--	<0.0049	--	<0.0047	--	<0.0046	--
Endosulfan Sulfate	NE	--	--	<0.0048	--	<0.0049	--	<0.0047	--	<0.0046	--
Endrin	NE	--	--	<0.0048	--	<0.0049	--	<0.0047	--	<0.0046	--
Endrin Aldehyde	25	--	--	<0.0048	--	<0.0049	--	<0.0047	--	<0.0046	--
Endrin ketone	NE	--	--	<0.0048	--	<0.0049	--	<0.0047	--	<0.0046	--
Gamma-BHC (Lindane)	NE	--	--	<0.0048	--	<0.0049	--	<0.0047	--	<0.0046	--
Heptachlor	2.5	--	--	<0.0048	--	<0.0049	--	<0.0047	--	<0.0046	--
Heptachlor Epoxide	7.7	--	--	<0.0048	--	<0.0049	--	<0.0047	--	<0.0046	--
Methoxychlor	0.63	--	--	<0.0048	--	<0.0049	--	<0.0047	--	<0.0046	--
Toxaphene	0.33	--	--	<0.12	--	<0.12	--	<0.12	--	<0.11	--
alpha-BHC	410	--	--	<0.0048	--	<0.0049	--	<0.0047	--	<0.0046	--
beta-BHC	2.1	--	--	<0.0048	--	<0.0049	--	<0.0047	--	<0.0046	--
cis-Chlordane	0.36	--	--	<0.0048	--	<0.0049	--	<0.0047	--	<0.0046	--
delta-BHC	1.3	--	--	<0.0048	--	<0.0049	--	<0.0047	--	<0.0046	--
trans-Chlordane	NE	--	--	<0.0048	--	<0.0049	--	<0.0047	--	<0.0046	--
Chlorinated Herbicides											
2,4,5-T		--	--	<0.023	--	<0.023	--	<0.022	--	<0.022	--
2,4,5-TP (Silvex)		--	--	<0.023	--	<0.023	--	<0.022	--	<0.022	--
2,4-D		--	--	<0.23	--	<0.23	--	<0.22	--	<0.22	--
2,4-DB		--	--	<0.23	--	<0.23	--	<0.22	--	<0.22	--
Dalapon		--	--	<0.55	--	<0.55	--	<0.53	--	<0.53	--
Dicamba		--	--	<0.023	--	<0.023	--	<0.022	--	<0.022	--
Dichloroprop		--	--	<0.23	--	<0.23	--	<0.22	--	<0.22	--
Dinoseb		--	--	<0.12	--	<0.11	--	<0.11	--	<0.11	--
MCPA		--	--	<23	--	<22	--	<22	--	<22	--
MCPP		--	--	<23	--	<23	--	<22	--	<22	--
Total Petroleum Hydrocarbons (TPH)											
TPH DRO	620	--	--	--	--	--	--	--	--	--	--

Notes:
This table is only to be used in conjunction with the report for which it was prepared. See t
Samples collected Between September 8, 2022 and September 15, 2022
Results in milligrams per kilogram (mg/kg), equivalent to parts per million (ppm)
NRCS = MDE Non Residential Cleanup Standards for soil as presented in MDE's Cleanup Star
ATC = Anticipated Typical Concentration for soils in Eastern Maryland
Shaded and bold values represent exceedance of MDE RCS
NA = Not applicable
NE = MDE standard not established
* = Risk-based calculated value
The comparison value for mercury is referenced as the elemental mercury RCS/NRCS.

Sample Identification	MDE NRCS	ATC Central	GTA-SA4-C	GTA-SA4-C	GTA-SA4-D	GTA-SA4-D	GTA-SA4-E	GTA-SA4-E	GTA-SA4-F	GTA-SA4-F	GTA-SA4-G
Sample Interval			0-1	1-5.5	0-1	1-6	0-1	1-15	0-1	1-15	0-1
Sample Type			Grab	Composite	Grab	Composite	Grab	Composite	Grab	Composite	Grab
Sampling Date			9/8/2022	9/8/2022	9/8/2022	9/8/2022	9/8/2022	9/8/2022	9/8/2022	9/8/2022	9/8/2022
Polycyclic Aromatic Hydrocarbons (PAHs)											
2-Methylnaphthalene	300	--	<0.0098	<0.012	<0.0093	<0.0099	<0.0091	<0.010	<0.50	<0.010	<0.0099
Acenaphthene	4,500	--	<0.0098	<0.012	<0.0093	<0.0099	<0.0091	<0.010	<0.50	<0.010	<0.0099
Acenaphthylene	NE	--	<0.0098	<0.012	<0.0093	<0.0099	<0.0091	<0.010	<0.50	<0.010	<0.0099
Anthracene	23,000	--	<0.0098	<0.012	<0.0093	<0.0099	<0.0091	<0.010	<0.50	0.014	<0.0099
Benzo(a)anthracene	21	--	<0.0098	<0.012	<0.0093	<0.0099	<0.0091	<0.010	<0.50	0.046	0.013
Benzo(a)pyrene	2	--	<0.0098	<0.012	<0.0093	<0.0099	<0.0091	<0.010	<0.50	0.048	0.013
Benzo(b)fluoranthene	21	--	<0.0098	<0.012	<0.0093	<0.0099	<0.0091	<0.010	<0.50	0.033	<0.0099
Benzo(g,h,i)perylene	NE	--	<0.0098	<0.012	<0.0093	<0.0099	<0.0091	<0.010	<0.50	0.049	0.015
Benzo(k)fluoranthene	210	--	<0.0098	<0.012	<0.0093	<0.0099	<0.0091	<0.010	<0.50	0.064	0.016
Chrysene	2,100	--	<0.0098	<0.012	<0.0093	<0.0099	<0.0091	<0.010	<0.50	0.048	0.011
Dibenz(a,h)Anthracene	2.1	--	<0.0098	<0.012	<0.0093	<0.0099	<0.0091	<0.010	<0.50	0.046	0.013
Fluoranthene	3,000	--	<0.0098	<0.012	<0.0093	<0.0099	<0.0091	<0.010	<0.50	0.033	<0.0099
Fluorene	3,000	--	<0.0098	<0.012	<0.0093	<0.0099	<0.0091	<0.010	<0.50	<0.010	<0.0099
Indeno(1,2,3-c,d)Pyrene	21	--	<0.0098	<0.012	<0.0093	<0.0099	<0.0091	<0.010	<0.50	0.052	0.015
Naphthalene	17	--	<0.0098	<0.012	<0.0093	<0.0099	<0.0091	<0.010	<0.50	<0.010	<0.0099
Phenanthrene	2,300	--	<0.0098	<0.012	<0.0093	<0.0099	<0.0091	<0.010	<0.50	0.013	<0.0099
Pyrene	2,300	--	<0.0098	<0.012	<0.0093	<0.0099	<0.0091	<0.010	<0.50	0.039	<0.0099
Priority Pollutant (PP) Metals											
Antimony	47	6.8	<2.6	<2.8	<2.4	<2.2	<1.9	<2.5	<2.3	<2.1	<2.4
Arsenic	3.0/26.8*	4.9	4.9	7.8	2.7	4.1	3.2	6.0	6.7	4.0	5.1
Beryllium	230	1.6	0.74	2.4	0.59	0.75	1.2	2.4	1.8	1.2	3.9
Cadmium	98	1.1	<0.52	<0.57	<0.48	<0.43	<0.38	<0.49	<0.46	<0.42	<0.48
Chromium [3]	6.3	30	26	30	17	23	**37**	29	27	28	30
Copper	4,700	42	21	32	8.1	13	14	25	28	9.3	12
Lead	550	61	9.7	15	8.5	10	13	16	12	8.6	9.7
Mercury	4.6	0.14	<0.10	<0.11	<0.095	<0.087	<0.077	<0.098	<0.093	<0.083	<0.096
Nickel	2,200	22	32	49	14	24	29	44	40	36	54
Selenium	580	1.0	<0.52	<0.57	<0.48	<0.43	<0.38	<0.49	<0.46	<0.42	<0.48
Silver	580	1.0	<0.52	<0.57	<0.48	<0.43	<0.38	<0.49	<0.46	<0.42	<0.48
Thallium	1.2	1.5	<0.52	<0.57	<0.48	<0.43	<0.38	<0.49	<0.46	<0.42	<0.48
Zinc	35,000	73	58	86	33	83	71	78	70	69	75
Organochlorine Pesticides											
4,4-DDD	2.5	--	<0.0045	--	<0.0045	--	<0.0042	--	<0.0046	--	<0.0046
4,4-DDE	9.3	--	<0.0045	--	<0.0045	--	<0.0042	--	<0.0046	--	<0.0046
4,4-DDT	8.5	--	<0.0045	--	<0.0045	--	<0.0042	--	<0.0046	--	<0.0046
Aldrin	0.18	--	<0.0045	--	<0.0045	--	<0.0042	--	<0.0046	--	<0.0046
Chlordane (n.o.s.)	7.7	--	<0.11	--	<0.11	--	<0.11	--	<0.11	--	<0.12
Dieldrin	7.7	--	<0.0045	--	<0.0045	--	<0.0042	--	<0.0046	--	<0.0046
Endosulfan I	0.14	--	<0.0045	--	<0.0045	--	<0.0042	--	<0.0046	--	<0.0046
Endosulfan II	700	--	<0.0045	--	<0.0045	--	<0.0042	--	<0.0046	--	<0.0046
Endosulfan Sulfate	NE	--	<0.0045	--	<0.0045	--	<0.0042	--	<0.0046	--	<0.0046
Endrin	NE	--	<0.0045	--	<0.0045	--	<0.0042	--	<0.0046	--	<0.0046
Endrin Aldehyde	25	--	<0.0045	--	<0.0045	--	<0.0042	--	<0.0046	--	<0.0046
Endrin ketone	NE	--	<0.0045	--	<0.0045	--	<0.0042	--	<0.0046	--	<0.0046
Gamma-BHC (Lindane)	NE	--	<0.0045	--	<0.0045	--	<0.0042	--	<0.0046	--	<0.0046
Heptachlor	2.5	--	<0.0045	--	<0.0045	--	<0.0042	--	<0.0046	--	<0.0046
Heptachlor Epoxide	7.7	--	<0.0045	--	<0.0045	--	<0.0042	--	<0.0046	--	<0.0046
Methoxychlor	0.63	--	<0.0045	--	<0.0045	--	<0.0042	--	<0.0046	--	<0.0046
Toxaphene	0.33	--	<0.11	--	<0.11	--	<0.11	--	<0.11	--	<0.12
alpha-BHC	410	--	<0.0045	--	<0.0045	--	<0.0042	--	<0.0046	--	<0.0046
beta-BHC	2.1	--	<0.0045	--	<0.0045	--	<0.0042	--	<0.0046	--	<0.0046
cis-Chlordane	0.36	--	<0.0045	--	<0.0045	--	<0.0042	--	<0.0046	--	<0.0046
delta-BHC	1.3	--	<0.0045	--	<0.0045	--	<0.0042	--	<0.0046	--	<0.0046
trans-Chlordane	NE	--	<0.0045	--	<0.0045	--	<0.0042	--	<0.0046	--	<0.0046
Chlorinated Herbicides											
2,4,5-T		--	<0.022	--	<0.021	--	<0.021	--	<0.023	--	<0.023
2,4,5-TP (Silvex)		--	<0.022	--	<0.021	--	<0.021	--	<0.023	--	<0.023
2,4-D		--	<0.22	--	<0.21	--	<0.21	--	<0.23	--	<0.23
2,4-DB		--	<0.22	--	<0.21	--	<0.21	--	<0.23	--	<0.23
Dalapon		--	<0.52	--	<0.50	--	<0.50	--	<0.55	--	<0.55
Dicamba		--	<0.022	--	<0.021	--	<0.021	--	<0.023	--	<0.023
Dichloroprop		--	<0.22	--	<0.21	--	<0.21	--	<0.23	--	<0.23
Dinoseb		--	<0.11	--	<0.10	--	<0.10	--	<0.11	--	<0.11
MCPA		--	<21	--	<20	--	<21	--	<22	--	<22
MCPP		--	<22	--	<21	--	<21	--	<23	--	<23
Total Petroleum Hydrocarbons (TPH)											
TPH DRO	620	--	--	--	--	--	--	--	--	--	--

Notes:
This table is only to be used in conjunction with the report for which it was prepared. See t
Samples collected Between September 8, 2022 and September 15, 2022
Results in milligrams per kilogram (mg/kg), equivalent to parts per million (ppm)
NRCS = MDE Non Residential Cleanup Standards for soil as presented in MDE's Cleanup Star
ATC = Anticipated Typical Concentration for soils in Eastern Maryland
Shaded and bold values represent exceedance of MDE RCS
NA = Not applicable
NE = MDE standard not established
* = Risk-based calculated value
The comparison value for mercury is referenced as the elemental mercury RCS/NRCS.

Sample Identification	MDE NRCS	ATC Central	GTA-SA4-G	GTA-SA4-H	GTA-SA4-H	GTA-SA4-I	GTA-SA4-I	GTA-SA4-J	GTA-SA4-J	GTA-SA4-K	GTA-SA4-K
Sample Interval			1-15	0-1	1-11	0-1	1-15	0-1	1-9	0-1	1-15
Sample Type			Composite	Grab	Composite	Grab	Composite	Grab	Composite	Grab	Composite
Sampling Date			9/8/2022	9/8/2022	9/8/2022	9/8/2022	9/8/2022	9/8/2022	9/8/2022	9/8/2022	9/8/2022
Polycyclic Aromatic Hydrocarbons (PAHs)											
2-Methylnaphthalene	300	--	<0.011	<0.010	<0.011	<0.0087	<0.011	<0.0093	<0.011	<0.0087	<0.011
Acenaphthene	4,500	--	<0.011	<0.010	<0.011	<0.0087	<0.011	<0.0093	<0.011	<0.0087	0.012
Acenaphthylene	NE	--	<0.011	<0.010	<0.011	<0.0087	<0.011	<0.0093	<0.011	<0.0087	<0.011
Anthracene	23,000	--	<0.011	<0.010	<0.011	<0.0087	<0.011	<0.0093	<0.011	<0.0087	0.023
Benzo(a)anthracene	21	--	<0.011	<0.010	<0.011	<0.0087	<0.011	<0.0093	<0.011	<0.0087	0.024
Benzo(a)pyrene	2	--	<0.011	<0.010	<0.011	<0.0087	<0.011	0.010	<0.011	<0.0087	0.018
Benzo(b)fluoranthene	21	--	<0.011	<0.010	<0.011	<0.0087	<0.011	0.0093	<0.011	<0.0087	0.015
Benzo(g,h,i)perylene	NE	--	<0.011	<0.010	<0.011	<0.0087	<0.011	0.014	<0.011	<0.0087	<0.011
Benzo(k)fluoranthene	210	--	<0.011	<0.010	<0.011	<0.0087	<0.011	<0.0093	<0.011	<0.0087	0.017
Chrysene	2,100	--	<0.011	<0.010	<0.011	<0.0087	<0.011	<0.0093	<0.011	<0.0087	0.022
Dibenz(a,h)Anthracene	2.1	--	<0.011	<0.010	<0.011	<0.0087	<0.011	<0.0093	<0.011	<0.0087	<0.011
Fluoranthene	3,000	--	<0.011	<0.010	<0.011	<0.0087	<0.011	<0.0093	<0.011	<0.0087	0.069
Fluorene	3,000	--	<0.011	<0.010	<0.011	<0.0087	<0.011	<0.0093	<0.011	<0.0087	0.019
Indeno(1,2,3-c,d)Pyrene	21	--	<0.011	<0.010	<0.011	<0.0087	<0.011	0.011	<0.011	<0.0087	<0.011
Naphthalene	17	--	<0.011	<0.010	<0.011	<0.0087	<0.011	<0.0093	<0.011	<0.0087	<0.011
Phenanthrene	2,300	--	<0.011	<0.010	<0.011	<0.0087	<0.011	<0.0093	<0.011	<0.0087	0.085
Pyrene	2,300	--	<0.011	<0.010	<0.011	<0.0087	<0.011	<0.0093	<0.011	<0.0087	0.053
Priority Pollutant (PP) Metals											
Antimony	47	6.8	<2.3	<2.9	<3.2	<2.1	<2.9	<2.5	<3.0	<2.1	<3.3
Arsenic	3.0/26.8*	4.9	4.7	6.4	3.3	2.7	9.4	3.1	4.7	2.6	15
Beryllium	230	1.6	1.6	2.5	0.74	0.55	2.1	0.63	2.0	0.56	4.1
Cadmium	98	1.1	<0.46	<0.58	<0.63	<0.41	<0.59	<0.51	<0.59	<0.43	<0.66
Chromium [3]	6.3	30	**38**	**46**	30	21	27	18	**37**	13	**36**
Copper	4,700	42	19	15	7.6	9.3	27	9.1	12	5.9	19
Lead	550	61	7.4	12	10	5.9	13	9.4	9.5	4.0	15
Mercury	4.6	0.14	<0.093	<0.12	<0.13	<0.083	<0.12	<0.10	<0.12	<0.085	<0.13
Nickel	2,200	22	53	54	40	19	75	17	40	12	89
Selenium	580	1.0	<0.46	<0.58	<0.63	<0.41	<0.59	<0.51	<0.59	<0.43	<0.66
Silver	580	1.0	<0.46	<0.58	<0.63	<0.41	<0.59	<0.51	<0.59	<0.43	<0.66
Thallium	1.2	1.5	<0.46	<0.58	<0.63	<0.41	<0.59	<0.51	<0.59	<0.43	<0.66
Zinc	35,000	73	85	100	67	35	120	54	70	24	170
Organochlorine Pesticides											
4,4-DDD	2.5	--	--	<0.0049	--	<0.0041	--	<0.0046	--	<0.0042	--
4,4-DDE	9.3	--	--	<0.0049	--	<0.0041	--	<0.0046	--	<0.0042	--
4,4-DDT	8.5	--	--	<0.0049	--	<0.0041	--	<0.0046	--	<0.0042	--
Aldrin	0.18	--	--	<0.0049	--	<0.0041	--	<0.0046	--	<0.0042	--
Chlordane (n.o.s.)	7.7	--	--	<0.12	--	<0.10	--	<0.11	--	<0.11	--
Dieldrin	7.7	--	--	<0.0049	--	<0.0041	--	<0.0046	--	<0.0042	--
Endosulfan I	0.14	--	--	<0.0049	--	<0.0041	--	<0.0046	--	<0.0042	--
Endosulfan II	700	--	--	<0.0049	--	<0.0041	--	<0.0046	--	<0.0042	--
Endosulfan Sulfate	NE	--	--	<0.0049	--	<0.0041	--	<0.0046	--	<0.0042	--
Endrin	NE	--	--	<0.0049	--	<0.0041	--	<0.0046	--	<0.0042	--
Endrin Aldehyde	25	--	--	<0.0049	--	<0.0041	--	<0.0046	--	<0.0042	--
Endrin ketone	NE	--	--	<0.0049	--	<0.0041	--	<0.0046	--	<0.0042	--
Gamma-BHC (Lindane)	NE	--	--	<0.0049	--	<0.0041	--	<0.0046	--	<0.0042	--
Heptachlor	2.5	--	--	<0.0049	--	<0.0041	--	<0.0046	--	<0.0042	--
Heptachlor Epoxide	7.7	--	--	<0.0049	--	<0.0041	--	<0.0046	--	<0.0042	--
Methoxychlor	0.63	--	--	<0.0049	--	<0.0041	--	<0.0046	--	<0.0042	--
Toxaphene	0.33	--	--	<0.12	--	<0.10	--	<0.11	--	<0.11	--
alpha-BHC	410	--	--	<0.0049	--	<0.0041	--	<0.0046	--	<0.0042	--
beta-BHC	2.1	--	--	<0.0049	--	<0.0041	--	<0.0046	--	<0.0042	--
cis-Chlordane	0.36	--	--	<0.0049	--	<0.0041	--	<0.0046	--	<0.0042	--
delta-BHC	1.3	--	--	<0.0049	--	<0.0041	--	<0.0046	--	<0.0042	--
trans-Chlordane	NE	--	--	<0.0049	--	<0.0041	--	<0.0046	--	<0.0042	--
Chlorinated Herbicides											
2,4,5-T		--	--	<0.023	--	<0.020	--	<0.022	--	<0.020	--
2,4,5-TP (Silvex)		--	--	<0.023	--	<0.020	--	<0.022	--	<0.020	--
2,4-D		--	--	<0.23	--	<0.20	--	<0.21	--	<0.20	--
2,4-DB		--	--	<0.23	--	<0.20	--	<0.22	--	<0.21	--
Dalapon		--	--	<0.55	--	<0.47	--	<0.52	--	<0.49	--
Dicamba		--	--	<0.023	--	<0.020	--	<0.021	--	<0.020	--
Dichloroprop		--	--	<0.23	--	<0.20	--	<0.21	--	<0.20	--
Dinoseb		--	--	<0.12	--	<0.099	--	<0.11	--	<0.10	--
MCPA		--	--	<23	--	<19	--	<21	--	<20	--
MCPP		--	--	<23	--	<20	--	<21	--	<20	--
Total Petroleum Hydrocarbons (TPH)											
TPH DRO	620	--	--	--	--	--	--	--	--	--	--

Notes:
This table is only to be used in conjunction with the report for which it was prepared. See t
Samples collected Between September 8, 2022 and September 15, 2022
Results in milligrams per kilogram (mg/kg), equivalent to parts per million (ppm)
NRCS = MDE Non Residential Cleanup Standards for soil as presented in MDE's Cleanup Star
ATC = Anticipated Typical Concentration for soils in Eastern Maryland
Shaded and bold values represent exceedance of MDE RCS
NA = Not applicable
NE = MDE standard not established
* = Risk-based calculated value
The comparison value for mercury is referenced as the elemental mercury RCS/NRCS.

Table 2
Soil Analysis Summary

Sample Identification	MDE NRCS	ATC Central	GTA-SA4-L	GTA-SA4-L	GTA-SA4-M
Sample Interval			0-1	1-15	0-1
Sample Type			Grab	Composite	Grab
Sampling Date			9/8/2022	9/8/2022	9/8/2022
Polycyclic Aromatic Hydrocarbons (PAHs)					
2-Methylnaphthalene	300	--	<0.0100	<0.011	<0.0094
Acenaphthene	4,500	--	<0.0100	<0.011	<0.0094
Acenaphthylene	NE	--	<0.0100	<0.011	<0.0094
Anthracene	23,000	--	<0.0100	<0.011	<0.0094
Benzo(a)anthracene	21	--	<0.0100	<0.011	<0.0094
Benzo(a)pyrene	2	--	<0.0100	<0.011	<0.0094
Benzo(b)fluoranthene	21	--	<0.0100	<0.011	<0.0094
Benzo(g,h,i)perylene	NE	--	<0.0100	<0.011	<0.0094
Benzo(k)fluoranthene	210	--	<0.0100	<0.011	<0.0094
Chrysene	2,100	--	<0.0100	<0.011	<0.0094
Dibenz(a,h)Anthracene	2.1	--	<0.0100	<0.011	<0.0094
Fluoranthene	3,000	--	<0.0100	<0.011	<0.0094
Fluorene	3,000	--	<0.0100	<0.011	<0.0094
Indeno(1,2,3-c,d)Pyrene	21	--	<0.0100	<0.011	<0.0094
Naphthalene	17	--	<0.0100	<0.011	<0.0094
Phenanthrene	2,300	--	<0.0100	<0.011	<0.0094
Pyrene	2,300	--	<0.0100	<0.011	<0.0094
Priority Pollutant (PP) Metals					
Antimony	47	6.8	<2.9	<2.4	<2.5
Arsenic	3.0/26.8*	4.9	6.6	3.0	1.8
Beryllium	230	1.6	1.1	1.5	<0.49
Cadmium	98	1.1	<0.57	<0.48	<0.49
Chromium [3]	6.3	30	**33**	21	8.5
Copper	4,700	42	18	14	6.2
Lead	550	61	17	8.5	3.9
Mercury	4.6	0.14	<0.11	<0.096	<0.099
Nickel	2,200	22	23	54	8.3
Selenium	580	1.0	<0.57	<0.48	<0.49
Silver	580	1.0	<0.57	<0.48	<0.49
Thallium	1.2	1.5	<0.57	<0.48	<0.49
Zinc	35,000	73	54	74	85
Organochlorine Pesticides					
4,4-DDD	2.5	--	<0.0046	--	<0.0044
4,4-DDE	9.3	--	<0.0046	--	<0.0044
4,4-DDT	8.5	--	<0.0046	--	<0.0044
Aldrin	0.18	--	<0.0046	--	<0.0044
Chlordane (n.o.s.)	7.7	--	<0.11	--	<0.11
Dieldrin	7.7	--	<0.0046	--	<0.0044
Endosulfan I	0.14	--	<0.0046	--	<0.0044
Endosulfan II	700	--	<0.0046	--	<0.0044
Endosulfan Sulfate	NE	--	<0.0046	--	<0.0044
Endrin	NE	--	<0.0046	--	<0.0044
Endrin Aldehyde	25	--	<0.0046	--	<0.0044
Endrin ketone	NE	--	<0.0046	--	<0.0044
Gamma-BHC (Lindane)	NE	--	<0.0046	--	<0.0044
Heptachlor	2.5	--	<0.0046	--	<0.0044
Heptachlor Epoxide	7.7	--	<0.0046	--	<0.0044
Methoxychlor	0.63	--	<0.0046	--	<0.0044
Toxaphene	0.33	--	<0.11	--	<0.11
alpha-BHC	410	--	<0.0046	--	<0.0044
beta-BHC	2.1	--	<0.0046	--	<0.0044
cis-Chlordane	0.36	--	<0.0046	--	<0.0044
delta-BHC	1.3	--	<0.0046	--	<0.0044
trans-Chlordane	NE	--	<0.0046	--	<0.0044
Chlorinated Herbicides					
2,4,5-T		--	<0.022	--	<0.022
2,4,5-TP (Silvex)		--	<0.022	--	<0.022
2,4-D		--	<0.21	--	<0.22
2,4-DB		--	<0.22	--	<0.22
Dalapon		--	<0.52	--	<0.53
Dicamba		--	<0.021	--	<0.022
Dichloroprop		--	<0.21	--	<0.22
Dinoseb		--	<0.11	--	<0.11
MCPA		--	<21	--	<22
MCPP		--	<21	--	<22
Total Petroleum Hydrocarbons (TPH)					
TPH DRO	620	--	--	--	--

Notes:
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Samples collected Between September 8, 2022 and September 15, 2022
Results in milligrams per kilogram (mg/kg), equivalent to parts per million (ppm)
NRCS = MDE Non Residential Cleanup Standards for soil as presented in MDE's Cleanup Stan
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Shaded and bold values represent exceedance of MDE RCS
NA = Not applicable
NE = MDE standard not established
* = Risk-based calculated value
The comparison value for mercury is referenced as the elemental mercury RCS/NRCS.

Sample Identification	MDE NRCS	ATC Central	GTA-SA4-M	GTA-SA4-N	GTA-SA4-N	GTA-SA4-O	GTA-SA4-O	GTA-SA5-A	GTA-SA5-A
Sample Interval			1-15	0-1	1-15	0-1	1-15	0-1	1-7.5
Sample Type			Composite	Grab	Composite	Grab	Composite	Grab	Composite
Sampling Date			9/8/2022	9/8/2022	9/8/2022	9/8/2022	9/8/2022	9/12/2022	9/12/2022
Polycyclic Aromatic Hydrocarbons (PAHs)									
2-Methylnaphthalene	300	--	<0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.011
Acenaphthene	4,500	--	<0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.011
Acenaphthylene	NE	--	<0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.011
Anthracene	23,000	--	<0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.011
Benzo(a)anthracene	21	--	<0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.011
Benzo(a)pyrene	2	--	<0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.011
Benzo(b)fluoranthene	21	--	<0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.011
Benzo(g,h,i)perylene	NE	--	<0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.011
Benzo(k)fluoranthene	210	--	<0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.011
Chrysene	2,100	--	<0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.011
Dibenz(a,h)Anthracene	2.1	--	<0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.011
Fluoranthene	3,000	--	<0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.011
Fluorene	3,000	--	<0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.011
Indeno(1,2,3-c,d)Pyrene	21	--	<0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.011
Naphthalene	17	--	<0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.011
Phenanthrene	2,300	--	<0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.011
Pyrene	2,300	--	<0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.011
Priority Pollutant (PP) Metals									
Antimony	47	6.8	<2.9	<2.7	<2.3	<3.0	<2.5	<2.3	<2.5
Arsenic	3.0/26.8*	4.9	4.8	3.6	8.0	6.4	5.5	5.2	6.2
Beryllium	230	1.6	1.9	1.6	4.0	0.94	1.9	1.0	0.90
Cadmium	98	1.1	<0.58	<0.54	<0.47	<0.61	<0.51	<0.45	<0.50
Chromium [3]	6.3	30	21	25	22	**33**	30	28	30
Copper	4,700	42	13	64	25	28	26	18	15
Lead	550	61	13	12	7.9	18	12	14	15
Mercury	4.6	0.14	<0.12	<0.11	<0.093	0.21	<0.10	<0.090	<0.10
Nickel	2,200	22	52	40	73	31	57	28	36
Selenium	580	1.0	<0.58	<0.54	<0.47	<0.61	<0.51	<0.45	<0.50
Silver	580	1.0	<0.58	<0.54	<0.47	<0.61	<0.51	<0.45	<0.50
Thallium	1.2	1.5	<0.58	<0.54	<0.47	<0.61	<0.51	<0.45	<0.50
Zinc	35,000	73	110	69	120	53	110	60	52
Organochlorine Pesticides									
4,4-DDD	2.5	--	--	<0.0050	--	<0.0048	--	<0.0049	--
4,4-DDE	9.3	--	--	<0.0050	--	<0.0048	--	<0.0049	--
4,4-DDT	8.5	--	--	<0.0050	--	<0.0048	--	<0.0049	--
Aldrin	0.18	--	--	<0.0050	--	<0.0048	--	<0.0049	--
Chlordane (n.o.s.)	7.7	--	--	<0.12	--	<0.12	--	<0.12	--
Dieldrin	7.7	--	--	<0.0050	--	<0.0048	--	<0.0049	--
Endosulfan I	0.14	--	--	<0.0050	--	<0.0048	--	<0.0049	--
Endosulfan II	700	--	--	<0.0050	--	<0.0048	--	<0.0049	--
Endosulfan Sulfate	NE	--	--	<0.0050	--	<0.0048	--	<0.0049	--
Endrin	NE	--	--	<0.0050	--	<0.0048	--	<0.0049	--
Endrin Aldehyde	25	--	--	<0.0050	--	<0.0048	--	<0.0049	--
Endrin ketone	NE	--	--	<0.0050	--	<0.0048	--	<0.0049	--
Gamma-BHC (Lindane)	NE	--	--	<0.0050	--	<0.0048	--	<0.0049	--
Heptachlor	2.5	--	--	<0.0050	--	<0.0048	--	<0.0049	--
Heptachlor Epoxide	7.7	--	--	<0.0050	--	<0.0048	--	<0.0049	--
Methoxychlor	0.63	--	--	<0.0050	--	<0.0048	--	<0.0049	--
Toxaphene	0.33	--	--	<0.12	--	<0.12	--	<0.12	--
alpha-BHC	410	--	--	<0.0050	--	<0.0048	--	<0.0049	--
beta-BHC	2.1	--	--	<0.0050	--	<0.0048	--	<0.0049	--
cis-Chlordane	0.36	--	--	<0.0050	--	<0.0048	--	<0.0049	--
delta-BHC	1.3	--	--	<0.0050	--	<0.0048	--	<0.0049	--
trans-Chlordane	NE	--	--	<0.0050	--	<0.0048	--	<0.0049	--
Chlorinated Herbicides									
2,4,5-T		--	--	<0.022	--	<0.025	--	<0.023	--
2,4,5-TP (Silvex)		--	--	<0.022	--	<0.025	--	<0.023	--
2,4-D		--	--	<0.22	--	<0.24	--	<0.23	--
2,4-DB		--	--	<0.23	--	<0.25	--	<0.23	--
Dalapon		--	--	<0.54	--	<0.59	--	<0.55	--
Dicamba		--	--	<0.022	--	<0.024	--	<0.023	--
Dichloroprop		--	--	<0.22	--	<0.24	--	<0.23	--
Dinoseb		--	--	<0.11	--	<0.12	--	<0.12	--
MCPA		--	--	<22	--	<24	--	<23	--
MCPP		--	--	<22	--	<24	--	<23	--
Total Petroleum Hydrocarbons (TPH)									
TPH DRO	620	--	--	--	--	--	--	<12	--

Notes:
This table is only to be used in conjunction with the report for which it was prepared. See t
Samples collected Between September 8, 2022 and September 15, 2022
Results in milligrams per kilogram (mg/kg), equivalent to parts per million (ppm)
NRCS = MDE Non Residential Cleanup Standards for soil as presented in MDE's Cleanup Stan
ATC = Anticipated Typical Concentration for soils in Eastern Maryland
Shaded and bold values represent exceedance of MDE RCS
NA = Not applicable
NE = MDE standard not established
* = Risk-based calculated value
The comparison value for mercury is referenced as the elemental mercury RCS/NRCS.

Sample Identification	MDE NRCS	ATC Central	GTA-SA5-B	GTA-SA5-B	GTA-SA5-C	GTA-SA5-C	GTA-SA5-D	GTA-SA5-D	GTA-SA5-E	GTA-SA5-E	GTA-SA5-F
Sample Interval			0-1	1-10.5	0-1	1-11.5	0-1	1-14.25	0-1	1-8	0-1
Sample Type			Grab	Composite	Grab	Composite	Grab	Composite	Grab	Composite	Grab
Sampling Date			9/12/2022	9/12/2022	9/12/2022	9/12/2022	9/12/2022	9/12/2022	9/12/2022	9/12/2022	9/12/2022
Polycyclic Aromatic Hydrocarbons (PAHs)											
2-Methylnaphthalene	300	--	<0.010	<0.012	<0.011	<0.012	<0.0097	<0.011	<0.011	<0.011	<0.011
Acenaphthene	4,500	--	<0.010	<0.012	<0.011	<0.012	<0.0097	<0.011	<0.011	<0.011	<0.011
Acenaphthylene	NE	--	<0.010	<0.012	<0.011	<0.012	<0.0097	<0.011	<0.011	<0.011	<0.011
Anthracene	23,000	--	<0.010	<0.012	<0.011	<0.012	<0.0097	<0.011	<0.011	<0.011	<0.011
Benzo(a)anthracene	21	--	<0.010	<0.012	<0.011	<0.012	<0.0097	<0.011	<0.011	<0.011	<0.011
Benzo(a)pyrene	2	--	<0.010	<0.012	<0.011	<0.012	<0.0097	<0.011	<0.011	<0.011	<0.011
Benzo(b)fluoranthene	21	--	<0.010	<0.012	<0.011	<0.012	<0.0097	<0.011	<0.011	<0.011	<0.011
Benzo(g,h,i)perylene	NE	--	<0.010	<0.012	<0.011	<0.012	<0.0097	<0.011	<0.011	<0.011	<0.011
Benzo(k)fluoranthene	210	--	<0.010	<0.012	<0.011	<0.012	<0.0097	<0.011	<0.011	<0.011	<0.011
Chrysene	2,100	--	<0.010	<0.012	<0.011	<0.012	<0.0097	<0.011	<0.011	<0.011	<0.011
Dibenz(a,h)Anthracene	2.1	--	<0.010	<0.012	<0.011	<0.012	<0.0097	<0.011	<0.011	<0.011	<0.011
Fluoranthene	3,000	--	<0.010	<0.012	<0.011	<0.012	<0.0097	<0.011	<0.011	<0.011	<0.011
Fluorene	3,000	--	<0.010	<0.012	<0.011	<0.012	<0.0097	<0.011	<0.011	<0.011	<0.011
Indeno(1,2,3-c,d)Pyrene	21	--	<0.010	<0.012	<0.011	<0.012	<0.0097	<0.011	<0.011	<0.011	<0.011
Naphthalene	17	--	<0.010	<0.012	<0.011	<0.012	<0.0097	<0.011	<0.011	<0.011	<0.011
Phenanthrene	2,300	--	<0.010	<0.012	<0.011	<0.012	<0.0097	<0.011	<0.011	<0.011	<0.011
Pyrene	2,300	--	<0.010	<0.012	<0.011	<0.012	<0.0097	<0.011	<0.011	<0.011	<0.011
Priority Pollutant (PP) Metals											
Antimony	47	6.8	<2.5	<3.1	<2.2	<2.5	<2.1	<2.7	<3.0	<2.5	<2.4
Arsenic	3.0/26.8*	4.9	6.7	5.5	8.6	13	5.3	8.7	8.7	7.3	8.0
Beryllium	230	1.6	1.1	1.9	1.4	2.6	1.2	1.5	1.5	1.9	3.2
Cadmium	98	1.1	<0.49	<0.62	<0.44	<0.50	<0.43	<0.53	<0.60	<0.49	<0.48
Chromium [3]	6.3	30	**37**	**43**	**41**	**36**	**44**	**52**	**44**	**58**	**58**
Copper	4,700	42	16	19	26	32	9.7	26	30	27	30
Lead	550	61	20	12	13	18	20	12	16	12	14
Mercury	4.6	0.14	<0.099	<0.12	0.089	0.15	<0.086	<0.11	<0.12	<0.099	0.17
Nickel	2,200	22	18	40	32	57	20	51	36	64	46
Selenium	580	1.0	<0.49	<0.62	<0.44	<0.50	<0.43	<0.53	<0.60	<0.49	<0.48
Silver	580	1.0	<0.49	<0.62	<0.44	<0.50	<0.43	<0.53	<0.60	<0.49	<0.48
Thallium	1.2	1.5	<0.49	<0.62	<0.44	<0.50	<0.43	<0.53	<0.60	<0.49	<0.48
Zinc	35,000	73	46	79	59	72	48	89	61	94	71
Organochlorine Pesticides											
4,4-DDD	2.5	--	<0.0049	--	<0.0051	--	<0.0047	--	<0.0053	--	<0.0050
4,4-DDE	9.3	--	<0.0049	--	<0.0051	--	<0.0047	--	<0.0053	--	<0.0050
4,4-DDT	8.5	--	<0.0049	--	<0.0051	--	<0.0047	--	<0.0053	--	<0.0050
Aldrin	0.18	--	<0.0049	--	<0.0051	--	<0.0047	--	<0.0053	--	<0.0050
Chlordane (n.o.s.)	7.7	--	<0.12	--	<0.13	--	<0.12	--	<0.13	--	<0.13
Dieldrin	7.7	--	<0.0049	--	<0.0051	--	<0.0047	--	<0.0053	--	<0.0050
Endosulfan I	0.14	--	<0.0049	--	<0.0051	--	<0.0047	--	<0.0053	--	<0.0050
Endosulfan II	700	--	<0.0049	--	<0.0051	--	<0.0047	--	<0.0053	--	<0.0050
Endosulfan Sulfate	NE	--	<0.0049	--	<0.0051	--	<0.0047	--	<0.0053	--	<0.0050
Endrin	NE	--	<0.0049	--	<0.0051	--	<0.0047	--	<0.0053	--	<0.0050
Endrin Aldehyde	25	--	<0.0049	--	<0.0051	--	<0.0047	--	<0.0053	--	<0.0050
Endrin ketone	NE	--	<0.0049	--	<0.0051	--	<0.0047	--	<0.0053	--	<0.0050
Gamma-BHC (Lindane)	NE	--	<0.0049	--	<0.0051	--	<0.0047	--	<0.0053	--	<0.0050
Heptachlor	2.5	--	<0.0049	--	<0.0051	--	<0.0047	--	<0.0053	--	<0.0050
Heptachlor Epoxide	7.7	--	<0.0049	--	<0.0051	--	<0.0047	--	<0.0053	--	<0.0050
Methoxychlor	0.63	--	<0.0049	--	<0.0051	--	<0.0047	--	<0.0053	--	<0.0050
Toxaphene	0.33	--	<0.12	--	<0.13	--	<0.12	--	<0.13	--	<0.13
alpha-BHC	410	--	<0.0049	--	<0.0051	--	<0.0047	--	<0.0053	--	<0.0050
beta-BHC	2.1	--	<0.0049	--	<0.0051	--	<0.0047	--	<0.0053	--	<0.0050
cis-Chlordane	0.36	--	<0.0049	--	<0.0051	--	<0.0047	--	<0.0053	--	<0.0050
delta-BHC	1.3	--	<0.0049	--	<0.0051	--	<0.0047	--	<0.0053	--	<0.0050
trans-Chlordane	NE	--	<0.0049	--	<0.0051	--	<0.0047	--	<0.0053	--	<0.0050
Chlorinated Herbicides											
2,4,5-T		--	<0.023	--	<0.024	--	<0.023	--	<0.026	--	<0.024
2,4,5-TP (Silvex)		--	<0.023	--	<0.024	--	<0.023	--	<0.026	--	<0.024
2,4-D		--	<0.23	--	<0.24	--	<0.22	--	<0.25	--	<0.24
2,4-DB		--	<0.23	--	<0.25	--	<0.23	--	<0.26	--	<0.24
Dalapon		--	<0.56	--	<0.59	--	<0.54	--	<0.61	--	<0.58
Dicamba		--	<0.023	--	<0.024	--	<0.022	--	<0.025	--	<0.024
Dichloroprop		--	<0.23	--	<0.24	--	<0.22	--	<0.25	--	<0.24
Dinoseb		--	<0.12	--	<0.12	--	<0.11	--	<0.13	--	<0.12
MCPA		--	<23	--	<24	--	<22	--	<25	--	<24
MCPP		--	<23	--	<24	--	<22	--	<25	--	<24
Total Petroleum Hydrocarbons (TPH)											
TPH DRO	620	--	<12	--	<13	--	<12	--	<13	--	<13

Notes:
This table is only to be used in conjunction with the report for which it was prepared. See t
Samples collected Between September 8, 2022 and September 15, 2022
Results in milligrams per kilogram (mg/kg), equivalent to parts per million (ppm)
NRCS = MDE Non Residential Cleanup Standards for soil as presented in MDE's Cleanup Star
ATC = Anticipated Typical Concentration for soils in Eastern Maryland
Shaded and bold values represent exceedance of MDE RCS
NA = Not applicable
NE = MDE standard not established
* = Risk-based calculated value
The comparison value for mercury is referenced as the elemental mercury RCS/NRCS.

Table 2
Soil Analysis Summary

Sample Identification	MDE NRCS	ATC Central	GTA-SA5-F	GTA-SA5-G	GTA-SA5-G	GTA-SA5-H	GTA-SA5-H	GTA-SA5-I	GTA-SA5-I	GTA-SA5-J	GTA-SA5-J
Sample Interval			1-9.8	0-1	1-9	0-1	1-15	0-1	1-13	0-1	1-8.5
Sample Type			Composite	Grab	Composite	Grab	Composite	Grab	Composite	Grab	Composite
Sampling Date			9/12/2022	9/13/2022	9/13/2022	9/13/2022	9/13/2022	9/13/2022	9/13/2022	9/13/2022	9/13/2022
Polycyclic Aromatic Hydrocarbons (PAHs)											
2-Methylnaphthalene	300	--	<0.011	<0.0090	<0.011	<0.010	<0.010	<0.011	<0.011	<0.0099	<0.011
Acenaphthene	4,500	--	<0.011	<0.0090	<0.011	<0.010	<0.010	<0.011	<0.011	<0.0099	<0.011
Acenaphthylene	NE	--	<0.011	<0.0090	<0.011	<0.010	<0.010	<0.011	<0.011	<0.0099	<0.011
Anthracene	23,000	--	<0.011	<0.0090	<0.011	<0.010	<0.010	<0.011	<0.011	<0.0099	<0.011
Benzo(a)anthracene	21	--	<0.011	<0.0090	<0.011	<0.010	<0.010	<0.011	<0.011	<0.0099	<0.011
Benzo(a)pyrene	2	--	<0.011	<0.0090	<0.011	<0.010	<0.010	<0.011	<0.011	<0.0099	<0.011
Benzo(b)fluoranthene	21	--	<0.011	<0.0090	<0.011	<0.010	<0.010	<0.011	<0.011	<0.0099	<0.011
Benzo(g,h,i)perylene	NE	--	<0.011	<0.0090	<0.011	<0.010	<0.010	<0.011	<0.011	<0.0099	<0.011
Benzo(k)fluoranthene	210	--	<0.011	<0.0090	<0.011	<0.010	<0.010	<0.011	<0.011	<0.0099	<0.011
Chrysene	2,100	--	<0.011	<0.0090	<0.011	<0.010	<0.010	<0.011	<0.011	<0.0099	<0.011
Dibenz(a,h)Anthracene	2.1	--	<0.011	<0.0090	<0.011	<0.010	<0.010	<0.011	<0.011	<0.0099	<0.011
Fluoranthene	3,000	--	<0.011	<0.0090	<0.011	<0.010	<0.010	<0.011	<0.011	<0.0099	<0.011
Fluorene	3,000	--	<0.011	<0.0090	<0.011	<0.010	<0.010	<0.011	<0.011	<0.0099	<0.011
Indeno(1,2,3-c,d)Pyrene	21	--	<0.011	<0.0090	<0.011	<0.010	<0.010	<0.011	<0.011	<0.0099	<0.011
Naphthalene	17	--	<0.011	<0.0090	<0.011	<0.010	<0.010	<0.011	<0.011	<0.0099	<0.011
Phenanthrene	2,300	--	<0.011	<0.0090	<0.011	<0.010	<0.010	<0.011	<0.011	<0.0099	<0.011
Pyrene	2,300	--	<0.011	<0.0090	<0.011	<0.010	<0.010	<0.011	<0.011	<0.0099	<0.011
Priority Pollutant (PP) Metals											
Antimony	47	6.8	<2.6	<2.7	<2.4	<2.1	<3.0	<3.0	<2.4	<2.0	<2.4
Arsenic	3.0/26.8*	4.9	14	12	13	8.3	10	8.8	8.4	3.9	7.7
Beryllium	230	1.6	5.3	6.8	5.0	1.9	3.7	2.0	2.7	1.3	2.2
Cadmium	98	1.1	<0.53	<0.54	<0.49	<0.43	<0.60	<0.60	<0.48	<0.40	<0.49
Chromium [3]	6.3	30	29	**43**	**63**	**38**	**42**	**45**	**64**	24	**56**
Copper	4,700	42	29	22	29	25	29	29	27	12	21
Lead	550	61	15	15	16	15	12	13	12	16	10
Mercury	4.6	0.14	<0.11	<0.11	<0.098	0.12	<0.12	0.14	<0.095	<0.080	<0.098
Nickel	2,200	22	53	45	53	33	51	38	55	18	49
Selenium	580	1.0	<0.53	<0.54	<0.49	<0.43	<0.60	<0.60	<0.48	<0.40	<0.49
Silver	580	1.0	<0.53	<0.54	<0.49	<0.43	<0.60	<0.60	<0.48	<0.40	<0.49
Thallium	1.2	1.5	<0.53	<0.54	<0.49	<0.43	<0.60	<0.60	<0.48	<0.40	<0.49
Zinc	35,000	73	68	53	77	53	73	58	76	49	72
Organochlorine Pesticides											
4,4-DDD	2.5	--	--	<0.0043	--	<0.0050	--	<0.0050	--	<0.0047	--
4,4-DDE	9.3	--	--	<0.0043	--	<0.0050	--	<0.0050	--	<0.0047	--
4,4-DDT	8.5	--	--	<0.0043	--	<0.0050	--	<0.0050	--	<0.0047	--
Aldrin	0.18	--	--	<0.0043	--	<0.0050	--	<0.0050	--	<0.0047	--
Chlordane (n.o.s.)	7.7	--	--	<0.11	--	<0.13	--	<0.12	--	<0.12	--
Dieldrin	7.7	--	--	<0.0043	--	<0.0050	--	<0.0050	--	<0.0047	--
Endosulfan I	0.14	--	--	<0.0043	--	<0.0050	--	<0.0050	--	<0.0047	--
Endosulfan II	700	--	--	<0.0043	--	<0.0050	--	<0.0050	--	<0.0047	--
Endosulfan Sulfate	NE	--	--	<0.0043	--	<0.0050	--	<0.0050	--	<0.0047	--
Endrin	NE	--	--	<0.0043	--	<0.0050	--	<0.0050	--	<0.0047	--
Endrin Aldehyde	25	--	--	<0.0043	--	<0.0050	--	<0.0050	--	<0.0047	--
Endrin ketone	NE	--	--	<0.0043	--	<0.0050	--	<0.0050	--	<0.0047	--
Gamma-BHC (Lindane)	NE	--	--	<0.0043	--	<0.0050	--	<0.0050	--	<0.0047	--
Heptachlor	2.5	--	--	<0.0043	--	<0.0050	--	<0.0050	--	<0.0047	--
Heptachlor Epoxide	7.7	--	--	<0.0043	--	<0.0050	--	<0.0050	--	<0.0047	--
Methoxychlor	0.63	--	--	<0.0043	--	<0.0050	--	<0.0050	--	<0.0047	--
Toxaphene	0.33	--	--	<0.11	--	<0.13	--	<0.12	--	<0.12	--
alpha-BHC	410	--	--	<0.0043	--	<0.0050	--	<0.0050	--	<0.0047	--
beta-BHC	2.1	--	--	<0.0043	--	<0.0050	--	<0.0050	--	<0.0047	--
cis-Chlordane	0.36	--	--	<0.0043	--	<0.0050	--	<0.0050	--	<0.0047	--
delta-BHC	1.3	--	--	<0.0043	--	<0.0050	--	<0.0050	--	<0.0047	--
trans-Chlordane	NE	--	--	<0.0043	--	<0.0050	--	<0.0050	--	<0.0047	--
Chlorinated Herbicides											
2,4,5-T		--	--	<0.020	--	<0.023	--	<0.024	--	<0.024	--
2,4,5-TP (Silvex)		--	--	<0.020	--	<0.023	--	<0.024	--	<0.024	--
2,4-D		--	--	<0.20	--	<0.23	--	<0.24	--	<0.24	--
2,4-DB		--	--	<0.20	--	<0.24	--	<0.25	--	<0.24	--
Dalapon		--	--	<0.47	--	<0.56	--	<0.59	--	<0.57	--
Dicamba		--	--	<0.020	--	<0.023	--	<0.024	--	<0.024	--
Dichloroprop		--	--	<0.20	--	<0.23	--	<0.24	--	<0.24	--
Dinoseb		--	--	<0.099	--	<0.12	--	<0.12	--	<0.12	--
MCPA		--	--	<19	--	<23	--	<24	--	<23	--
MCPP		--	--	<20	--	<23	--	<24	--	<24	--
Total Petroleum Hydrocarbons (TPH)											
TPH DRO	620	--	--	<11	--	<13	--	<13	--	<12	--

Notes:
This table is only to be used in conjunction with the report for which it was prepared. See t
Samples collected Between September 8, 2022 and September 15, 2022
Results in milligrams per kilogram (mg/kg), equivalent to parts per million (ppm)
NRCS = MDE Non Residential Cleanup Standards for soil as presented in MDE's Cleanup Star
ATC = Anticipated Typical Concentration for soils in Eastern Maryland
Shaded and bold values represent exceedance of MDE RCS
NA = Not applicable
NE = MDE standard not established
* = Risk-based calculated value
The comparison value for mercury is referenced as the elemental mercury RCS/NRCS.

Sample Identification	MDE NRCS	ATC Central	GTA-SA5-K	GTA-SA5-K	GTA-SA5-L	GTA-SA5-L	GTA-SA6-A	GTA-SA6-A	GTA-SA6-B	GTA-SA6-B	GTA-SA6-C
Sample Interval			0-1	1-5.5	0-1	1-9	0-1	1-20	0-1	1-15	0-1
Sample Type			Grab	Composite	Grab	Composite	Grab	Composite	Grab	Composite	Grab
Sampling Date			9/13/2022	9/13/2022	9/15/2022	9/15/2022	9/12/2022	9/12/2022	9/12/2022	9/12/2022	9/13/2022
Polycyclic Aromatic Hydrocarbons (PAHs)											
2-Methylnaphthalene	300	--	<0.010	<0.0098	<0.012	<0.010	<0.011	<0.012	<0.010	<0.012	<0.010
Acenaphthene	4,500	--	<0.010	<0.0098	<0.012	<0.010	<0.011	<0.012	<0.010	<0.012	<0.010
Acenaphthylene	NE	--	<0.010	<0.0098	<0.012	<0.010	<0.011	<0.012	<0.010	<0.012	<0.010
Anthracene	23,000	--	<0.010	<0.0098	<0.012	<0.010	<0.011	<0.012	<0.010	<0.012	<0.010
Benzo(a)anthracene	21	--	<0.010	<0.0098	0.024	<0.010	<0.011	<0.012	<0.010	<0.012	<0.010
Benzo(a)pyrene	2	--	<0.010	<0.0098	0.030	<0.010	<0.011	<0.012	<0.010	<0.012	<0.010
Benzo(b)fluoranthene	21	--	<0.010	<0.0098	0.024	<0.010	<0.011	<0.012	<0.010	<0.012	<0.010
Benzo(g,h,i)perylene	NE	--	<0.010	<0.0098	0.022	<0.010	<0.011	<0.012	<0.010	<0.012	<0.010
Benzo(k)fluoranthene	210	--	<0.010	<0.0098	0.023	<0.010	<0.011	<0.012	<0.010	<0.012	<0.010
Chrysene	2,100	--	<0.010	<0.0098	0.025	<0.010	<0.011	<0.012	<0.010	<0.012	<0.010
Dibenz(a,h)Anthracene	2.1	--	<0.010	<0.0098	<0.012	<0.010	<0.011	<0.012	<0.010	<0.012	<0.010
Fluoranthene	3,000	--	<0.010	<0.0098	0.031	<0.010	<0.011	<0.012	<0.010	<0.012	<0.010
Fluorene	3,000	--	<0.010	<0.0098	<0.012	<0.010	<0.011	<0.012	<0.010	<0.012	<0.010
Indeno(1,2,3-c,d)Pyrene	21	--	<0.010	<0.0098	0.021	<0.010	<0.011	<0.012	<0.010	<0.012	<0.010
Naphthalene	17	--	<0.010	<0.0098	<0.012	<0.010	<0.011	<0.012	<0.010	<0.012	<0.010
Phenanthrene	2,300	--	<0.010	<0.0098	0.012	<0.010	<0.011	<0.012	<0.010	<0.012	<0.010
Pyrene	2,300	--	<0.010	<0.0098	0.031	<0.010	<0.011	<0.012	<0.010	<0.012	<0.010
Priority Pollutant (PP) Metals											
Antimony	47	6.8	<2.9	<2.5	<3.4	<2.4	<2.3	<3.1	<2.4	<2.6	<2.8
Arsenic	3.0/26.8*	4.9	7.3	8.5	6.4	4.2	6.7	7.7	8.2	7.5	9.3
Beryllium	230	1.6	2.6	3.8	1.6	0.66	1.2	2.0	1.2	2.2	2.5
Cadmium	98	1.1	<0.58	<0.51	<0.68	<0.48	<0.46	<0.63	<0.48	<0.53	<0.57
Chromium [3]	6.3	30	**48**	**47**	21	20	28	12	**38**	29	**52**
Copper	4,700	42	27	28	12	16	26	32	22	24	24
Lead	550	61	17	13	23	12	17	21	15	12	18
Mercury	4.6	0.14	0.14	<0.10	<0.14	<0.097	<0.092	<0.13	<0.097	<0.11	<0.11
Nickel	2,200	22	46	56	35	19	32	38	38	47	42
Selenium	580	1.0	<0.58	<0.51	<0.68	<0.48	<0.46	<0.63	0.59	<0.53	<0.57
Silver	580	1.0	<0.58	<0.51	<0.68	<0.48	<0.46	<0.63	<0.48	<0.53	<0.57
Thallium	1.2	1.5	<0.58	<0.51	<0.68	<0.48	<0.46	<0.63	<0.48	<0.53	<0.57
Zinc	35,000	73	89	71	84	37	54	71	66	62	69
Organochlorine Pesticides											
4,4-DDD	2.5	--	<0.0047	--	<0.0059	--	<0.0052	--	<0.0052	--	<0.0048
4,4-DDE	9.3	--	<0.0047	--	<0.0059	--	<0.0052	--	<0.0052	--	<0.0048
4,4-DDT	8.5	--	<0.0047	--	<0.0059	--	<0.0052	--	<0.0052	--	<0.0048
Aldrin	0.18	--	<0.0047	--	<0.0059	--	<0.0052	--	<0.0052	--	<0.0048
Chlordane (n.o.s.)	7.7	--	<0.12	--	<0.15	--	<0.13	--	<0.13	--	<0.12
Dieldrin	7.7	--	<0.0047	--	<0.0059	--	<0.0052	--	<0.0052	--	<0.0048
Endosulfan I	0.14	--	<0.0047	--	<0.0059	--	<0.0052	--	<0.0052	--	<0.0048
Endosulfan II	700	--	<0.0047	--	<0.0059	--	<0.0052	--	<0.0052	--	<0.0048
Endosulfan Sulfate	NE	--	<0.0047	--	<0.0059	--	<0.0052	--	<0.0052	--	<0.0048
Endrin	NE	--	<0.0047	--	<0.0059	--	<0.0052	--	<0.0052	--	<0.0048
Endrin Aldehyde	25	--	<0.0047	--	<0.0059	--	<0.0052	--	<0.0052	--	<0.0048
Endrin ketone	NE	--	<0.0047	--		--	<0.0052	--	<0.0052	--	<0.0048
Gamma-BHC (Lindane)	NE	--	<0.0047	--	<0.0059	--	<0.0052	--	<0.0052	--	<0.0048
Heptachlor	2.5	--	<0.0047	--	<0.0059	--	<0.0052	--	<0.0052	--	<0.0048
Heptachlor Epoxide	7.7	--	<0.0047	--	<0.0059	--	<0.0052	--	<0.0052	--	<0.0048
Methoxychlor	0.63	--	<0.0047	--		--	<0.0052	--	<0.0052	--	<0.0048
Toxaphene	0.33	--	<0.12	--	<0.15	--	<0.13	--	<0.13	--	<0.12
alpha-BHC	410	--	<0.0047	--	<0.0059	--	<0.0052	--	<0.0052	--	<0.0048
beta-BHC	2.1	--	<0.0047	--	<0.0059	--	<0.0052	--	<0.0052	--	<0.0048
cis-Chlordane	0.36	--	<0.0047	--	<0.0059	--	<0.0052	--	<0.0052	--	<0.0048
delta-BHC	1.3	--	<0.0047	--	<0.0059	--	<0.0052	--	<0.0052	--	<0.0048
trans-Chlordane	NE	--	<0.0047	--	<0.0059	--	<0.0052	--	<0.0052	--	<0.0048
Chlorinated Herbicides											
2,4,5-T		--	<0.023	--	<0.027	--	<0.024	--	<0.023	--	<0.024
2,4,5-TP (Silvex)		--	<0.023	--	<0.027	--	<0.024	--	<0.023	--	<0.024
2,4-D		--	<0.23	--	<0.27	--	<0.23	--	<0.23	--	<0.24
2,4-DB		--	<0.23	--	<0.27	--	<0.24	--	<0.23	--	<0.24
Dalapon		--	<0.55	--	<0.64	--	<0.57	--	<0.55	--	<0.57
Dicamba		--	<0.023	--	<0.027	--	<0.023	--	<0.023	--	<0.024
Dichloroprop		--	<0.23	--	<0.27	--	<0.23	--	<0.23	--	<0.24
Dinoseb		--	<0.12	--	<0.13	--	<0.12	--	<0.11	--	<0.12
MCPA		--	<23	--	<26	--	<23	--	<22	--	<23
MCPP		--	<23	--	<27	--	<23	--	<23	--	<24
Total Petroleum Hydrocarbons (TPH)											
TPH DRO	620	--	<12	--	<14	--	--	--	--	--	--

Notes:
This table is only to be used in conjunction with the report for which it was prepared. See t
Samples collected Between September 8, 2022 and September 15, 2022
Results in milligrams per kilogram (mg/kg), equivalent to parts per million (ppm)
NRCS = MDE Non Residential Cleanup Standards for soil as presented in MDE's Cleanup Star
ATC = Anticipated Typical Concentration for soils in Eastern Maryland
Shaded and bold values represent exceedance of MDE RCS
NA = Not applicable
NE = MDE standard not established
* = Risk-based calculated value
The comparison value for mercury is referenced as the elemental mercury RCS/NRCS.

Table 2
Soil Analysis Summary

Sample Identification	MDE NRCS	ATC Central	GTA-SA6-C	GTA-SA6-D	GTA-SA6-D	GTA-SA6-E	GTA-SA6-E	GTA-SA6-F	GTA-SA6-F	GTA-SA7-A	GTA-SA7-A
Sample Interval			1-8.5	0-1	1-8.8'	0-1	1-15	0-1	1-15	0-1	1-5
Sample Type			Composite	Grab	Composite	Grab	Composite	Grab	Composite	Grab	Composite
Sampling Date			9/13/2022	9/13/2022	9/13/2022	9/8/2022	9/8/2022	9/14/2022	9/14/2022	9/14/2022	9/14/2022
Polycyclic Aromatic Hydrocarbons (PAHs)											
2-Methylnaphthalene	300	--	<0.011	<0.010	<0.011	<0.086	<0.010	<0.010	<0.011	<0.010	<0.010
Acenaphthene	4,500	--	<0.011	<0.010	<0.011	<0.086	<0.010	<0.010	<0.011	<0.010	<0.010
Acenaphthylene	NE	--	<0.011	<0.010	<0.011	<0.086	<0.010	<0.010	<0.011	<0.010	<0.010
Anthracene	23,000	--	<0.011	<0.010	<0.011	<0.086	<0.010	<0.010	<0.011	<0.010	<0.010
Benzo(a)anthracene	21	--	<0.011	<0.010	<0.011	0.11	<0.010	<0.010	<0.011	<0.010	<0.010
Benzo(a)pyrene	2	--	0.011	<0.010	<0.011	0.14	<0.010	<0.010	<0.011	<0.010	<0.010
Benzo(b)fluoranthene	21	--	<0.011	<0.010	<0.011	0.12	<0.010	<0.010	<0.011	<0.010	<0.010
Benzo(g,h,i)perylene	NE	--	<0.011	<0.010	<0.011	0.10	<0.010	<0.010	<0.011	<0.010	<0.010
Benzo(k)fluoranthene	210	--	<0.011	<0.010	<0.011	0.10	<0.010	<0.010	<0.011	<0.010	<0.010
Chrysene	2,100	--	<0.011	<0.010	<0.011	0.11	<0.010	<0.010	<0.011	<0.010	<0.010
Dibenz(a,h)Anthracene	2.1	--	<0.011	<0.010	<0.011	<0.086	<0.010	<0.010	<0.011	<0.010	<0.010
Fluoranthene	3,000	--	<0.011	<0.010	<0.011	0.14	<0.010	<0.010	<0.011	<0.010	<0.010
Fluorene	3,000	--	<0.011	<0.010	<0.011	<0.086	<0.010	<0.010	<0.011	<0.010	<0.010
Indeno(1,2,3-c,d)Pyrene	21	--	<0.011	<0.010	<0.011	0.097	<0.010	<0.010	<0.011	<0.010	<0.010
Naphthalene	17	--	<0.011	<0.010	<0.011	<0.086	<0.010	<0.010	<0.011	<0.010	<0.010
Phenanthrene	2,300	--	<0.011	<0.010	<0.011	<0.086	<0.010	<0.010	<0.011	<0.010	<0.010
Pyrene	2,300	--	0.011	<0.010	<0.011	0.14	<0.010	<0.010	<0.011	<0.010	<0.010
Priority Pollutant (PP) Metals											
Antimony	47	6.8	<2.6	<2.3	<3.3	<2.1	<2.6	<1.9	<2.9	<2.0	<2.9
Arsenic	3.0/26.8*	4.9	10	7.2	16	4.1	9.3	10	7.0	5.7	7.2
Beryllium	230	1.6	2.9	1.2	1.4	0.76	<0.52	1.1	2.0	0.84	1.1
Cadmium	98	1.1	<0.53	<0.46	<0.65	<0.42	<0.52	<0.39	<0.58	<0.41	<0.58
Chromium [3]	6.3	30	**53**	**38**	**120**	27	**41**	**35**	26	**44**	**34**
Copper	4,700	42	26	21	23	15	29	40	14	20	85
Lead	550	61	20	15	34	20	17	28	9.5	18	24
Mercury	4.6	0.14	<0.11	<0.092	<0.13	<0.085	<0.10	0.19	<0.12	0.21	0.15
Nickel	2,200	22	43	28	37	19	27	44	58	25	34
Selenium	580	1.0	<0.53	<0.46	<0.65	<0.42	<0.52	0.53	<0.58	0.61	<0.58
Silver	580	1.0	<0.53	<0.46	<0.65	<0.42	<0.52	<0.39	<0.58	<0.41	<0.58
Thallium	1.2	1.5	<0.53	<0.46	<0.65	<0.42	<0.52	0.44	<0.58	<0.41	<0.58
Zinc	35,000	73	67	58	49	63	60	60	90	40	50
Organochlorine Pesticides											
4,4-DDD	2.5	--	--	<0.0049	--	<0.021	--	<0.0049	--	<0.0051	--
4,4-DDE	9.3	--	--	<0.0049	--	<0.021	--	<0.0049	--	<0.0051	--
4,4-DDT	8.5	--	--	<0.0049	--	<0.021	--	<0.0049	--	<0.0051	--
Aldrin	0.18	--	--	<0.0049	--	<0.021	--	<0.0049	--	<0.0051	--
Chlordane (n.o.s.)	7.7	--	--	<0.12	--	<0.53	--	<0.12	--	<0.13	--
Dieldrin	7.7	--	--	<0.0049	--	<0.021	--	<0.0049	--	<0.0051	--
Endosulfan I	0.14	--	--	<0.0049	--	<0.021	--	<0.0049	--	<0.0051	--
Endosulfan II	700	--	--	<0.0049	--	<0.021	--	<0.0049	--	<0.0051	--
Endosulfan Sulfate	NE	--	--	<0.0049	--	<0.021	--	<0.0049	--	<0.0051	--
Endrin	NE	--	--	<0.0049	--	<0.021	--	<0.0049	--	<0.0051	--
Endrin Aldehyde	25	--	--	<0.0049	--	<0.021	--	<0.0049	--	<0.0051	--
Endrin ketone	NE	--	--	<0.0049	--	<0.021	--	<0.0049	--	<0.0051	--
Gamma-BHC (Lindane)	NE	--	--	<0.0049	--	<0.021	--	<0.0049	--	<0.0051	--
Heptachlor	2.5	--	--	<0.0049	--	<0.021	--	<0.0049	--	<0.0051	--
Heptachlor Epoxide	7.7	--	--	<0.0049	--	<0.021	--	<0.0049	--	<0.0051	--
Methoxychlor	0.63	--	--	<0.0049	--	<0.021	--	<0.0049	--	<0.0051	--
Toxaphene	0.33	--	--	<0.12	--	<0.53	--	<0.12	--	<0.13	--
alpha-BHC	410	--	--	<0.0049	--	<0.021	--	<0.0049	--	<0.0051	--
beta-BHC	2.1	--	--	<0.0049	--	<0.021	--	<0.0049	--	<0.0051	--
cis-Chlordane	0.36	--	--	<0.0049	--	<0.021	--	<0.0049	--	<0.0051	--
delta-BHC	1.3	--	--	<0.0049	--	<0.021	--	<0.0049	--	<0.0051	--
trans-Chlordane	NE	--	--	<0.0049	--	<0.021	--	<0.0049	--	<0.0051	--
Chlorinated Herbicides											
2,4,5-T		--	--	<0.024	--	<0.019	--	<0.023	--	<0.023	--
2,4,5-TP (Silvex)		--	--	<0.024	--	<0.019	--	<0.023	--	<0.023	--
2,4-D		--	--	<0.24	--	<0.19	--	<0.23	--	<0.22	--
2,4-DB		--	--	<0.24	--	<0.19	--	<0.23	--	<0.23	--
Dalapon		--	--	<0.57	--	<0.46	--	<0.55	--	<0.54	--
Dicamba		--	--	<0.024	--	<0.019	--	<0.023	--	<0.022	--
Dichloroprop		--	--	<0.24	--	<0.19	--	<0.23	--	<0.22	--
Dinoseb		--	--	<0.12	--	<0.095	--	<0.12	--	<0.11	--
MCPA		--	--	<23	--	<19	--	<23	--	<22	--
MCPP		--	--	<24	--	<19	--	<23	--	<22	--
Total Petroleum Hydrocarbons (TPH)											
TPH DRO	620	--	--	--	--	--	--	--	--	--	--

Notes:
This table is only to be used in conjunction with the report for which it was prepared. See t
Samples collected Between September 8, 2022 and September 15, 2022
Results in milligrams per kilogram (mg/kg), equivalent to parts per million (ppm)
NRCS = MDE Non Residential Cleanup Standards for soil as presented in MDE's Cleanup Star
ATC = Anticipated Typical Concentration for soils in Eastern Maryland
Shaded and bold values represent exceedance of MDE RCS
NA = Not applicable
NE = MDE standard not established
* = Risk-based calculated value
The comparison value for mercury is referenced as the elemental mercury RCS/NRCS.

Table 2
Soil Analysis Summary

Sample Identification	MDE NRCS	ATC Central	GTA-SA7-B	GTA-SA7-B	GTA-SA7-C	GTA-SA7-C	GTA-SA7-D	GTA-SA7-D	GTA-SA7-E	GTA-SA7-E	GTA-SA7-F
Sample Interval			0-1	1-5	0-1	1-5	0-1	1-5	0-1	1-5	0-1
Sample Type			Grab	Composite	Grab	Composite	Grab	Composite	Grab	Composite	Grab
Sampling Date			9/14/2022	9/14/2022	9/14/2022	9/14/2022	9/14/2022	9/14/2022	9/14/2022	9/14/2022	9/14/2022
Polycyclic Aromatic Hydrocarbons (PAHs)											
2-Methylnaphthalene	300	--	<0.0098	<0.011	<0.010	<0.0094	<0.011	<0.011	<0.0095	<0.0098	<0.010
Acenaphthene	4,500	--	<0.0098	<0.011	<0.010	<0.0094	<0.011	<0.011	<0.0095	<0.0098	<0.010
Acenaphthylene	NE	--	<0.0098	<0.011	<0.010	<0.0094	<0.011	<0.011	<0.0095	<0.0098	<0.010
Anthracene	23,000	--	<0.0098	<0.011	<0.010	<0.0094	<0.011	<0.011	<0.0095	<0.0098	<0.010
Benzo(a)anthracene	21	--	<0.0098	<0.011	<0.010	<0.0094	<0.011	<0.011	<0.0095	<0.0098	<0.010
Benzo(a)pyrene	2	--	<0.0098	<0.011	<0.010	<0.0094	<0.011	<0.011	<0.0095	<0.0098	<0.010
Benzo(b)fluoranthene	21	--	<0.0098	<0.011	<0.010	<0.0094	<0.011	<0.011	0.0095	<0.0098	<0.010
Benzo(g,h,i)perylene	NE	--	<0.0098	<0.011	<0.010	<0.0094	<0.011	<0.011	<0.0095	<0.0098	<0.010
Benzo(k)fluoranthene	210	--	<0.0098	<0.011	<0.010	<0.0094	<0.011	<0.011	<0.0095	<0.0098	<0.010
Chrysene	2,100	--	<0.0098	<0.011	<0.010	<0.0094	<0.011	<0.011	<0.0095	<0.0098	<0.010
Dibenz(a,h)Anthracene	2.1	--	<0.0098	<0.011	<0.010	<0.0094	<0.011	<0.011	<0.0095	<0.0098	<0.010
Fluoranthene	3,000	--	<0.0098	<0.011	<0.010	<0.0094	<0.011	<0.011	<0.0095	<0.0098	<0.010
Fluorene	3,000	--	<0.0098	<0.011	<0.010	<0.0094	<0.011	<0.011	<0.0095	<0.0098	<0.010
Indeno(1,2,3-c,d)Pyrene	21	--	<0.0098	<0.011	<0.010	<0.0094	<0.011	<0.011	<0.0095	<0.0098	<0.010
Naphthalene	17	--	<0.0098	<0.011	<0.010	<0.0094	<0.011	<0.011	<0.0095	<0.0098	<0.010
Phenanthrene	2,300	--	<0.0098	<0.011	<0.010	<0.0094	<0.011	<0.011	<0.0095	<0.0098	<0.010
Pyrene	2,300	--	<0.0098	<0.011	<0.010	<0.0094	<0.011	<0.011	0.0095	<0.0098	<0.010
Priority Pollutant (PP) Metals											
Antimony	47	6.8	<2.8	<2.5	<2.4	<2.5	<2.5	<2.9	<2.6	<2.3	<2.7
Arsenic	3.0/26.8*	4.9	8.9	7.6	4.3	2.8	3.9	6.7	3.8	2.9	4.8
Beryllium	230	1.6	0.63	1.1	1.3	0.92	1.6	1.7	1.2	1.3	0.97
Cadmium	98	1.1	<0.56	<0.51	<0.48	<0.49	<0.50	<0.58	<0.52	<0.47	<0.54
Chromium [3]	6.3	30	**45**	**32**	24	**31**	26	**51**	**32**	27	**46**
Copper	4,700	42	29	57	12	9.3	14	21	9.9	7.4	22
Lead	550	61	24	18	17	13	21	19	16	11	21
Mercury	4.6	0.14	<0.11	<0.10	<0.096	<0.098	<0.10	<0.12	<0.10	<0.093	<0.11
Nickel	2,200	22	28	32	17	16	20	54	22	18	36
Selenium	580	1.0	0.56	<0.51	<0.48	<0.49	<0.50	<0.58	<0.52	<0.47	<0.54
Silver	580	1.0	<0.56	<0.51	<0.48	<0.49	<0.50	<0.58	<0.52	<0.47	<0.54
Thallium	1.2	1.5	<0.56	<0.51	<0.48	<0.49	<0.50	<0.58	<0.52	<0.47	<0.54
Zinc	35,000	73	51	52	44	47	65	92	55	43	77
Organochlorine Pesticides											
4,4-DDD	2.5	--	<0.0048	--	<0.0051	--	<0.0054	--	<0.0045	--	<0.0051
4,4-DDE	9.3	--	<0.0048	--	<0.0051	--	<0.0054	--	<0.0045	--	<0.0051
4,4-DDT	8.5	--	<0.0048	--	<0.0051	--	<0.0054	--	<0.0045	--	<0.0051
Aldrin	0.18	--	<0.0048	--	<0.0051	--	<0.0054	--	<0.0045	--	<0.0051
Chlordane (n.o.s.)	7.7	--	<0.12	--	<0.13	--	<0.13	--	<0.11	--	<0.13
Dieldrin	7.7	--	<0.0048	--	<0.0051	--	<0.0054	--	<0.0045	--	<0.0051
Endosulfan I	0.14	--	<0.0048	--	<0.0051	--	<0.0054	--	<0.0045	--	<0.0051
Endosulfan II	700	--	<0.0048	--	<0.0051	--	<0.0054	--	<0.0045	--	<0.0051
Endosulfan Sulfate	NE	--	<0.0048	--	<0.0051	--	<0.0054	--	<0.0045	--	<0.0051
Endrin	NE	--	<0.0048	--	<0.0051	--	<0.0054	--	<0.0045	--	<0.0051
Endrin Aldehyde	25	--	<0.0048	--	<0.0051	--	<0.0054	--	<0.0045	--	<0.0051
Endrin ketone	NE	--	<0.0048	--	<0.0051	--	<0.0054	--	<0.0045	--	<0.0051
Gamma-BHC (Lindane)	NE	--	<0.0048	--	<0.0051	--	<0.0054	--	<0.0045	--	<0.0051
Heptachlor	2.5	--	<0.0048	--	<0.0051	--	<0.0054	--	<0.0045	--	<0.0051
Heptachlor Epoxide	7.7	--	<0.0048	--	<0.0051	--	<0.0054	--	<0.0045	--	<0.0051
Methoxychlor	0.63	--	<0.0048	--	<0.0051	--	<0.0054	--	<0.0045	--	<0.0051
Toxaphene	0.33	--	<0.12	--	<0.13	--	<0.13	--	<0.11	--	<0.13
alpha-BHC	410	--	<0.0048	--	<0.0051	--	<0.0054	--	<0.0045	--	<0.0051
beta-BHC	2.1	--	<0.0048	--	<0.0051	--	<0.0054	--	<0.0045	--	<0.0051
cis-Chlordane	0.36	--	<0.0048	--	<0.0051	--	<0.0054	--	<0.0045	--	<0.0051
delta-BHC	1.3	--	<0.0048	--	<0.0051	--	<0.0054	--	<0.0045	--	<0.0051
trans-Chlordane	NE	--	<0.0048	--	<0.0051	--	<0.0054	--	<0.0045	--	<0.0051
Chlorinated Herbicides											
2,4,5-T		--	<0.023	--	<0.022	--	<0.025	--	<0.023	--	<0.024
2,4,5-TP (Silvex)		--	<0.023	--	<0.022	--	<0.025	--	<0.023	--	<0.024
2,4-D		--	<0.22	--	<0.22	--	<0.25	--	<0.23	--	<0.24
2,4-DB		--	<0.23	--	<0.22	--	<0.25	--	<0.23	--	<0.25
Dalapon		--	<0.54	--	<0.53	--	<0.60	--	<0.55	--	<0.58
Dicamba		--	<0.022	--	<0.022	--	<0.025	--	<0.023	--	<0.024
Dichloroprop		--	<0.22	--	<0.22	--	<0.25	--	<0.23	--	<0.24
Dinoseb		--	<0.11	--	<0.11	--	<0.12	--	<0.11	--	<0.12
MCPA		--	<22	--	<22	--	<24	--	<22	--	<24
MCPP		--	<22	--	<22	--	<25	--	<23	--	<24
Total Petroleum Hydrocarbons (TPH)											
TPH DRO	620	--	--	--	--	--	--	--	--	--	--

Notes:
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Samples collected Between September 8, 2022 and September 15, 2022
Results in milligrams per kilogram (mg/kg), equivalent to parts per million (ppm)
NRCS = MDE Non Residential Cleanup Standards for soil as presented in MDE's Cleanup Star
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Shaded and bold values represent exceedance of MDE RCS
NA = Not applicable
NE = MDE standard not established
* = Risk-based calculated value
The comparison value for mercury is referenced as the elemental mercury RCS/NRCS.

Sample Identification	MDE NRCS	ATC Central	GTA-SA7-F	GTA-SA7-G	GTA-SA7-G	GTA-SA7-H	GTA-SA7-H	GTA-SA7-I	GTA-SA7-I	GTA-SA7-J	GTA-SA7-J
Sample Interval			1-5	0-1	1-5	0-1	1-5	0-1	1-5	0-1	1-5
Sample Type			Composite	Grab	Composite	Grab	Composite	Grab	Composite	Grab	Composite
Sampling Date			9/14/2022	9/14/2022	9/14/2022	9/14/2022	9/14/2022	9/9/2022	9/9/2022	9/9/2022	9/9/2022
Polycyclic Aromatic Hydrocarbons (PAHs)											
2-Methylnaphthalene	300	--	<0.0094	<0.010	<0.0095	<0.0097	<0.0098	<0.0098	<0.0096	<0.010	<0.011
Acenaphthene	4,500	--	<0.0094	<0.010	<0.0095	<0.0097	<0.0098	<0.0098	<0.0096	<0.010	<0.011
Acenaphthylene	NE	--	<0.0094	<0.010	<0.0095	<0.0097	<0.0098	<0.0098	<0.0096	<0.010	<0.011
Anthracene	23,000	--	<0.0094	<0.010	<0.0095	<0.0097	<0.0098	<0.0098	<0.0096	<0.010	<0.011
Benzo(a)anthracene	21	--	<0.0094	0.029	<0.0095	<0.0097	<0.0098	<0.0098	<0.0096	<0.010	<0.011
Benzo(a)pyrene	2	--	<0.0094	0.036	<0.0095	<0.0097	<0.0098	<0.0098	<0.0096	<0.010	<0.011
Benzo(b)fluoranthene	21	--	<0.0094	0.034	<0.0095	<0.0097	<0.0098	<0.0098	<0.0096	<0.010	<0.011
Benzo(g,h,i)perylene	NE	--	<0.0094	0.030	<0.0095	<0.0097	<0.0098	<0.0098	<0.0096	<0.010	<0.011
Benzo(k)fluoranthene	210	--	<0.0094	0.029	<0.0095	<0.0097	<0.0098	<0.0098	<0.0096	<0.010	<0.011
Chrysene	2,100	--	<0.0094	0.032	<0.0095	<0.0097	<0.0098	<0.0098	<0.0096	<0.010	<0.011
Dibenz(a,h)Anthracene	2.1	--	<0.0094	<0.010	<0.0095	<0.0097	<0.0098	<0.0098	<0.0096	<0.010	<0.011
Fluoranthene	3,000	--	<0.0094	0.038	<0.0095	<0.0097	<0.0098	<0.0098	<0.0096	<0.010	<0.011
Fluorene	3,000	--	<0.0094	<0.010	<0.0095	<0.0097	<0.0098	<0.0098	<0.0096	<0.010	<0.011
Indeno(1,2,3-c,d)Pyrene	21	--	<0.0094	0.028	<0.0095	<0.0097	<0.0098	<0.0098	<0.0096	<0.010	<0.011
Naphthalene	17	--	<0.0094	<0.010	<0.0095	<0.0097	<0.0098	<0.0098	<0.0096	<0.010	<0.011
Phenanthrene	2,300	--	<0.0094	0.012	<0.0095	<0.0097	<0.0098	<0.0098	<0.0096	<0.010	<0.011
Pyrene	2,300	--	<0.0094	0.040	<0.0095	<0.0097	<0.0098	<0.0098	<0.0096	<0.010	<0.011
Priority Pollutant (PP) Metals											
Antimony	47	6.8	<2.3	<2.3	<2.4	<2.4	<2.2	<2.3	<2.2	<2.2	<3.1
Arsenic	3.0/26.8*	4.9	3.2	3.5	3.2	4.5	5.9	5.4	4.4	5.5	5.1
Beryllium	230	1.6	0.92	1.1	1.0	1.8	1.9	1.5	1.6	1.4	0.99
Cadmium	98	1.1	<0.45	<0.46	<0.48	<0.47	<0.44	<0.47	<0.44	<0.44	<0.62
Chromium [3]	6.3	30	29	**35**	**44**	**56**	**55**	22	28	21	17
Copper	4,700	42	12	11	8.7	18	24	27	22	31	27
Lead	550	61	15	16	13	22	24	11	11	7.9	8.3
Mercury	4.6	0.14	<0.091	<0.091	<0.096	<0.094	<0.087	<0.093	<0.089	<0.087	<0.12
Nickel	2,200	22	21	31	28	52	46	32	34	30	25
Selenium	580	1.0	<0.45	<0.46	<0.48	<0.47	<0.44	<0.47	<0.44	<0.44	<0.62
Silver	580	1.0	<0.45	<0.46	<0.48	<0.47	<0.44	<0.47	<0.44	<0.44	<0.62
Thallium	1.2	1.5	<0.45	<0.46	<0.48	<0.47	<0.44	<0.47	<0.44	<0.44	<0.62
Zinc	35,000	73	44	75	61	120	110	58	62	42	34
Organochlorine Pesticides											
4,4-DDD	2.5	--	--	<0.0051	--	<0.0047	--	<0.0047	--	<0.0051	--
4,4-DDE	9.3	--	--	<0.0051	--	<0.0047	--	<0.0047	--	<0.0051	--
4,4-DDT	8.5	--	--	<0.0051	--	<0.0047	--	<0.0047	--	<0.0051	--
Aldrin	0.18	--	--	<0.0051	--	<0.0047	--	<0.0047	--	<0.0051	--
Chlordane (n.o.s.)	7.7	--	--	<0.13	--	<0.12	--	<0.12	--	<0.13	--
Dieldrin	7.7	--	--	<0.0051	--	<0.0047	--	<0.0047	--	<0.0051	--
Endosulfan I	0.14	--	--	<0.0051	--	<0.0047	--	<0.0047	--	<0.0051	--
Endosulfan II	700	--	--	<0.0051	--	<0.0047	--	<0.0047	--	<0.0051	--
Endosulfan Sulfate	NE	--	--	<0.0051	--	<0.0047	--	<0.0047	--	<0.0051	--
Endrin	NE	--	--	<0.0051	--	<0.0047	--	<0.0047	--	<0.0051	--
Endrin Aldehyde	25	--	--	<0.0051	--	<0.0047	--	<0.0047	--	<0.0051	--
Endrin ketone	NE	--	--	<0.0051	--	<0.0047	--	<0.0047	--	<0.0051	--
Gamma-BHC (Lindane)	NE	--	--	<0.0051	--	<0.0047	--	<0.0047	--	<0.0051	--
Heptachlor	2.5	--	--	<0.0051	--	<0.0047	--	<0.0047	--	<0.0051	--
Heptachlor Epoxide	7.7	--	--	<0.0051	--	<0.0047	--	<0.0047	--	<0.0051	--
Methoxychlor	0.63	--	--	<0.0051	--	<0.0047	--	<0.0047	--	<0.0051	--
Toxaphene	0.33	--	--	<0.13	--	<0.12	--	<0.12	--	<0.13	--
alpha-BHC	410	--	--	<0.0051	--	<0.0047	--	<0.0047	--	<0.0051	--
beta-BHC	2.1	--	--	<0.0051	--	<0.0047	--	<0.0047	--	<0.0051	--
cis-Chlordane	0.36	--	--	<0.0051	--	<0.0047	--	<0.0047	--	<0.0051	--
delta-BHC	1.3	--	--	<0.0051	--	<0.0047	--	<0.0047	--	<0.0051	--
trans-Chlordane	NE	--	--	<0.0051	--	<0.0047	--	<0.0047	--	<0.0051	--
Chlorinated Herbicides											
2,4,5-T		--	--	<0.023	--	<0.021	--	<0.022	--	<0.023	--
2,4,5-TP (Silvex)		--	--	<0.023	--	<0.021	--	<0.022	--	<0.023	--
2,4-D		--	--	<0.23	--	<0.21	--	<0.22	--	<0.23	--
2,4-DB		--	--	<0.23	--	<0.21	--	<0.22	--	<0.23	--
Dalapon		--	--	<0.55	--	<0.51	--	<0.53	--	<0.55	--
Dicamba		--	--	<0.023	--	<0.021	--	<0.022	--	<0.023	--
Dichloroprop		--	--	<0.23	--	<0.21	--	<0.22	--	<0.23	--
Dinoseb		--	--	<0.12	--	<0.11	--	<0.11	--	<0.12	--
MCPA		--	--	<23	--	<21	--	<22	--	<23	--
MCPP		--	--	<23	--	<21	--	<22	--	<23	--
Total Petroleum Hydrocarbons (TPH)											
TPH DRO	620	--	--	--	--	--	--	--	--	--	--

Notes:
This table is only to be used in conjunction with the report for which it was prepared. See t
Samples collected Between September 8, 2022 and September 15, 2022
Results in milligrams per kilogram (mg/kg), equivalent to parts per million (ppm)
NRCS = MDE Non Residential Cleanup Standards for soil as presented in MDE's Cleanup Star
ATC = Anticipated Typical Concentration for soils in Eastern Maryland
Shaded and bold values represent exceedance of MDE RCS
NA = Not applicable
NE = MDE standard not established
* = Risk-based calculated value
The comparison value for mercury is referenced as the elemental mercury RCS/NRCS.

Sample Identification	MDE NRCS	ATC Central	GTA-SA7-K	GTA-SA7-K	GTA-SA8-A	GTA-SA8-A	GTA-SA8-B	GTA-SA8-B	GTA-SA8-C	GTA-SA8-C	GTA-SA8-D
Sample Interval			0-1	1-11	0-1	1-4	0-1	1-4	0-1	1-4	0-1
Sample Type			Grab	Composite	Grab	Composite	Grab	Composite	Grab	Composite	Grab
Sampling Date			9/9/2022	9/9/2022	9/13/2022	9/13/2022	9/13/2022	9/13/2022	9/13/2022	9/13/2022	9/13/2022
Polycyclic Aromatic Hydrocarbons (PAHs)											
2-Methylnaphthalene	300	--	<0.0091	<0.011	<0.0099	<0.0095	<0.0097	<0.0093	<0.0097	<0.0094	<0.0097
Acenaphthene	4,500	--	<0.0091	<0.011	<0.0099	<0.0095	<0.0097	<0.0093	<0.0097	<0.0094	<0.0097
Acenaphthylene	NE	--	<0.0091	<0.011	<0.0099	<0.0095	<0.0097	<0.0093	<0.0097	<0.0094	<0.0097
Anthracene	23,000	--	<0.0091	0.036	<0.0099	<0.0095	<0.0097	<0.0093	<0.0097	<0.0094	<0.0097
Benzo(a)anthracene	21	--	0.050	0.030	<0.0099	<0.0095	<0.0097	<0.0093	<0.0097	<0.0094	<0.0097
Benzo(a)pyrene	2	--	0.043	0.022	<0.0099	<0.0095	<0.0097	<0.0093	<0.0097	<0.0094	<0.0097
Benzo(b)fluoranthene	21	--	0.11	0.018	<0.0099	<0.0095	<0.0097	<0.0093	<0.0097	<0.0094	<0.0097
Benzo(g,h,i)perylene	NE	--	0.049	0.014	<0.0099	<0.0095	<0.0097	<0.0093	<0.0097	<0.0094	<0.0097
Benzo(k)fluoranthene	210	--	0.055	0.021	<0.0099	<0.0095	<0.0097	<0.0093	<0.0097	<0.0094	<0.0097
Chrysene	2,100	--	0.085	0.028	<0.0099	<0.0095	<0.0097	<0.0093	<0.0097	<0.0094	<0.0097
Dibenz(a,h)Anthracene	2.1	--	0.012	<0.011	<0.0099	<0.0095	<0.0097	<0.0093	<0.0097	<0.0094	<0.0097
Fluoranthene	3,000	--	0.048	0.079	<0.0099	<0.0095	<0.0097	<0.0093	<0.0097	<0.0094	<0.0097
Fluorene	3,000	--	<0.0091	0.020	<0.0099	<0.0095	<0.0097	<0.0093	<0.0097	<0.0094	<0.0097
Indeno(1,2,3-c,d)Pyrene	21	--	0.039	0.014	<0.0099	<0.0095	<0.0097	<0.0093	<0.0097	<0.0094	<0.0097
Naphthalene	17	--	<0.0091	<0.011	<0.0099	<0.0095	<0.0097	<0.0093	<0.0097	<0.0094	<0.0097
Phenanthrene	2,300	--	0.015	0.10	<0.0099	<0.0095	<0.0097	<0.0093	<0.0097	<0.0094	<0.0097
Pyrene	2,300	--	0.048	0.063	<0.0099	<0.0095	<0.0097	<0.0093	<0.0097	<0.0094	<0.0097
Priority Pollutant (PP) Metals											
Antimony	47	6.8	<2.5	<2.3	<2.4	<2.8	<2.4	<2.1	<2.2	<2.2	<2.8
Arsenic	3.0/26.8*	4.9	4.3	11	3.4	4.3	2.9	2.9	4.5	4.1	4.3
Beryllium	230	1.6	1.0	2.5	1.1	1.00	1.3	1.5	1.9	1.5	1.8
Cadmium	98	1.1	<0.50	<0.46	<0.49	<0.56	<0.49	<0.42	<0.44	<0.44	<0.56
Chromium [3]	6.3	30	21	**31**	**37**	30	**61**	**79**	**50**	**52**	**43**
Copper	4,700	42	13	25	8.4	8.2	16	19	13	20	14
Lead	550	61	20	22	16	13	14	23	22	20	20
Mercury	4.6	0.14	<0.10	<0.093	<0.097	<0.11	<0.097	<0.084	<0.088	<0.089	<0.11
Nickel	2,200	22	21	44	26	17	47	59	41	42	36
Selenium	580	1.0	<0.50	<0.46	<0.49	<0.56	<0.49	<0.42			
Silver	580	1.0	<0.50	<0.46	<0.49	<0.56	<0.49	<0.42	<0.44	<0.44	<0.56
Thallium	1.2	1.5	<0.50	<0.46	<0.49	<0.56	<0.49	<0.42	<0.44	<0.44	<0.56
Zinc	35,000	73	71	70	70	52	96	130	100	92	94
Organochlorine Pesticides											
4,4-DDD	2.5	--	<0.021	--	<0.0047	--	<0.0045	--	<0.0045	--	<0.0046
4,4-DDE	9.3	--	<0.021	--	<0.0047	--	<0.0045	--	<0.0045	--	<0.0046
4,4-DDT	8.5	--	<0.021	--	<0.0047	--	<0.0045	--	<0.0045	--	<0.0046
Aldrin	0.18	--	<0.021	--	<0.0047	--	<0.0045	--	<0.0045	--	<0.0046
Chlordane (n.o.s.)	7.7	--	<0.53	--	<0.12	--	<0.11	--	<0.11	--	<0.11
Dieldrin	7.7	--	<0.021	--	<0.0047	--	<0.0045	--	<0.0045	--	<0.0046
Endosulfan I	0.14	--	<0.021	--	<0.0047	--	<0.0045	--	<0.0045	--	<0.0046
Endosulfan II	700	--	<0.021	--	<0.0047	--	<0.0045	--	<0.0045	--	<0.0046
Endosulfan Sulfate	NE	--	<0.021	--	<0.0047	--	<0.0045	--	<0.0045	--	<0.0046
Endrin	NE	--	<0.021	--	<0.0047	--	<0.0045	--	<0.0045	--	<0.0046
Endrin Aldehyde	25	--	<0.021	--	<0.0047	--	<0.0045	--	<0.0045	--	<0.0046
Endrin ketone	NE	--	<0.021	--	<0.0047	--	<0.0045	--	<0.0045	--	<0.0046
Gamma-BHC (Lindane)	NE	--	<0.021	--	<0.0047	--	<0.0045	--	<0.0045	--	<0.0046
Heptachlor	2.5	--	<0.021	--	<0.0047	--	<0.0045	--	<0.0045	--	<0.0046
Heptachlor Epoxide	7.7	--	<0.021	--	<0.0047	--	<0.0045	--	<0.0045	--	<0.0046
Methoxychlor	0.63	--	<0.021	--	<0.0047	--	<0.0045	--	<0.0045	--	<0.0046
Toxaphene	0.33	--	<0.53	--	<0.12	--	<0.11	--	<0.11	--	<0.11
alpha-BHC	410	--	<0.021	--	<0.0047	--	<0.0045	--	<0.0045	--	<0.0046
beta-BHC	2.1	--	<0.021	--	<0.0047	--	<0.0045	--	<0.0045	--	<0.0046
cis-Chlordane	0.36	--	<0.021	--	<0.0047	--	<0.0045	--	<0.0045	--	<0.0046
delta-BHC	1.3	--	<0.021	--	<0.0047	--	<0.0045	--	<0.0045	--	<0.0046
trans-Chlordane	NE	--	<0.021	--	<0.0047	--	<0.0045	--	<0.0045	--	<0.0046
Chlorinated Herbicides											
2,4,5-T		--	<0.021	--	<0.022	--	<0.021	--	<0.023	--	<0.023
2,4,5-TP (Silvex)		--	<0.021	--	<0.022	--	<0.021	--	<0.023	--	<0.023
2,4-D		--	<0.21	--	<0.22	--	<0.21	--	<0.22	--	<0.23
2,4-DB		--	<0.21	--	<0.22	--	<0.22	--	<0.23	--	<0.23
Dalapon		--	<0.51	--	<0.52	--	<0.51	--	<0.54	--	<0.55
Dicamba		--	<0.021	--	<0.022	--	<0.021	--	<0.022	--	<0.023
Dichloroprop		--	<0.21	--	<0.22	--	<0.21	--	<0.22	--	<0.23
Dinoseb		--	<0.11	--	<0.11	--	<0.11	--	<0.11	--	<0.12
MCPA		--	<21	--	<21	--	<21	--	<22	--	<23
MCPP		--	<21	--	<22	--	<21	--	<22	--	<23
Total Petroleum Hydrocarbons (TPH)											
TPH DRO	620	--	--	--	--	--	--	--	--	--	--

Notes:
This table is only to be used in conjunction with the report for which it was prepared. See t
Samples collected Between September 8, 2022 and September 15, 2022
Results in milligrams per kilogram (mg/kg), equivalent to parts per million (ppm)
NRCS = MDE Non Residential Cleanup Standards for soil as presented in MDE's Cleanup Star
ATC = Anticipated Typical Concentration for soils in Eastern Maryland
Shaded and bold values represent exceedance of MDE RCS
NA = Not applicable
NE = MDE standard not established
* = Risk-based calculated value
The comparison value for mercury is referenced as the elemental mercury RCS/NRCS.

Sample Identification	MDE NRCS	ATC Central	GTA-SA8-D	GTA-SA8-E	GTA-SA8-E	GTA-SA8-F	GTA-SA8-F	GTA-SA8-G	GTA-SA8-G	GTA-SA8-H	GTA-SA8-H
Sample Interval			1-4	0-1	1-4	0-1	1-4	0-1	1-4	0-1	1-4
Sample Type			Composite	Grab	Composite	Grab	Composite	Grab	Composite	Grab	Composite
Sampling Date			9/13/2022	9/13/2022	9/13/2022	9/13/2022	9/13/2022	9/13/2022	9/13/2022	9/13/2022	9/13/2022
Polycyclic Aromatic Hydrocarbons (PAHs)											
2-Methylnaphthalene	300	--	<0.0099	<0.010	<0.010	<0.0097	<0.0097	<0.0099	<0.010	<0.0099	<0.010
Acenaphthene	4,500	--	<0.0099	<0.010	<0.010	<0.0097	<0.0097	<0.0099	<0.010	<0.0099	<0.010
Acenaphthylene	NE	--	<0.0099	<0.010	<0.010	<0.0097	<0.0097	<0.0099	<0.010	<0.0099	<0.010
Anthracene	23,000	--	<0.0099	<0.010	<0.010	<0.0097	<0.0097	<0.0099	<0.010	<0.0099	<0.010
Benzo(a)anthracene	21	--	<0.0099	<0.010	<0.010	<0.0097	<0.0097	<0.0099	<0.010	<0.0099	<0.010
Benzo(a)pyrene	2	--	<0.0099	<0.010	<0.010	<0.0097	<0.0097	<0.0099	<0.010	<0.0099	<0.010
Benzo(b)fluoranthene	21	--	<0.0099	<0.010	<0.010	<0.0097	<0.0097	<0.0099	<0.010	<0.0099	<0.010
Benzo(g,h,i)perylene	NE	--	<0.0099	<0.010	<0.010	<0.0097	<0.0097	<0.0099	<0.010	<0.0099	<0.010
Benzo(k)fluoranthene	210	--	<0.0099	<0.010	<0.010	<0.0097	<0.0097	<0.0099	<0.010	<0.0099	<0.010
Chrysene	2,100	--	<0.0099	<0.010	<0.010	<0.0097	<0.0097	<0.0099	<0.010	<0.0099	<0.010
Dibenz(a,h)Anthracene	2.1	--	<0.0099	<0.010	<0.010	<0.0097	<0.0097	<0.0099	<0.010	<0.0099	<0.010
Fluoranthene	3,000	--	<0.0099	<0.010	<0.010	<0.0097	<0.0097	<0.0099	<0.010	<0.0099	<0.010
Fluorene	3,000	--	<0.0099	<0.010	<0.010	<0.0097	<0.0097	<0.0099	<0.010	<0.0099	<0.010
Indeno(1,2,3-c,d)Pyrene	21	--	<0.0099	<0.010	<0.010	<0.0097	<0.0097	<0.0099	<0.010	<0.0099	<0.010
Naphthalene	17	--	<0.0099	<0.010	<0.010	<0.0097	<0.0097	<0.0099	<0.010	<0.0099	<0.010
Phenanthrene	2,300	--	<0.0099	<0.010	<0.010	<0.0097	<0.0097	<0.0099	<0.010	<0.0099	<0.010
Pyrene	2,300	--	<0.0099	<0.010	<0.010	<0.0097	<0.0097	<0.0099	<0.010	<0.0099	<0.010
Priority Pollutant (PP) Metals											
Antimony	47	6.8	<2.4	<2.3	<2.6	<2.2	<2.3	<2.1	<2.4	<2.4	<2.1
Arsenic	3.0/26.8*	4.9	3.9	6.3	4.9	6.4	5.0	7.8	7.0	6.8	6.1
Beryllium	230	1.6	1.6	1.8	2.2	1.4	1.9	1.4	2.4	1.4	1.0
Cadmium	98	1.1	<0.48	<0.47	<0.53	<0.44	<0.46	<0.42	<0.49	<0.47	<0.42
Chromium [3]	6.3	30	**44**	27	**41**	**46**	**61**	**49**	**35**	**55**	**43**
Copper	4,700	42	15	11	27	18	27	23	31	19	17
Lead	550	61	20	15	19	26	23	25	13	18	15
Mercury	4.6	0.14	<0.096	<0.094	<0.11	<0.088	<0.091	<0.085	<0.098	<0.094	<0.085
Nickel	2,200	22	37	26	72	35	52	36	40	26	23
Selenium	580	1.0				<0.44	<0.46	0.49	<0.49	0.60	<0.42
Silver	580	1.0	<0.48	<0.47	<0.53	<0.44	<0.46	<0.42	<0.49	<0.47	<0.42
Thallium	1.2	1.5	<0.48	<0.47	<0.53	<0.44	<0.46	<0.42	<0.49	<0.47	<0.42
Zinc	35,000	73	91	69	130	87	100	83	82	64	66
Organochlorine Pesticides											
4,4-DDD	2.5	--	--	<0.0049	--	<0.0045	--	<0.0045	--	<0.0047	--
4,4-DDE	9.3	--	--	<0.0049	--	<0.0045	--	<0.0045	--	<0.0047	--
4,4-DDT	8.5	--	--	<0.0049	--	<0.0045	--	<0.0045	--	<0.0047	--
Aldrin	0.18	--	--	<0.0049	--	<0.0045	--	<0.0045	--	<0.0047	--
Chlordane (n.o.s.)	7.7	--	--	<0.12	--	<0.11	--	<0.11	--	<0.12	--
Dieldrin	7.7	--	--	<0.0049	--	<0.0045	--	<0.0045	--	<0.0047	--
Endosulfan I	0.14	--	--	<0.0049	--	<0.0045	--	<0.0045	--	<0.0047	--
Endosulfan II	700	--	--	<0.0049	--	<0.0045	--	<0.0045	--	<0.0047	--
Endosulfan Sulfate	NE	--	--	<0.0049	--	<0.0045	--	<0.0045	--	<0.0047	--
Endrin	NE	--	--	<0.0049	--	<0.0045	--	<0.0045	--	<0.0047	--
Endrin Aldehyde	25	--	--	<0.0049	--	<0.0045	--	<0.0045	--	<0.0047	--
Endrin ketone	NE	--	--	<0.0049	--	<0.0045	--	<0.0045	--	<0.0047	--
Gamma-BHC (Lindane)	NE	--	--	<0.0049	--	<0.0045	--	<0.0045	--	<0.0047	--
Heptachlor	2.5	--	--	<0.0049	--	<0.0045	--	<0.0045	--	<0.0047	--
Heptachlor Epoxide	7.7	--	--	<0.0049	--	<0.0045	--	<0.0045	--	<0.0047	--
Methoxychlor	0.63	--	--	<0.0049	--	<0.0045	--	<0.0045	--	<0.0047	--
Toxaphene	0.33	--	--	<0.12	--	<0.11	--	<0.11	--	<0.12	--
alpha-BHC	410	--	--	<0.0049	--	<0.0045	--	<0.0045	--	<0.0047	--
beta-BHC	2.1	--	--	<0.0049	--	<0.0045	--	<0.0045	--	<0.0047	--
cis-Chlordane	0.36	--	--	<0.0049	--	<0.0045	--	<0.0045	--	<0.0047	--
delta-BHC	1.3	--	--	<0.0049	--	<0.0045	--	<0.0045	--	<0.0047	--
trans-Chlordane	NE	--	--	<0.0049	--	<0.0045	--	<0.0045	--	<0.0047	--
Chlorinated Herbicides											
2,4,5-T		--	--	<0.025	--	<0.022	--	<0.023	--	<0.022	--
2,4,5-TP (Silvex)		--	--	<0.025	--	<0.022	--	<0.023	--	<0.022	--
2,4-D		--	--	<0.25	--	<0.22	--	<0.23	--	<0.22	--
2,4-DB		--	--	<0.26	--	<0.22	--	<0.23	--	<0.23	--
Dalapon		--	--	<0.61	--	<0.53	--	<0.55	--	<0.54	--
Dicamba		--	--	<0.025	--	<0.022	--	<0.023	--	<0.022	--
Dichloroprop		--	--	<0.25	--	<0.22	--	<0.23	--	<0.22	--
Dinoseb		--	--	<0.13	--	<0.11	--	<0.11	--	<0.11	--
MCPA		--	--	<25	--	<21	--	<22	--	<22	--
MCPP		--	--	<25	--	<22	--	<23	--	<22	--
Total Petroleum Hydrocarbons (TPH)											
TPH DRO	620	--	--	--	--	--	--	--	--	--	--

Notes:
This table is only to be used in conjunction with the report for which it was prepared. See t
Samples collected Between September 8, 2022 and September 15, 2022
Results in milligrams per kilogram (mg/kg), equivalent to parts per million (ppm)
NRCS = MDE Non Residential Cleanup Standards for soil as presented in MDE's Cleanup Star
ATC = Anticipated Typical Concentration for soils in Eastern Maryland
Shaded and bold values represent exceedance of MDE RCS
NA = Not applicable
NE = MDE standard not established
* = Risk-based calculated value
The comparison value for mercury is referenced as the elemental mercury RCS/NRCS.

Sample Identification	MDE NRCS	ATC Central	GTA-SA8-I	GTA-SA8-I	GTA-SA8-J	GTA-SA8-J	GTA-SA8-K	GTA-SA8-K	GTA-SA8-L	GTA-SA8-L	GTA-SA8-M
Sample Interval			0-1	1-4	0-1	1-4	0-1	1-4	0-1	1-4	0-1
Sample Type			Grab	Composite	Grab	Composite	Grab	Composite	Grab	Composite	Grab
Sampling Date			9/9/2022	9/9/2022	9/9/2022	9/9/2022	9/9/2022	9/9/2022	9/9/2022	9/9/2022	9/9/2022
Polycyclic Aromatic Hydrocarbons (PAHs)											
2-Methylnaphthalene	300	--	<0.0099	<0.010	<0.010	<0.010	<0.010	<0.010	<0.0098	<0.010	<0.0098
Acenaphthene	4,500	--	<0.0099	<0.010	<0.010	<0.010	<0.010	<0.010	<0.0098	<0.010	<0.0098
Acenaphthylene	NE	--	<0.0099	<0.010	<0.010	<0.010	<0.010	<0.010	<0.0098	<0.010	<0.0098
Anthracene	23,000	--	<0.0099	<0.010	<0.010	<0.010	<0.010	<0.010	<0.0098	<0.010	<0.0098
Benzo(a)anthracene	21	--	<0.0099	<0.010	<0.010	<0.010	<0.010	<0.010	<0.0098	<0.010	<0.0098
Benzo(a)pyrene	2	--	<0.0099	<0.010	<0.010	<0.010	<0.010	<0.010	<0.0098	<0.010	<0.0098
Benzo(b)fluoranthene	21	--	<0.0099	<0.010	<0.010	<0.010	<0.010	<0.010	<0.0098	<0.010	<0.0098
Benzo(g,h,i)perylene	NE	--	<0.0099	<0.010	<0.010	<0.010	<0.010	<0.010	<0.0098	<0.010	<0.0098
Benzo(k)fluoranthene	210	--	<0.0099	<0.010	<0.010	<0.010	<0.010	<0.010	<0.0098	<0.010	<0.0098
Chrysene	2,100	--	<0.0099	<0.010	<0.010	<0.010	<0.010	<0.010	<0.0098	<0.010	<0.0098
Dibenz(a,h)Anthracene	2.1	--	<0.0099	<0.010	<0.010	<0.010	<0.010	<0.010	<0.0098	<0.010	<0.0098
Fluoranthene	3,000	--	<0.0099	<0.010	<0.010	<0.010	<0.010	<0.010	<0.0098	<0.010	<0.0098
Fluorene	3,000	--	<0.0099	<0.010	<0.010	<0.010	<0.010	<0.010	<0.0098	<0.010	<0.0098
Indeno(1,2,3-c,d)Pyrene	21	--	<0.0099	<0.010	<0.010	<0.010	<0.010	<0.010	<0.0098	<0.010	<0.0098
Naphthalene	17	--	<0.0099	<0.010	<0.010	<0.010	<0.010	<0.010	<0.0098	<0.010	<0.0098
Phenanthrene	2,300	--	<0.0099	<0.010	<0.010	<0.010	<0.010	<0.010	<0.0098	<0.010	<0.0098
Pyrene	2,300	--	<0.0099	<0.010	<0.010	<0.010	<0.010	<0.010	<0.0098	<0.010	<0.0098
Priority Pollutant (PP) Metals											
Antimony	47	6.8	<2.2	<2.4	<2.7	<3.1	<2.8	<2.8	<2.3	<3.1	<2.9
Arsenic	3.0/26.8*	4.9	2.4	6.7	7.2	3.1	9.9	14	4.5	6.9	8.7
Beryllium	230	1.6	1.1	1.6	1.3	1.1	1.4	1.7	0.65	0.75	0.93
Cadmium	98	1.1	<0.43	<0.48	<0.54	<0.63	<0.55	<0.55	<0.46	<0.63	<0.58
Chromium [3]	6.3	30	**33**	**47**	**46**	**40**	**48**	**50**	29	**43**	**44**
Copper	4,700	42	9.5	26	21	15	22	23	8.6	18	19
Lead	550	61	11	16	15	13	17	16	13	14	22
Mercury	4.6	0.14	<0.086	<0.097	<0.11	<0.13	<0.11	<0.11	<0.092	<0.13	<0.12
Nickel	2,200	22	19	52	29	27	29	35	13	24	22
Selenium	580	1.0	<0.43	<0.48	<0.54	<0.63	<0.55	<0.55	0.48	<0.63	<0.58
Silver	580	1.0	<0.43	<0.48	<0.54	<0.63	<0.55	<0.55	<0.46	<0.63	<0.58
Thallium	1.2	1.5	<0.43	<0.48	<0.54	<0.63	<0.55	<0.55	<0.46	<0.63	<0.58
Zinc	35,000	73	50	76	68	55	86	83	29	39	56
Organochlorine Pesticides											
4,4-DDD	2.5	--	<0.0046	--	<0.0048	--	<0.0047	--	<0.0047	--	<0.0046
4,4-DDE	9.3	--	<0.0046	--	<0.0048	--	<0.0047	--	<0.0047	--	<0.0046
4,4-DDT	8.5	--	<0.0046	--	<0.0048	--	<0.0047	--	<0.0047	--	<0.0046
Aldrin	0.18	--	<0.0046	--	<0.0048	--	<0.0047	--	<0.0047	--	<0.0046
Chlordane (n.o.s.)	7.7	--	<0.12	--	<0.12	--	<0.12	--	<0.12	--	<0.12
Dieldrin	7.7	--	<0.0046	--	<0.0048	--	<0.0047	--	<0.0047	--	<0.0046
Endosulfan I	0.14	--	<0.0046	--	<0.0048	--	<0.0047	--	<0.0047	--	<0.0046
Endosulfan II	700	--	<0.0046	--	<0.0048	--	<0.0047	--	<0.0047	--	<0.0046
Endosulfan Sulfate	NE	--	<0.0046	--	<0.0048	--	<0.0047	--	<0.0047	--	<0.0046
Endrin	NE	--	<0.0046	--	<0.0048	--	<0.0047	--	<0.0047	--	<0.0046
Endrin Aldehyde	25	--	<0.0046	--	<0.0048	--	<0.0047	--	<0.0047	--	<0.0046
Endrin ketone	NE	--	<0.0046	--	<0.0048	--	<0.0047	--	<0.0047	--	<0.0046
Gamma-BHC (Lindane)	NE	--	<0.0046	--	<0.0048	--	<0.0047	--	<0.0047	--	<0.0046
Heptachlor	2.5	--	<0.0046	--	<0.0048	--	<0.0047	--	<0.0047	--	<0.0046
Heptachlor Epoxide	7.7	--	<0.0046	--	<0.0048	--	<0.0047	--	<0.0047	--	<0.0046
Methoxychlor	0.63	--	<0.0046	--	<0.0048	--	<0.0047	--	<0.0047	--	<0.0046
Toxaphene	0.33	--	<0.12	--	<0.12	--	<0.12	--	<0.12	--	<0.12
alpha-BHC	410	--	<0.0046	--	<0.0048	--	<0.0047	--	<0.0047	--	<0.0046
beta-BHC	2.1	--	<0.0046	--	<0.0048	--	<0.0047	--	<0.0047	--	<0.0046
cis-Chlordane	0.36	--	<0.0046	--	<0.0048	--	<0.0047	--	<0.0047	--	<0.0046
delta-BHC	1.3	--	<0.0046	--	<0.0048	--	<0.0047	--	<0.0047	--	<0.0046
trans-Chlordane	NE	--	<0.0046	--	<0.0048	--	<0.0047	--	<0.0047	--	<0.0046
Chlorinated Herbicides											
2,4,5-T		--	<0.023	--	<0.022	--	<0.025	--	<0.023	--	<0.022
2,4,5-TP (Silvex)		--	<0.023	--	<0.022	--	<0.025	--	<0.023	--	<0.022
2,4-D		--	<0.23	--	<0.22	--	<0.24	--	<0.23	--	<0.21
2,4-DB		--	<0.23	--	<0.22	--	<0.25	--	<0.23	--	<0.22
Dalapon		--	<0.56	--	<0.53	--	<0.59	--	<0.55	--	<0.52
Dicamba		--	<0.023	--	<0.022	--	<0.024	--	<0.023	--	<0.021
Dichloroprop		--	<0.23	--	<0.22	--	<0.24	--	<0.23	--	<0.21
Dinoseb		--	<0.12	--	<0.11	--	<0.12	--	<0.11	--	<0.11
MCPA		--	<23	--	<22	--	<24	--	<22	--	<21
MCPP		--	<23	--	<22	--	<24	--	<23	--	<21
Total Petroleum Hydrocarbons (TPH)											
TPH DRO	620	--	--	--	--	--	--	--	--	--	--

Notes:
This table is only to be used in conjunction with the report for which it was prepared. See t
Samples collected Between September 8, 2022 and September 15, 2022
Results in milligrams per kilogram (mg/kg), equivalent to parts per million (ppm)
NRCS = MDE Non Residential Cleanup Standards for soil as presented in MDE's Cleanup Star
ATC = Anticipated Typical Concentration for soils in Eastern Maryland
Shaded and bold values represent exceedance of MDE RCS
NA = Not applicable
NE = MDE standard not established
* = Risk-based calculated value
The comparison value for mercury is referenced as the elemental mercury RCS/NRCS.

Sample Identification	MDE NRCS	ATC Central	GTA-SA8-M	GTA-SA9-A	GTA-SA9-A	GTA-SA9-B	GTA-SA9-B	GTA-SA9-C	GTA-SA9-C	GTA-SA9-D	GTA-SA9-D
Sample Interval			1-4	0-1	1-5	0-1	1-5	0-1	1-5	0-1	1-5
Sample Type			Composite	Grab	Composite	Grab	Composite	Grab	Composite	Grab	Composite
Sampling Date			9/9/2022	9/14/2022	9/14/2022	9/14/2022	9/14/2022	9/14/2022	9/14/2022	9/14/2022	9/14/2022
Polycyclic Aromatic Hydrocarbons (PAHs)											
2-Methylnaphthalene	300	--	<0.011	<0.0099	<0.0099	<0.0100	<0.0099	<0.010	<0.010	<0.011	<0.011
Acenaphthene	4,500	--	<0.011	<0.0099	<0.0099	<0.0100	<0.0099	<0.010	<0.010	<0.011	<0.011
Acenaphthylene	NE	--	<0.011	<0.0099	<0.0099	<0.0100	<0.0099	<0.010	<0.010	<0.011	<0.011
Anthracene	23,000	--	<0.011	<0.0099	<0.0099	<0.0100	<0.0099	<0.010	<0.010	<0.011	<0.011
Benzo(a)anthracene	21	--	<0.011	<0.0099	<0.0099	<0.0100	<0.0099	<0.010	<0.010	<0.011	<0.011
Benzo(a)pyrene	2	--	<0.011	<0.0099	<0.0099	<0.0100	<0.0099	<0.010	<0.010	<0.011	<0.011
Benzo(b)fluoranthene	21	--	<0.011	<0.0099	<0.0099	<0.0100	<0.0099	<0.010	<0.010	<0.011	<0.011
Benzo(g,h,i)perylene	NE	--	<0.011	<0.0099	<0.0099	<0.0100	<0.0099	<0.010	<0.010	<0.011	<0.011
Benzo(k)fluoranthene	210	--	<0.011	<0.0099	<0.0099	<0.0100	<0.0099	<0.010	<0.010	<0.011	<0.011
Chrysene	2,100	--	<0.011	<0.0099	<0.0099	<0.0100	<0.0099	<0.010	<0.010	<0.011	<0.011
Dibenz(a,h)Anthracene	2.1	--	<0.011	<0.0099	<0.0099	<0.0100	<0.0099	<0.010	<0.010	<0.011	<0.011
Fluoranthene	3,000	--	<0.011	<0.0099	<0.0099	<0.0100	<0.0099	<0.010	<0.010	<0.011	<0.011
Fluorene	3,000	--	<0.011	<0.0099	<0.0099	<0.0100	<0.0099	<0.010	<0.010	<0.011	<0.011
Indeno(1,2,3-c,d)Pyrene	21	--	<0.011	<0.0099	<0.0099	<0.0100	<0.0099	<0.010	<0.010	<0.011	<0.011
Naphthalene	17	--	<0.011	<0.0099	<0.0099	<0.0100	<0.0099	<0.010	<0.010	<0.011	<0.011
Phenanthrene	2,300	--	<0.011	<0.0099	<0.0099	<0.0100	<0.0099	<0.010	<0.010	<0.011	<0.011
Pyrene	2,300	--	<0.011	<0.0099	<0.0099	<0.0100	<0.0099	<0.010	<0.010	<0.011	<0.011
Priority Pollutant (PP) Metals											
Antimony	47	6.8	<2.8	<2.5	<2.6	<2.0	<2.4	<2.4	<2.6	<2.9	<2.7
Arsenic	3.0/26.8*	4.9	7.4	8.1	9.6	6.9	6.8	5.7	7.0	6.8	5.3
Beryllium	230	1.6	0.82	1.4	1.9	0.95	1.0	1.3	1.5	1.9	2.8
Cadmium	98	1.1	<0.55	<0.49	<0.51	<0.41	<0.48	<0.49	<0.52	<0.58	<0.54
Chromium [3]	6.3	30	**33**	**33**	**50**	**54**	**41**	**34**	**36**	**35**	**37**
Copper	4,700	42	23	15	22	14	20	14	19	32	31
Lead	550	61	13	22	17	17	13	17	13	15	12
Mercury	4.6	0.14	0.14	<0.099	<0.10	<0.082	<0.096	<0.097	<0.10	<0.12	<0.11
Nickel	2,200	22	28	24	30	19	28	24	27	40	49
Selenium	580	1.0	<0.55	<0.49	<0.51	<0.41	<0.48	<0.49	<0.52	<0.58	<0.54
Silver	580	1.0	<0.55	<0.49	<0.51	<0.41	<0.48	<0.49	<0.52	<0.58	<0.54
Thallium	1.2	1.5	<0.55	<0.49	<0.51	<0.41	<0.48	<0.49	<0.52	<0.58	<0.54
Zinc	35,000	73	48	59	60	43	53	52	48	71	75
Organochlorine Pesticides											
4,4-DDD	2.5	--	--	<0.0047	--	<0.0046	--	<0.0051	--	<0.0053	--
4,4-DDE	9.3	--	--	<0.0047	--	<0.0046	--	<0.0051	--	<0.0053	--
4,4-DDT	8.5	--	--	<0.0047	--	<0.0046	--	<0.0051	--	<0.0053	--
Aldrin	0.18	--	--	<0.0047	--	<0.0046	--	<0.0051	--	<0.0053	--
Chlordane (n.o.s.)	7.7	--	--	<0.12	--	<0.11	--	<0.13	--	<0.13	--
Dieldrin	7.7	--	--	<0.0047	--	<0.0046	--	<0.0051	--	<0.0053	--
Endosulfan I	0.14	--	--	<0.0047	--	<0.0046	--	<0.0051	--	<0.0053	--
Endosulfan II	700	--	--	<0.0047	--	<0.0046	--	<0.0051	--	<0.0053	--
Endosulfan Sulfate	NE	--	--	<0.0047	--	<0.0046	--	<0.0051	--	<0.0053	--
Endrin	NE	--	--	<0.0047	--	<0.0046	--	<0.0051	--	<0.0053	--
Endrin Aldehyde	25	--	--	<0.0047	--	<0.0046	--	<0.0051	--	<0.0053	--
Endrin ketone	NE	--	--	<0.0047	--	<0.0046	--	<0.0051	--	<0.0053	--
Gamma-BHC (Lindane)	NE	--	--	<0.0047	--	<0.0046	--	<0.0051	--	<0.0053	--
Heptachlor	2.5	--	--	<0.0047	--	<0.0046	--	<0.0051	--	<0.0053	--
Heptachlor Epoxide	7.7	--	--	<0.0047	--	<0.0046	--	<0.0051	--	<0.0053	--
Methoxychlor	0.63	--	--	<0.0047	--	<0.0046	--	<0.0051	--	<0.0053	--
Toxaphene	0.33	--	--	<0.12	--	<0.11	--	<0.13	--	<0.13	--
alpha-BHC	410	--	--	<0.0047	--	<0.0046	--	<0.0051	--	<0.0053	--
beta-BHC	2.1	--	--	<0.0047	--	<0.0046	--	<0.0051	--	<0.0053	--
cis-Chlordane	0.36	--	--	<0.0047	--	<0.0046	--	<0.0051	--	<0.0053	--
delta-BHC	1.3	--	--	<0.0047	--	<0.0046	--	<0.0051	--	<0.0053	--
trans-Chlordane	NE	--	--	<0.0047	--	<0.0046	--	<0.0051	--	<0.0053	--
Chlorinated Herbicides											
2,4,5-T		--	--	<0.022	--	<0.023	--	<0.023	--	<0.024	--
2,4,5-TP (Silvex)		--	--	<0.022	--	<0.023	--	<0.023	--	<0.024	--
2,4-D		--	--	<0.22	--	<0.23	--	<0.23	--	<0.24	--
2,4-DB		--	--	<0.23	--	<0.23	--	<0.23	--	<0.24	--
Dalapon		--	--	<0.53	--	<0.55	--	<0.55	--	<0.57	--
Dicamba		--	--	<0.022	--	<0.023	--	<0.023	--	<0.024	--
Dichloroprop		--	--	<0.22	--	<0.23	--	<0.23	--	<0.24	--
Dinoseb		--	--	<0.11	--	<0.11	--	<0.11	--	<0.12	--
MCPA		--	--	<22	--	<22	--	<22	--	<23	--
MCPP		--	--	<22	--	<23	--	<23	--	<24	--
Total Petroleum Hydrocarbons (TPH)											
TPH DRO	620	--	--	--	--	--	--	--	--	--	--

Notes:
This table is only to be used in conjunction with the report for which it was prepared. See t
Samples collected Between September 8, 2022 and September 15, 2022
Results in milligrams per kilogram (mg/kg), equivalent to parts per million (ppm)
NRCS = MDE Non Residential Cleanup Standards for soil as presented in MDE's Cleanup Star
ATC = Anticipated Typical Concentration for soils in Eastern Maryland
Shaded and bold values represent exceedance of MDE RCS
NA = Not applicable
NE = MDE standard not established
* = Risk-based calculated value
The comparison value for mercury is referenced as the elemental mercury RCS/NRCS.

Sample Identification	MDE NRCS	ATC Central	GTA-SA9-E	GTA-SA9-E	GTA-SA9-F	GTA-SA9-F	GTA-SA10	GTA-SA10
Sample Interval			0-1	1-5	0-1	1-5	0-1	1-10
Sample Type			Grab	Composite	Grab	Composite	Grab	Composite
Sampling Date			9/14/2022	9/14/2022	9/14/2022	9/14/2022	9/9/2022	9/9/2022
Polycyclic Aromatic Hydrocarbons (PAHs)								
2-Methylnaphthalene	300	--	<0.010	<0.0098	<0.010	<0.010	<0.0098	<0.011
Acenaphthene	4,500	--	<0.010	<0.0098	<0.010	<0.010	<0.0098	<0.011
Acenaphthylene	NE	--	<0.010	<0.0098	<0.010	<0.010	<0.0098	<0.011
Anthracene	23,000	--	<0.010	<0.0098	<0.010	<0.010	<0.0098	<0.011
Benzo(a)anthracene	21	--	0.010	<0.0098	<0.010	<0.010	<0.0098	<0.011
Benzo(a)pyrene	2	--	0.012	<0.0098	<0.010	<0.010	<0.0098	<0.011
Benzo(b)fluoranthene	21	--	0.011	<0.0098	<0.010	<0.010	<0.0098	<0.011
Benzo(g,h,i)perylene	NE	--	<0.010	<0.0098	<0.010	<0.010	<0.0098	<0.011
Benzo(k)fluoranthene	210	--	<0.010	<0.0098	<0.010	<0.010	<0.0098	<0.011
Chrysene	2,100	--	0.011	<0.0098	<0.010	<0.010	<0.0098	<0.011
Dibenz(a,h)Anthracene	2.1	--	<0.010	<0.0098	<0.010	<0.010	<0.0098	<0.011
Fluoranthene	3,000	--	0.013	<0.0098	<0.010	<0.010	<0.0098	<0.011
Fluorene	3,000	--	<0.010	<0.0098	<0.010	<0.010	<0.0098	<0.011
Indeno(1,2,3-c,d)Pyrene	21	--	<0.010	<0.0098	<0.010	<0.010	<0.0098	<0.011
Naphthalene	17	--	<0.010	<0.0098	<0.010	<0.010	<0.0098	<0.011
Phenanthrene	2,300	--	<0.010	<0.0098	<0.010	<0.010	<0.0098	<0.011
Pyrene	2,300	--	0.013	<0.0098	<0.010	<0.010	<0.0098	<0.011
Priority Pollutant (PP) Metals								
Antimony	47	6.8	<2.9	<2.8	<2.0	<2.7	<2.6	<2.8
Arsenic	3.0/26.8*	4.9	5.2	6.3	5.6	4.3	6.2	5.4
Beryllium	230	1.6	1.0	1.8	1.2	1.4	1.1	2.3
Cadmium	98	1.1	<0.58	<0.55	<0.41	<0.53	<0.52	<0.56
Chromium [3]	6.3	30	22	7.8	23	20	**34**	17
Copper	4,700	42	21	24	23	22	13	20
Lead	550	61	16	19	15	12	17	14
Mercury	4.6	0.14	<0.12	<0.11	<0.081	<0.11	<0.10	<0.11
Nickel	2,200	22	26	39	27	28	23	30
Selenium	580	1.0	<0.58	<0.55	<0.41	<0.53	0.53	<0.56
Silver	580	1.0	<0.58	<0.55	<0.41	<0.53	<0.52	<0.56
Thallium	1.2	1.5	<0.58	<0.55	<0.41	<0.53	<0.52	<0.56
Zinc	35,000	73	45	95	43	41	49	54
Organochlorine Pesticides								
4,4-DDD	2.5	--	<0.0047	--	<0.0049	--	<0.0047	--
4,4-DDE	9.3	--	<0.0047	--	<0.0049	--	<0.0047	--
4,4-DDT	8.5	--	<0.0047	--	<0.0049	--	<0.0047	--
Aldrin	0.18	--	<0.0047	--	<0.0049	--	<0.0047	--
Chlordane (n.o.s.)	7.7	--	<0.12	--	<0.12	--	<0.12	--
Dieldrin	7.7	--	<0.0047	--	<0.0049	--	<0.0047	--
Endosulfan I	0.14	--	<0.0047	--	<0.0049	--	<0.0047	--
Endosulfan II	700	--	<0.0047	--	<0.0049	--	<0.0047	--
Endosulfan Sulfate	NE	--	<0.0047	--	<0.0049	--	<0.0047	--
Endrin	NE	--	<0.0047	--	<0.0049	--	<0.0047	--
Endrin Aldehyde	25	--	<0.0047	--	<0.0049	--	<0.0047	--
Endrin ketone	NE	--	<0.0047	--	<0.0049	--	<0.0047	--
Gamma-BHC (Lindane)	NE	--	<0.0047	--	<0.0049	--	<0.0047	--
Heptachlor	2.5	--	<0.0047	--	<0.0049	--	<0.0047	--
Heptachlor Epoxide	7.7	--	<0.0047	--	<0.0049	--	<0.0047	--
Methoxychlor	0.63	--	<0.0047	--	<0.0049	--	<0.0047	--
Toxaphene	0.33	--	<0.12	--	<0.12	--	<0.12	--
alpha-BHC	410	--	<0.0047	--	<0.0049	--	<0.0047	--
beta-BHC	2.1	--	<0.0047	--	<0.0049	--	<0.0047	--
cis-Chlordane	0.36	--	<0.0047	--	<0.0049	--	<0.0047	--
delta-BHC	1.3	--	<0.0047	--	<0.0049	--	<0.0047	--
trans-Chlordane	NE	--	<0.0047	--	<0.0049	--	<0.0047	--
Chlorinated Herbicides								
2,4,5-T		--	<0.024	--	<0.023	--	<0.022	--
2,4,5-TP (Silvex)		--	<0.024	--	<0.023	--	<0.022	--
2,4-D		--	<0.23	--	<0.22	--	<0.22	--
2,4-DB		--	<0.24	--	<0.23	--	<0.23	--
Dalapon		--	<0.56	--	<0.54	--	<0.53	--
Dicamba		--	<0.023	--	<0.022	--	<0.022	--
Dichloroprop		--	<0.23	--	<0.22	--	<0.22	--
Dinoseb		--	<0.12	--	<0.11	--	<0.11	--
MCPA		--	<23	--	<22	--	<22	--
MCPP		--	<23	--	<22	--	<22	--
Total Petroleum Hydrocarbons (TPH)								
TPH DRO	620	--	--	--	--	--	--	--

Notes:
This table is only to be used in conjunction with the report for which it was prepared. See t
Samples collected Between September 8, 2022 and September 15, 2022
Results in milligrams per kilogram (mg/kg), equivalent to parts per million (ppm)
NRCS = MDE Non Residential Cleanup Standards for soil as presented in MDE's Cleanup Stan
ATC = Anticipated Typical Concentration for soils in Eastern Maryland
Shaded and bold values represent exceedance of MDE RCS
NA = Not applicable
NE = MDE standard not established
* = Risk-based calculated value
The comparison value for mercury is referenced as the elemental mercury RCS/NRCS.

Appendix B

Analytical Data for Groundwater Collected Near Substation

500 E 4th Street, Suite 333
Austin, TX 78701
www.quantumloophole.com

December 19, 2023

Via Electronic Delivery

Mr. Brian Dietz
CHS Enforcement / Fund Lead Site Assessment Division
Waste Management Administration
Maryland Department of the Environment
1800 Washington Blvd.
Baltimore, MD 21230

RE: Semi-annual Report – Environmental Covenant

Dear Mr. Dietz:

In accordance with the Eastalco Environmental Covenant dated December 12, 2017, the attached report representing 1 April 2023 through 30 September 2023 is submitted to the Administration to summarize progress under the Groundwater & Surface Water Monitoring Plan submitted in 2011. Quantum Loophole acquired the property from ALCOA on June 28, 2021, and has assumed the monitoring and reporting requirements at the facility per the Environmental Covenant and the Site Management Plan, a component of the Environmental Covenant.

Detailed laboratory reports are available for your inspection upon request.

Please contact Bill Williams – Chief Operations Officer, if you require additional information or have any questions regarding this report. He can be reached at (703) 505-9378 or via email at bill@ql.email.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information is, to the best of my knowledge andbelief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Sincerely,

Bill Williams
Chief Operations Officer

cc: Josh Mullis, Tetra Tech

TETRA TECH

2023 GROUNDWATER AND SURFACE WATER MONITORING REPORT

Quantum Maryland, LLC

December 2023

complex world

CLEAR SOLUTIONS™

Quantum Maryland, LLC

Groundwater and Surface Water Monitoring Report

QUANTUM MARYLAND, LLC







December 2023

TETRA TECH

Groundwater and Surface Water Monitoring Report

Quantum Maryland, LLC
December 2023

PRESENTED TO

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TETRA TECH

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APPENDICES

A Groundwater and Surface Water Analytical Data
B Historical Groundwater and Surface Water Data

1.0 INTRODUCTION

This annual monitoring report was prepared by Tetra Tech, Inc (Tetra Tech) for Quantum Maryland, LLC (Quantum) to document and evaluate the results of groundwater monitoring and surface water monitoring activities completed in 2023 at the former Eastalco Works aluminum smelter located in Frederick, Maryland (Figure 1-1). Quantum acquired the property from the Eastalco Aluminum Company (Eastalco) on June 28, 2021. The site is now referred to as Quantum Fredrick. Quantum has begun the permitting and design process for a master planned, first-of-its-kind, clean cloud community campus to be located on the property while continuing groundwater and surface water monitoring at the facility per the requirements of the Environmental Covenant (EC) executed on December 12, 2017 (Eastalco, 2017) and the Site Management Plan (SMP), a component of the EC. The EC replaces the previous Administrative Consent Order (ACO) CO-07-026. This monitoring report presents the results of the semiannual and annual groundwater and surface water monitoring activities performed in 2023 in accordance with the Groundwater and Surface Water Monitoring Plan (Tetra Tech, 2011; Exhibit F of the EC).

1.1 OVERVIEW

Aluminum production was curtailed at the Eastalco smelter in December 2005, and the plant was formally closed in March 2010. Demolition of the plant was completed in June 2016. Regrading and seeding of the former plant area were completed by early 2017.

The 2007 ACO CO-07-026 required Eastalco to monitor fluoride concentrations in groundwater and free cyanide concentrations in surface water. A monitoring plan to address the ACO requirements was initially submitted in 2007 and revised in 2011. Groundwater and surface water monitoring occur semiannually and annually, respectively, and reports are submitted annually as approved by Maryland Department of the Environment (MDE, 2017).

The EC was executed in December 2017 and placed restrictions on land and groundwater use as a means of managing contamination and protecting human health and the environment during current and future activities/redevelopment. The SMP addresses the remediation and future management of known and potential environmental concerns (such as contaminated groundwater and surface water) associated with the former facility's operations. In the Activity and Use Limitations (Paragraph 6) of the EC, the property owner, now Quantum, is required to maintain compliance with long-term groundwater monitoring on the site in accordance with the Groundwater and Surface Water Monitoring Plan (Tetra Tech, 2011).

Per the Monitoring Plan, the annual report will contain the following:

1. A complete copy of the laboratory data;
2. A comparison of the results against the Definitions of Contamination;
3. Concentration maps depicting total contaminant concentrations measured during the monitoring events;

4. As applicable, charts depicting concentration trends for fluoride in groundwater and free cyanide in surface water using linear regression to calculate a straight line that best fits the data;
5. A summary of all groundwater elevations measured at the wells included in this monitoring program; and
6. A narrative discussion concerning background information, sampling procedures, and results/trends, etc.

This report contains the above items for the groundwater monitoring events performed during the first and third quarters of 2023, and the surface water monitoring event which was conducted during the third quarter of 2023.

1.2 DOCUMENT ORGANIZATION

Section 2 provides a description of the site setting, and Section 3 describes the monitoring tasks that were performed during the 2023 calendar year. Section 4 provides results and associated conclusions.

2.0 SITE SETTINGS

2.1 TOPOGRAPHY

The Quantum Frederick facility (formerly known as the Eastalco facility) is located in the Frederick Valley, a synclinal structure characterized by gently rolling topography. Natural elevations at the site range from approximately 300 feet above sea level in the low areas to about 400 feet in the higher areas (Figure 1-1).

2.2 SURFACE WATER

The site is drained by Tuscarora Creek, a tributary of the Potomac River, located east of the plant. There is also an unnamed tributary to the west that flows south to join Tuscarora Creek. Tuscarora Creek then flows south into the Potomac River. Several man-made drainage ditches flow into Tuscarora Creek or the unnamed tributary.

2.3 GEOLOGY

2.3.1 Regional Geology

The Quantum Frederick facility is located in the southwest corner of a geologic feature known as the Frederick Valley. The valley is the topographic expression of a subsurface asymmetrical synclinorium composed of folded Cambro-Ordovician carbonates and siltstones of the Araby, Frederick, and Grove Formations. The elongated western limb of the synclinorium is truncated by an angular unconformity and overlain by Triassic “redbed" sedimentary strata of the Newark Group, which includes the New Oxford Formation and the Gettysburg Shale. The eastern limb of the synclinorium is foreshortened and in some cases overturned. It is bounded to the east by Precambrian metasedimentary rocks of the Western Piedmont.

The Quantum property straddles the contact between the Triassic siltstones, sandstones, and shale of the New Oxford Formation and the Cambrian limestone of the Adamstown member of the Frederick Formation. The bedrock surface expression of this contact trends north-northeast by south-southwest and dips west-northwest. On the Quantum property, it is located approximately 200 feet southeast of the closed North landfill. From east to west across the Quantum property, the depth to the contact between the New Oxford and Frederick Formations varies from 0 feet at the bedrock surface contact to 90 feet beneath the closed North Landfill. The contact surface is irregular, reflecting the erosional nature of the angular unconformity, which defines the contact between these formations in the subsurface; but, in general, the depth to the contact increases westward.

The Frederick Formation is a thin-bedded, laminated limestone with argillaceous partings and shaley zones. Estimated thickness is approximately 500 feet. The Frederick Formation has been subdivided into three members designated in ascending order: Spring Station, Adamstown, and Lime Kiln. The Adamstown member underlies the south and eastern portion of the plant site and consists of laminated, fine grained, thinly

bedded, argillaceous, dark gray limestone. The beds have a north-northeast strike and dip about 40° to the east.

The New Oxford Formation consists of interbedded red and gray arkosic sandstone, red shale, and siltstone. A distinctive limestone/quartz pebble conglomerate at the base of the unit displays a mottled red and gray texture. Sandstone beds in this formation are lenticular and prone to pinching out over short distances. The total estimated thickness of the unit is 4,500 feet. In the vicinity of Quantum's property, beds of the New Oxford Formation underlie the western and northern portion of the property. The strike of these beds is north to south, and dip is to the west at 5°.

2.3.2 Site Geology

Based on lithologic logs generated during installation of soil borings and monitoring wells at the facility, unconsolidated materials above bedrock (overburden) are composed of clay and silt with varying amounts of sand, gravel, and angular rock fragments. Near surface materials are composed of reddish orange to reddish brown, dense, compact silty clay, with occasional sandstone and shale fragments, gravel, and cobbles. Poorly graded limestone gravel is present at the surface at some locations.

Site boring logs indicate that deeper unconsolidated materials (weathered bedrock) are composed of reddish brown to yellowish orange silt, clay, and occasional zones of clayey gravel. The logs note relict bedding (inclined 20 to 30 degrees from horizontal), micaceous inclusions, and quartzite fragments. Several past reports identify this unconsolidated residual material as saprolite; however, saprolite is derived from the in-situ weathering of igneous or metamorphic material retaining many of the visual characteristics of the parent rock. The deeper unconsolidated materials at the site retain some of the characteristics of the parent rock; but they are derived from in-situ weathering of limestone. The thickness of this highly weathered limestone, which grades into the overlying silty clay unit, varies but averages about 5 feet.

The Quantum property is located within the northeast-trending Frederick syncline. According to geologic maps prepared by the Maryland Geological Survey (MGS), two bedrock formations are present beneath the site: the New Oxford and Frederick Limestone Formations (MGS, 1968). The New Oxford Formation is composed of interbedded red and gray arkosic sandstone, red shale and siltstone, with a basal conglomerate containing a red and gray calcareous matrix (MGS, 1981). The New Oxford Formation overlies the Frederick Formation. To the northwest of the Substation Area, the New Oxford Formation is reportedly about 90 feet thick (beneath the north industrial Landfill) and thicknesses of the New Oxford increase to the west (Atlantic, 1996). The Upper Cambrian bedrock beneath the eastern portion of the Site is the Frederick Limestone Formation, which consists of highly jointed and fractured, thinly bedded, argillaceous limestone with minor shale (MGS, 1981).

The Site-Wide Investigation Report (MFG, 2005) contains a topographic map of the bedrock surface from the western portion of the plant to the southern property boundary that was developed based on survey data and logs of existing wells and former construction borings. The undulating bedrock surface slopes from north to south with a bedrock trough that starts near the former Substation Area and appears to extend southward to the property boundary.

2.4 HYDROGEOLOGY

2.4.1 Regional Hydrogeology

Information on the regional hydrogeology was obtained from the Groundwater Atlas of the United States published by the United States Geological Survey. In the Frederick Valley area, significant sources of groundwater exist in the carbonate rock aquifers. The Frederick Limestone, which underlies most of the site, has a typical well yield of 120 to 170 gallons per minute (GPM) and can yield up to 275 GPM in some areas. The carbonate rocks of the Piedmont have virtually no primary porosity, and water in these rocks moves through secondary openings such as fractures, bedding planes, joints, and faults. Water moving through the secondary openings dissolves the carbonate rock and forms dissolution channels to create an interconnected network of openings, greatly increasing the porosity of the rock. Most of the water obtained from bedrock in this area is found in fractures and dissolution channels.

2.4.2 Site Hydrogeology

The groundwater system beneath the site consists of two water-bearing units: an overburden water bearing zone and a bedrock water bearing zone. Based on lithologic descriptions of the overburden materials, most groundwater flow likely occurs in the highly fractured zone (weathered bedrock) located directly above the competent bedrock (Atlantic, 1996). Groundwater movement in bedrock beneath the site typically occurs through fractures. In both the overburden and bedrock zones, the general direction of horizontal groundwater flow across the plant is toward the southeast (MFG, 2005).

3.0 MONITORING PROGRAM

3.1 MONITORING PLAN SUMMARY

Table 3-1 summarizes the monitoring program (i.e., monitoring points and frequencies) as described in the associated monitoring plan. Figure 3-1 shows the monitoring point locations and also indicates monitoring frequencies (semiannual or annual). Five monitoring wells were sampled during the first quarter event on March 28 through March 30, 2023. Sixteen monitoring wells were sampled during the third quarter event on September 11 through 15, 2023. Annual surface water samples from three monitoring points were collected on September 12, 2023.

3.2 SAMPLING AND ANALYSIS

Groundwater and surface water samples were collected in accordance with the standard operating procedures (SOPs) appended to the Groundwater and Surface Water Monitoring Plan (Tetra Tech, 2011). Field measurements, including water levels, pH, conductivity, dissolved oxygen, turbidity, oxidation reduction potential (ORP), and temperature, were collected during purging activities.

The samples were submitted to an off-site laboratory, Eurofins Lancaster Laboratories Environment Testing in Lancaster, Pennsylvania. The Practical Quantitation Limits (PQLs) are 0.1 milligrams per liter (mg/L) for fluoride and 0.006 mg/L for free cyanide.

4.0 RESULTS AND CONCLUSIONS

Groundwater field data collected during the March and September 2023 events are provided in Tables 4-1 and 4-2, respectively. The results of fluoride analyses performed on groundwater samples during the two monitoring events in 2023 are provided in Tables 4-3 and 4-4; results of free cyanide analyses performed on surface water samples collected during the third quarter monitoring event in 2023 are also provided in Table 4-4. The results are also summarized on Figures 4-1 and 4-2.

Figures 4-3 through 4-5 are plots of temporal total fluoride concentrations near the source area, downgradient/cross gradient of the source area, and near the property boundary, respectively. Figure 4-6 is a plot of temporal free cyanide concentrations at the three surface water monitoring locations. The charts contain data collected from 2005 to the present to evaluate concentrations before and after the plant's curtailment in December 2005.

Figures 4-3 through 4-6 also show post-curtailment trends, where applicable. Results are compared to the maximum contaminant level (MCL) for fluoride (4 mg/l) (i.e., 40 Code of Federal Regulations [CFR] 141.62), and the Maryland surface water quality criteria for free cyanide (0.0052 mg/l) (i.e., Code of Maryland Regulations [COMAR] 26.08.02.03-2).

4.1 GROUNDWATER

4.1.1 Source Area

During the post-curtailment period, fluoride concentrations in groundwater near historical source areas (i.e., former Waste Disposal Site #10 [WDS-10] covered in 2016; and North and South Ponds, removed from service in 2005 and excavated in 2016) ranged from 16 to 26 mg/L in RW-29, 56, and 68. Although MW45 is not listed in Table 3-1 as a source area/former pumping well, it is located in close proximity to the former North and South Ponds.

Consistent with previous monitoring events, fluoride was detected above the MCL in each well near the source area during the third quarter 2023 monitoring event (Figure 4-2). Due to a lower water table affecting all overburden monitoring wells at the site, MW-56 was dry and could not be sampled during the third quarter 2023 monitoring event. The concentrations of fluoride in MW-45 have been relatively stable in the most recent sampling events but have showed an overall increasing trend since the third quarter of 2006. However, since the excavation and removal of source materials from source areas in 2016, concentrations in MW-45 have decreased from a maximum concentration of 53 mg/L in September 2016 to as low as 15 mg/L in the September 2021 monitoring event, with the most recent concentration in the September 2023 monitoring event being 24 mg/L. The concentration in MW-68 (located near the South Landfill) spiked to a concentration of 71.5 mg/L in the second quarter of 2006; but since then, the concentrations, although fluctuating, have remained relatively stable an overall decreasing trend since the elevation second quarter 2006 results. Fluoride concentrations in RW-29 increased during the first year after the plant curtailment; but since then, the concentrations, although fluctuating, have declined overall with the September 2023 monitoring event containing the third lowest concentration to date for fluoride in RW-29

With the exception of MW-45 (due to the elevated concentration of 53 mg/L during the September 2016 sampling event), the other source areas wells have shown a decreasing trend in concentrations since the complete closure of the facility in 2010, and also following the demolition of the facility and excavation and removal of source materials from source areas in 2016.

4.1.2 Downgradient Areas

Concentrations of fluoride in areas that are downgradient or cross-gradient of the source area are plotted on Figure 4-4, which shows that the concentrations in these wells are generally much lower than those measured near the source area. Over the last 8 years, concentrations in these wells have been less than 20 mg/L with the exception of an anomalous elevated concentration of 52 mg/L in MW-26 during the third quarter 2015 sampling event. The fluoride concentrations in MW-26 and MW-62 are stable while concentrations in MW-108are decreasing despite slight increases during the 2023 sampling event.

4.1.3 Property Boundary

During post-curtailment, fluoride concentrations in groundwater near the property boundary wells (MW-52, MW-60, MW-72, and MW-73) ranged from 2.6 to 5.8 mg/L. Fluoride concentrations in MW-13 (off-site well) have ranged from non-detect (less than the reporting limit) to 1.3 mg/L and have remained less than 1.3 mg/L since the first quarter of 2008.

During the 2023 reporting period three of the four on-site wells had fluoride concentrations that slightly exceeded the MCL of 4 mg/L with an average concentration of 5.7 mg/L. The concentration in MW-60 has been below the MCL since 2008 and has been fairly stable since then. As shown on Figure 4-5, concentrations in the other on-site property boundary wells show seasonal fluctuations with slightly increasing trends over the first 6 years of the post-curtailment period (through 2012) followed by slightly decreasing trends over the last 11 years. The fluoride concentration in the off-site well (MW-13) continues to be much lower than the MCL.

It should be noted that the first quarter 2006 monitoring report submitted to MDE showed that concentrations in MW-60, 72, and 73 were less than 1 mg/L. Although the laboratory could not find any evidence suggesting these data were in error, the accuracy of these data is uncertain because the concentrations were historically in range of 5 to 9 mg/L for many years prior; and MW-52, which is paired with MW-60, did not show a similar decline in that quarter. As such, the first quarter 2006 data from MW-60, 72, and 73 were not plotted on Figure 4-5.

4.2 SURFACE WATER

As shown on Figure 4-6, during the first 3 years following curtailment (from 2006 through 2008), free cyanide was detected at least twice at each of three surface water monitoring locations. Since then, there have been eleven detections among all three of the surface water monitoring locations with only two detections slightly above the surface water quality criteria (0.0052 mg/L). During the September 2023 event, free cyanide concentrations were not detected above the laboratory reporting limit for free cyanide.

5.0 REFERENCES

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TABLES

Table 3-1
Groundwater and Surface Water Monitoring Strategy
Quantum Maryland, LLC

Groundwater Monitoring for Fluoride		
Location	**Monitoring Location**	**Monitoring Frequency**
Source Area/Pumping Wells	RW-29	A
	MW-56	A
	MW-68	A
Downgradient/Crossgradient Plume	MW-4	A
	MW-6	A
	MW-26	A
	MW-25	A
	MW-45	A
	MW-51	A
	MW-62	A
	MW-103	A
	MW-107	A
	MW-108	A
Property Boundary	MW-13[(1)]	S
	MW-52	S
	MW-60	S
	MW-72	S
	MW-73	S

Surface Water Monitoring for Free Cyanide		
Location	**Monitoring Location**	**Monitoring Frequency**
Property Boundary	D	A
	E[(1)]	A
	I	A

S = Semi-annually
A = Annually
[(1)] Off-site location

Table 4-1
March 2023 Field Measurements
Quantum Maryland, LLC
Frederick, Maryland

Well ID	TOC Elevation (ft MSL)	Depth to Static Water (ft below TOC)	Groundwater Elevation (ft MSL)	pH (s.u.)	Specific Conductance (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature (^{o}C)	ORP (mV)
MW-13	290.28	15.55	274.73	7.47	0.481	1.05	4.36	16.22	368
MW-52	296.25	5.63	290.62	7.26	0.928	2.37	1.35	11.64	283
MW-60	295.72	25.15	270.57	7.36	0.902	0.29	9.77	13.57	298
MW-72	295.27	6.26	289.01	6.86	0.950	0.94	11.00	9.53	339
MW-73	294.69	5.59	289.10	7.26	0.958	0.13	10.55	11.15	311

Notes:

TOC	Top of Casing
ORP	Oxidation-reduction Potential
ft	Feet
ft MSL	Feet Above Mean Sea Level
s.u.	Standard Units
mS/cm	Millisiemens per Centimeter
NTUs	Nephelometric Turbidity Units
mV	Millivolts
mg/L	Milligrams per Liter
^{o}C	Degrees Centigrade

Table 4-2
September 2023 Field Measurements
Quantum Maryland, LLC
Frederick, Maryland

Well ID	TOC Elevation (ft MSL)	Depth to Static Water (ft below TOC)	Groundwater Elevation (ft MSL)	pH (s.u.)	Specific Conductance (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature (^{o}C)	ORP (mV)
MW-4	331.27	21.65	309.62	7.51	0.521	163.00	2.67	22.06	114
MW-6	323.66	15.70	307.96	6.91	0.00	>1000	9.35	22.11	-47
MW-13	290.28	6.42	283.86	7.55	0.521	22.40	4.31	15.14	221
MW-25	321.92	18.99	302.93	6.26	1.04	>1000	3.18	20.52	237
MW-26	324.49	19.25	305.24	7.96	0.637	204.0	2.66	20.97	179
RW-29	328.02	23.30	304.72	8.49	3.61	8	8.20	18.23	168
MW-45	328.03	20.53	307.50	7.85	0.66	3.5	10.45	16.44	218
MW-51	308.80	12.36	296.44	7.12	0.573	64.10	10.63	14.91	184
MW-52	296.25	5.89	290.36	7.35	0.644	1.84	4.20	15.81	248
MW-56[(2)]	330.86	Dry	NA	NA	NA	NA	NA	NA	NA
MW-60	295.72	5.74	289.98	7.50	0.610	13.80	0.00	14.38	78
MW-62	329.99	32.62	297.37	7.21	0.611	2.30	0.00	15.38	143
MW-68	328.12	24.46	303.66	7.67	1.04	97.6	10.17	17.82	230
MW-72	295.27	6.14	289.13	7.05	0.669	5.53	0.00	18.54	233
MW-73	294.69	5.52	289.17	7.19	0.655	0.53	5.79	15.82	266
MW-103	330.80	22.16	308.64	7.28	0.496	2.77	7.69	16.96	194
MW-107[(2)]	329.16	27.76	NA	NA	NA	NA	NA	NA	NA
MW-108	328.72	27.51	301.21	7.34	0.967	100.0	0.00	19.56	76

Notes:

TOC	Top of Casing
ORP	Oxidation-reduction Potential
ft	Feet
ft MSL	Feet above Mean Sea Level
s.u.	Standard units
mS/cm	Millisiemens per Centimeter
NTUs	Nephelometric Turbidity Units
mV	Millivolts
mg/L	Milligrams per Liter
^{o}C	Degrees Centigrade
AU	Attenuation Unit
NA	Not Applicable
Over	Indicates that the turbidity exceeded the limit of the turbidity meter.
(1)	Horiba U52 Used for Turbidity Measurements
(2)	Indicates that there was an absence of groundwater or an insufficient volume of groundwater required to complete purging and sampling of the well.

Table 4-3
March 2023
Groundwater Analytical Results
Quantum Maryland, LLC
Frederick, Maryland

Well ID	Fluoride (mg/L)
MCL [1]	*4*
MW-13	**0.30**
MW-52	**4.6**
MW-60	**2.6**
MW-72	**4.5**
MW-73	**4.8**

Notes:
All results are in milligrams/liter (mg/L).
[1] Maximum Contaminant Level (MCL) (i.e. 40 CFR 141.62)

U = Not detected above the laboratory reporting limit. Value shown is reporting limit.
BOLD indicates detected value

Indicates concentration above maximum contaminant level (MCL)

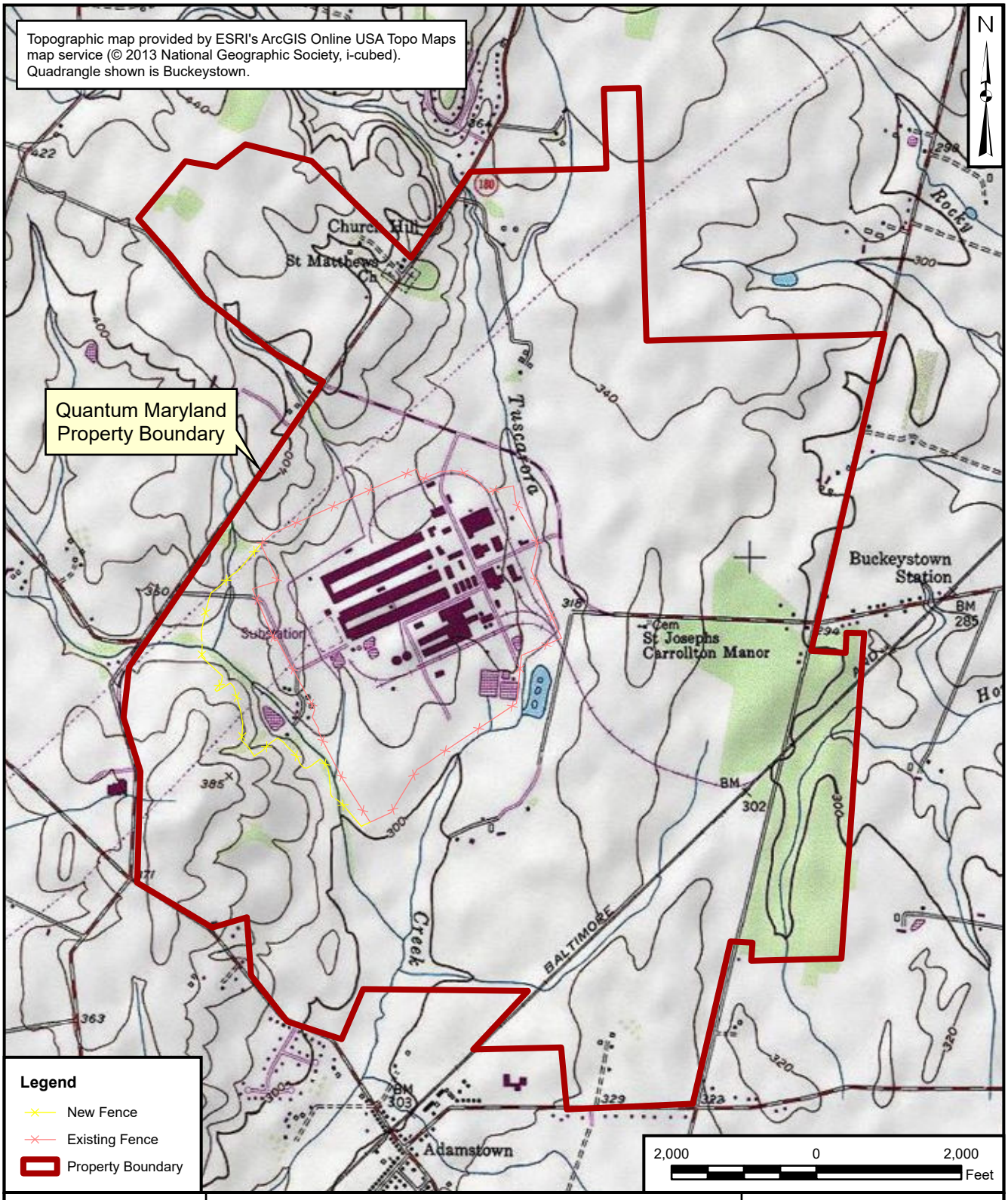
Table 4-4
September 2023 Groundwater and
Surface Water Analytical Results
Quantum Maryland, LLC
Frederick, Maryland

Well ID/Surface Water Location	Fluoride (mg/L)	Free Cyanide (mg/L)
MCL [1]	*4*	*0.0052*
MW-4	**2.6**	NA
MW-6	**1.1**	NA
MW-13	**0.43**	NA
MW-25	**15**	NA
MW-26	**5.5**	NA
RW-29	**26**	NA
RW-29 DUP[2]	**27**	NA
MW-45	**24**	NA
MW-51	**1.6**	NA
MW-52	**5.6**	NA
MW-56[5]	---	NA
MW-60	**2.6**	NA
MW-62	**4.1**	NA
MW-68	**16**	NA
MW-68 DUP[3]	**17**	NA
MW-72	**5.7**	NA
MW-73	**5.8**	NA
MW-103	**3.8**	NA
MW-107[5]	---	NA
MW-108	**13**	NA
SW-D	NA	0.0060 U
TUSCARORA CREEK DUP[4]	NA	0.0060 U
SW-E	NA	0.0060 U
SW-I	NA	0.0060 U

Notes:
All results are in milligrams/liter (mg/L).
[1] Per the ACO, Maximum Contaminant Level (MCL) (i.e. 40 CFR 141.62) for fluoride, and MDE surface water criterion for free cyanide
[2] Duplicate sample from RW-29
[3] Duplicate sample from MW-68
[4] Duplicate sample from Creek Location D
[5] Well was dry and was not sampled.
BOLD indicates detected value
indicates concentration above MCL
NA = not analyzed
J= Estimated value; detected above the method detection limit and below the reporting limit (or limit of quantitation).
U = Not detected above the laboratory reporting limit. Value shown is reporting limit.

FIGURES

\\EGSS706GISFS1\EGS\PITTSBURGH\GIS\GIS\ALCOA\EASTALCO\MAPDOCS\APRX\SITE_LOCATION_USGS.APRX - FIG 1-1 SITE_LOCATION_USGS 11/16/23JAZ



TETRA TECH

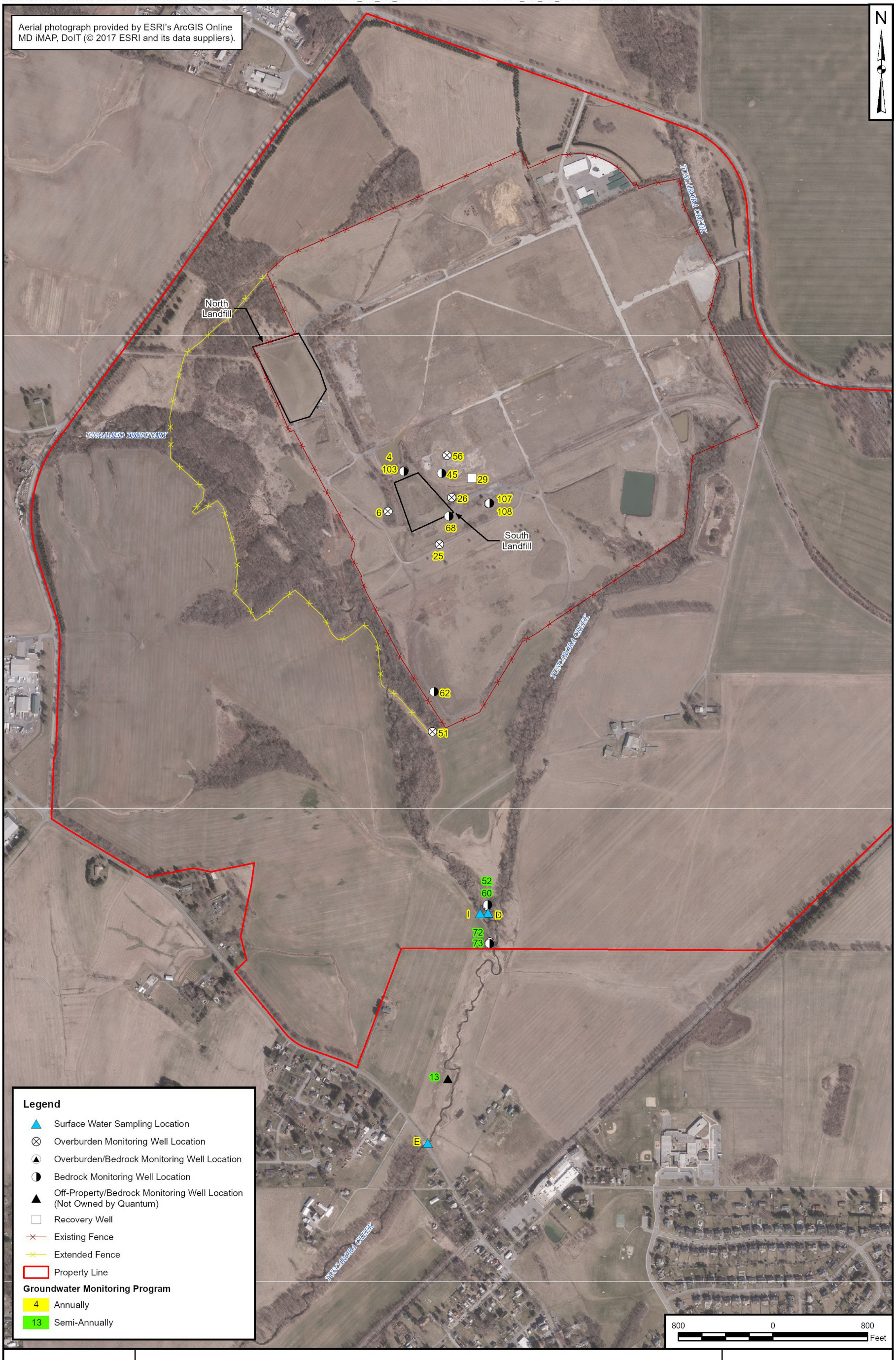
SITE LOCATION
QUANTUM MARYLAND, LLC
FREDERICK, MARYLAND

DRAWN BY: J. ZAMUDIO 11/16/23
CHECKED BY: D. MOORE 11/16/23
APPROVED BY: D. MOORE 11/16/23

CONTRACT NUMBER: 112C10050

FIGURE NUMBER	REV
1-1	0

\\EGSS706GISFS1\EGS\PITTSBURGH\GIS\GIS\ALCOA\EASTALCO\MAPDOCS\APRX\EASTALCO_GW_SW_LOCS.APRX - FIG 3-1 EASTALCO_GW_SW_LOCS 12/07/23 JAZ



TETRA TECH

GROUNDWATER AND SURFACE WATER MONITORING POINTS
QUANTUM MARYLAND, LLC
FREDERICK, MARYLAND

DRAWN BY: S. PAXTON 11/16/23
CHECKED BY: D. MOORE 12/07/23
APPROVED BY: D. MOORE 12/07/23

CONTRACT NUMBER: 112C10050

FIGURE NUMBER 3-1

REV 0

\\EGSS706GISFS1\EGS\PITTSBURGH\GIS\GIS\ALCOA\EASTALCO\MAPDOCS\APRX\EASTALCO_FLOURIDE_QTR1_2023.APRX - FIG 4-1 EASTALCO_FLUORIDE_QTR1_2023 11/16/23 JAZ

Aerial photograph provided by ESRI's ArcGIS Online
MD iMAP, DoIT (© 2017 ESRI and its data suppliers).

N

4
103
56
45
29
26
107
108
6
68
South Landfill
25
62
51
UNNAMED TRIBUTARY
TUSCARORA CREEK
60
2.6
52
4.6
I
D
72
73
4.5
4.8
TUSCARORA CREEK
13
0.3
E

Legend

- Surface Water Sampling Location
- Bedrock Monitoring Well Location
- Overburden Monitoring Well Location
- Off-Property/Bedrock Monitoring Well Location (Not Owned by Quantum)
- Recovery Well
- Extended Fence
- Existing Fence
- Property Line

Groundwater Monitoring Program

- 4 Annually
- 13 Semi-Annually
- 2.6 Groundwater Fluoride Concentration (mg/L)

450 0 450
Feet

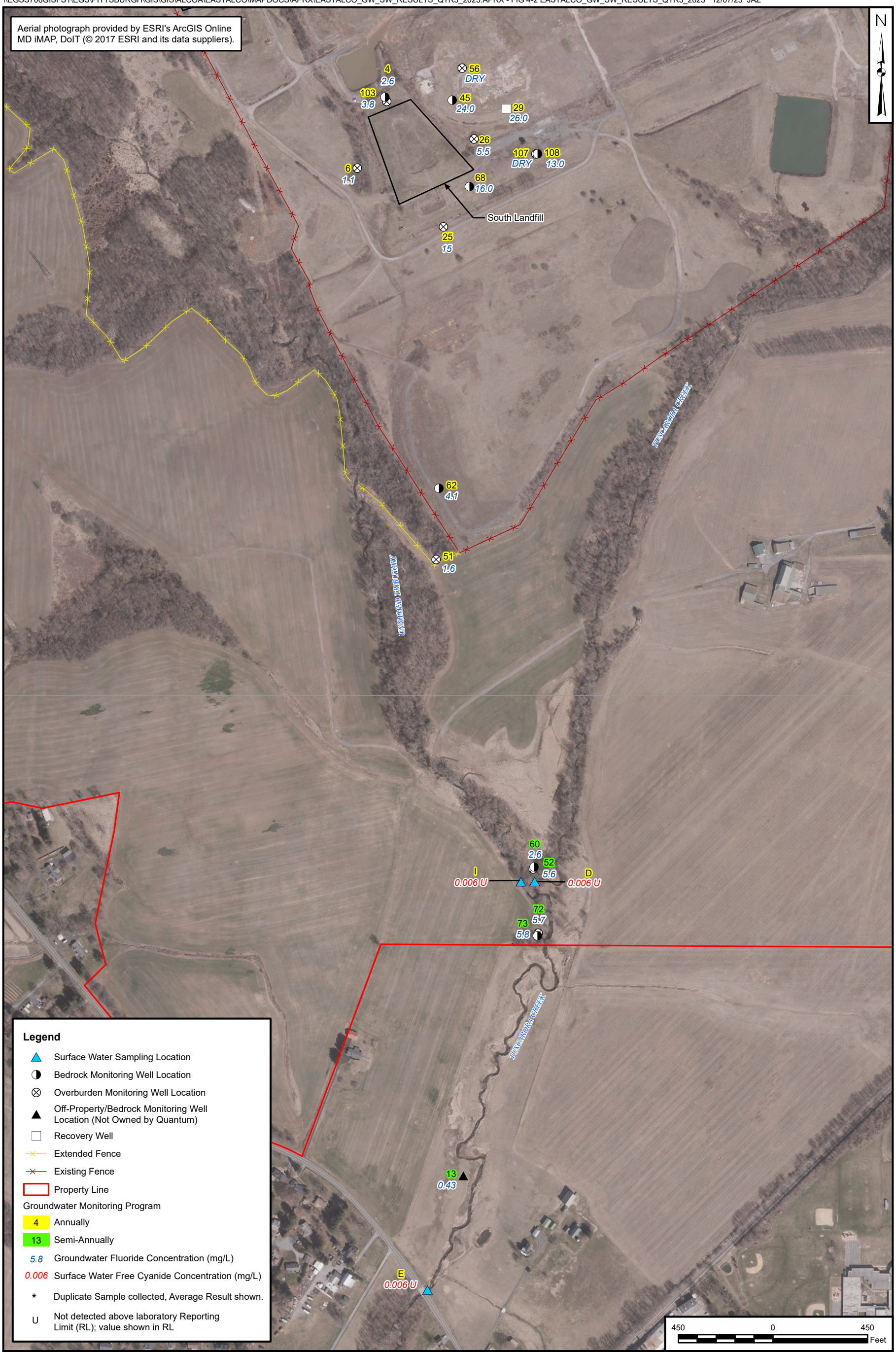
TETRA TECH

GROUNDWATER FLUORIDE CONCENTRATIONS
FIRST QUARTER 2023
QUANTUM MARYLAND, LLC.
FREDERICK, MARYLAND

DRAWN BY: J. ZAMUDIO 11/16/23
CHECKED BY: D. MOORE 11/16/23
APPROVED BY: D. MOORE 11/16/23

CONTRACT NUMBER: 112C10050

FIGURE NUMBER	REV
4-1	0



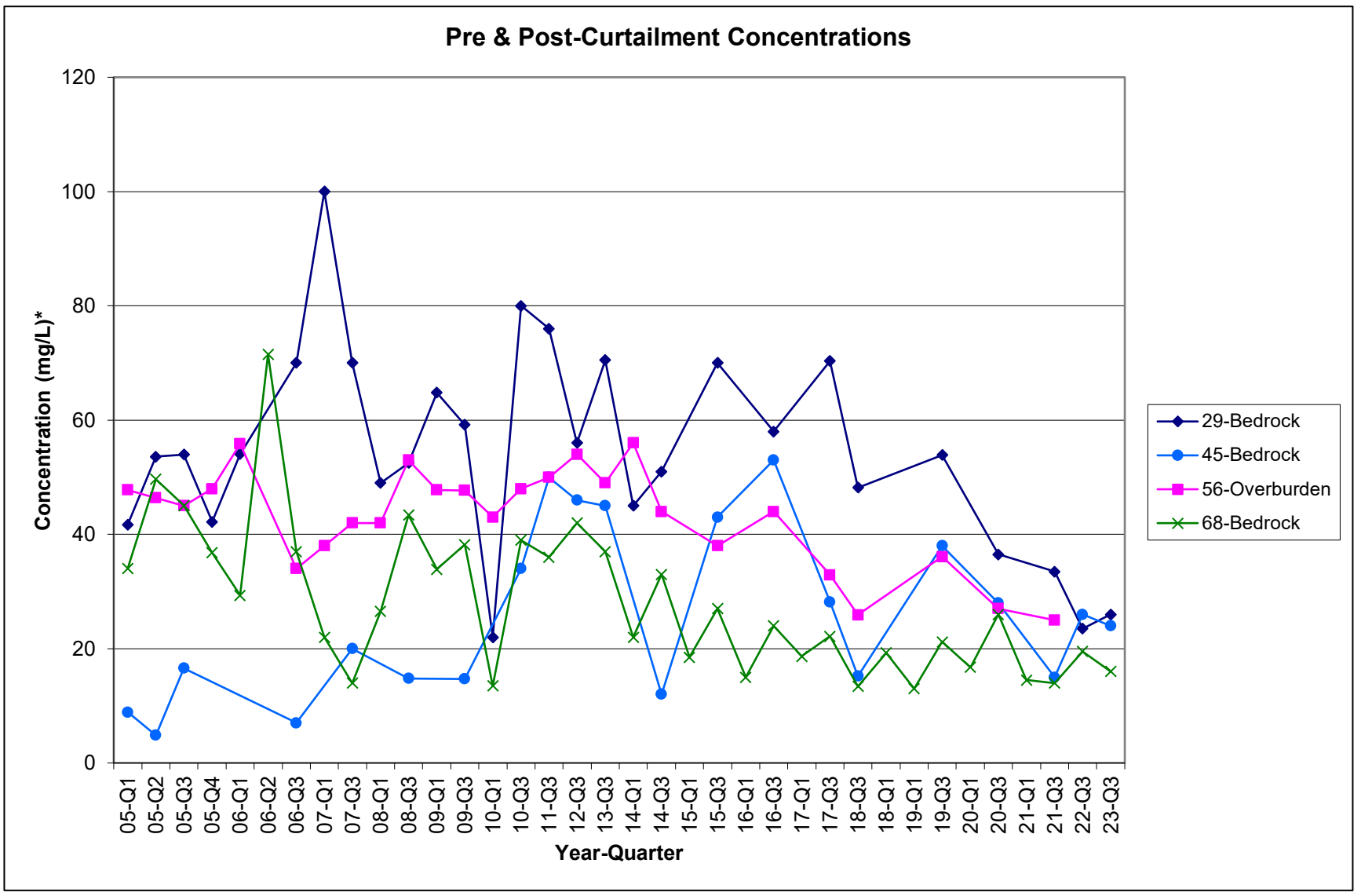
TETRA TECH

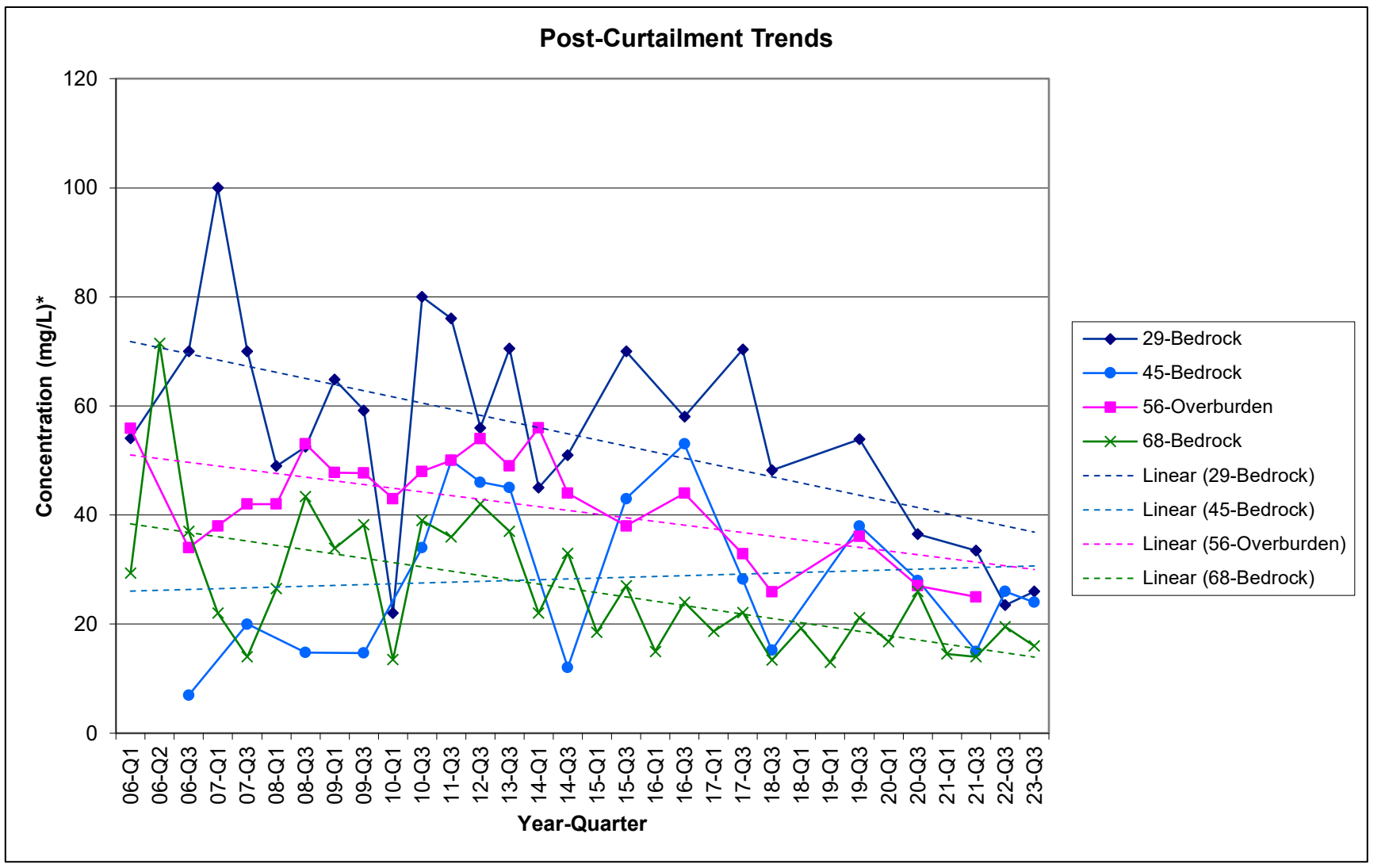
GROUNDWATER AND SURFACE WATER SAMPLE RESULTS
THIRD QUARTER 2023
QUANTUM MARYLAND, LLC.
FREDERICK, MARYLAND

DRAWN BY: J. ZAMUDIO 11/16/23
CHECKED BY: D. MOORE 12/07/23
APPROVED BY: D. MOORE 12/07/23

CONTRACT NUMBER: 112C10050

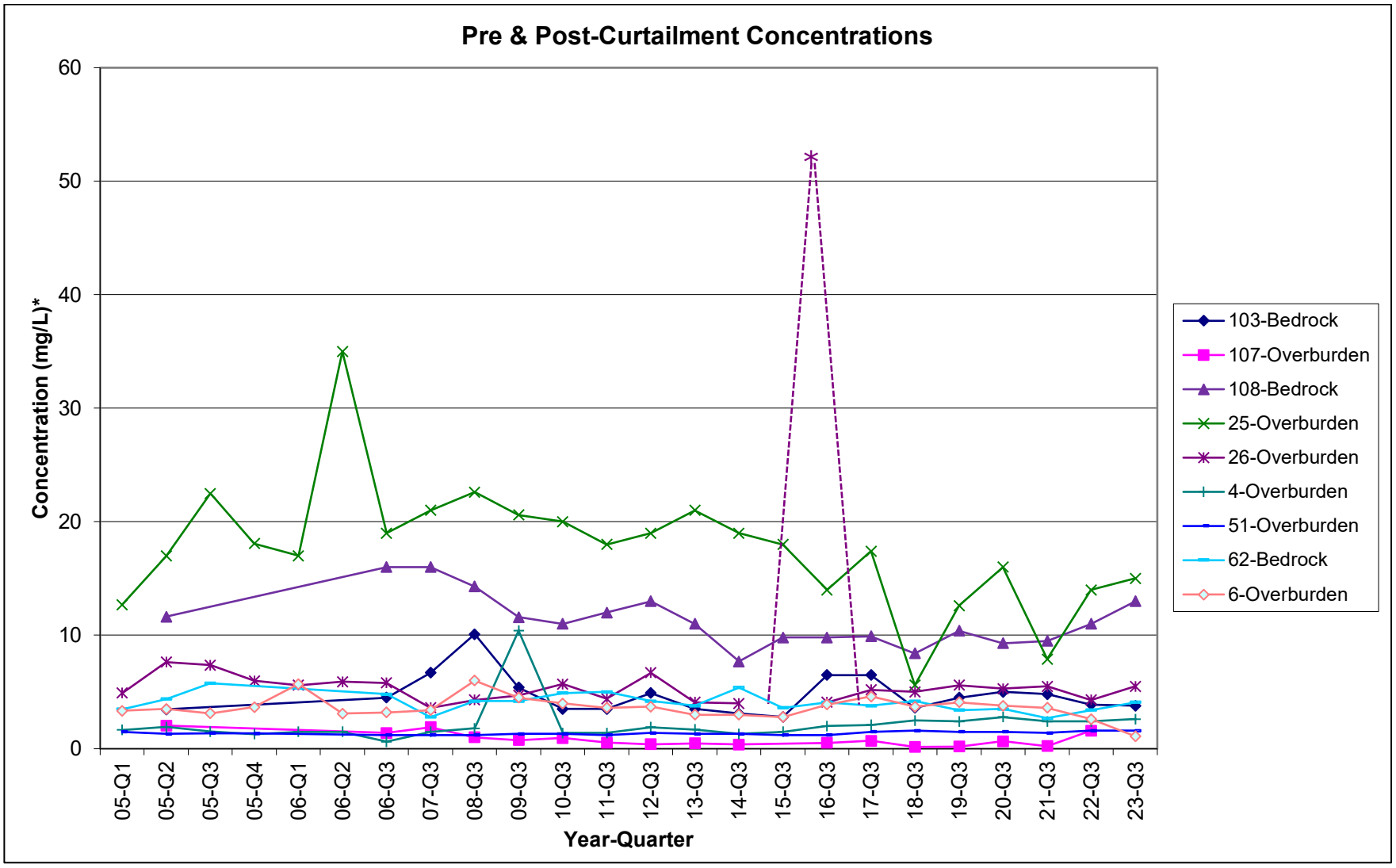
FIGURE NUMBER	REV
4-2	0





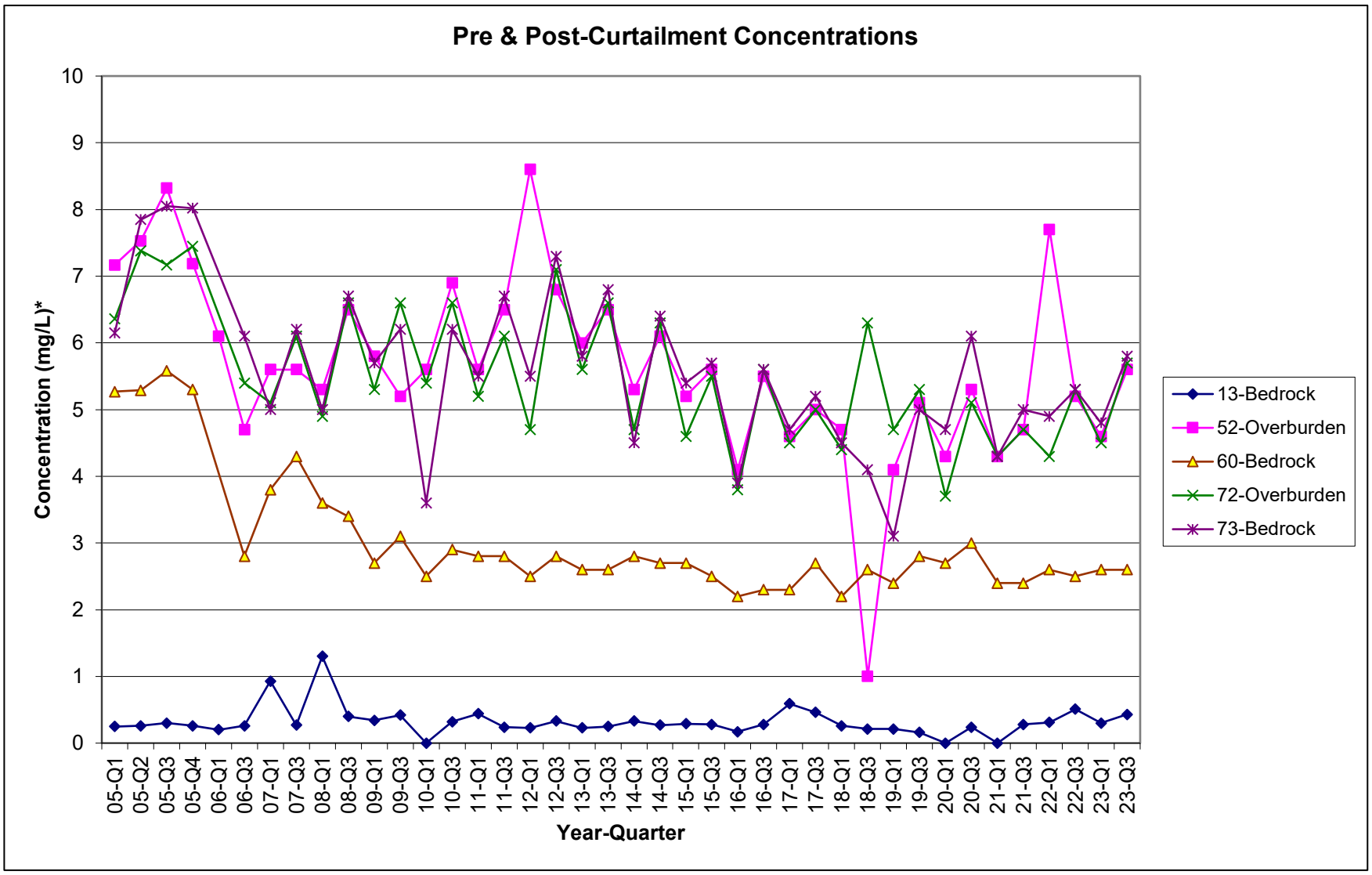
*The average concentration plotted if duplicate samples collected or well sampled more than once in a given quarter.

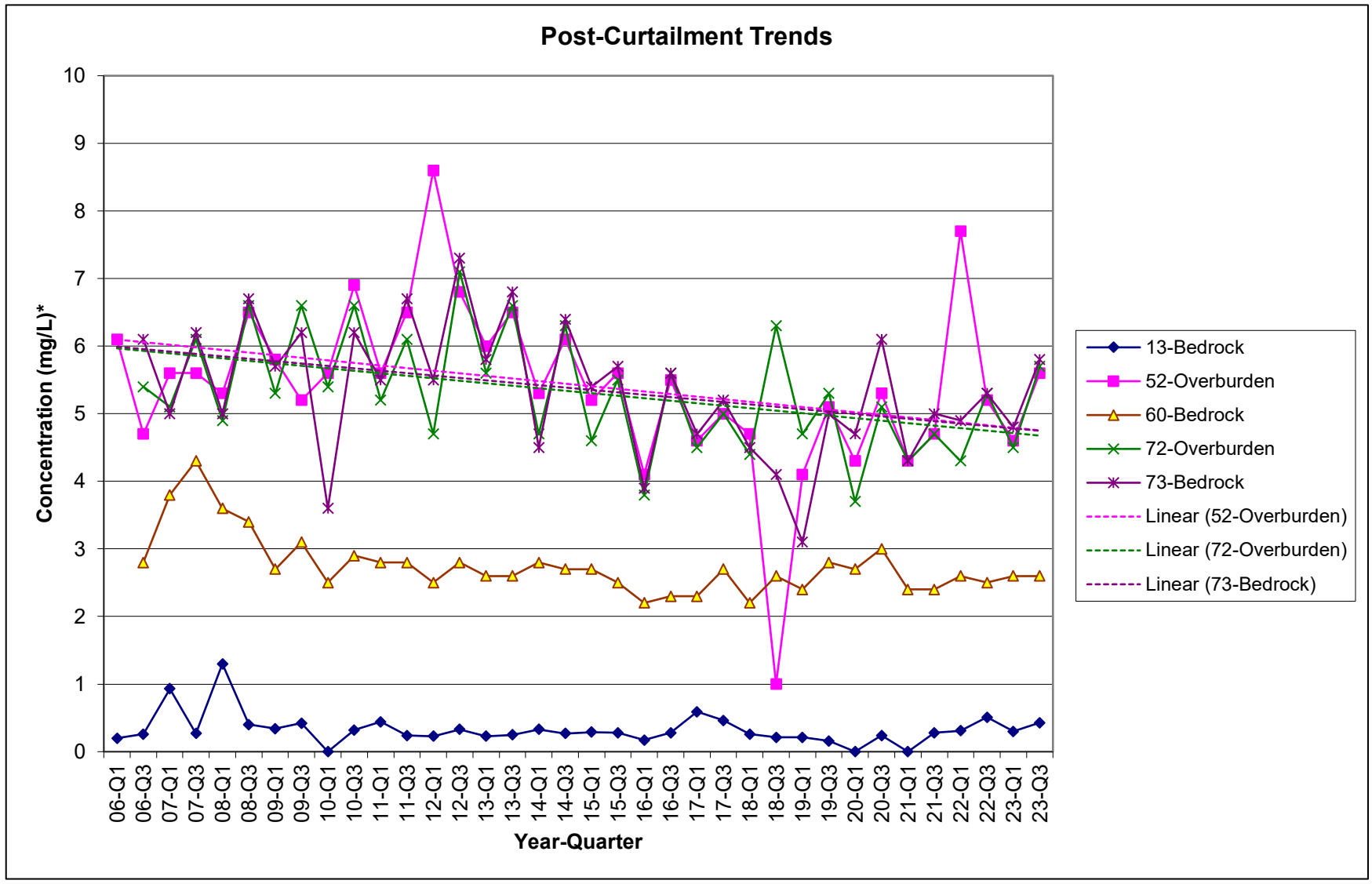
Figure 4-3
Fluoride in Groundwater near the Source Area



*Average concentration plotted if well was sampled more than once in a given quarter.
Third quarter 2015 result for MW-26 is considered anomalous. Value is plotted, but was not used to create trend line.

Figure 4-4
Fluoride in Downgradient/Cross Gradient Groundwater



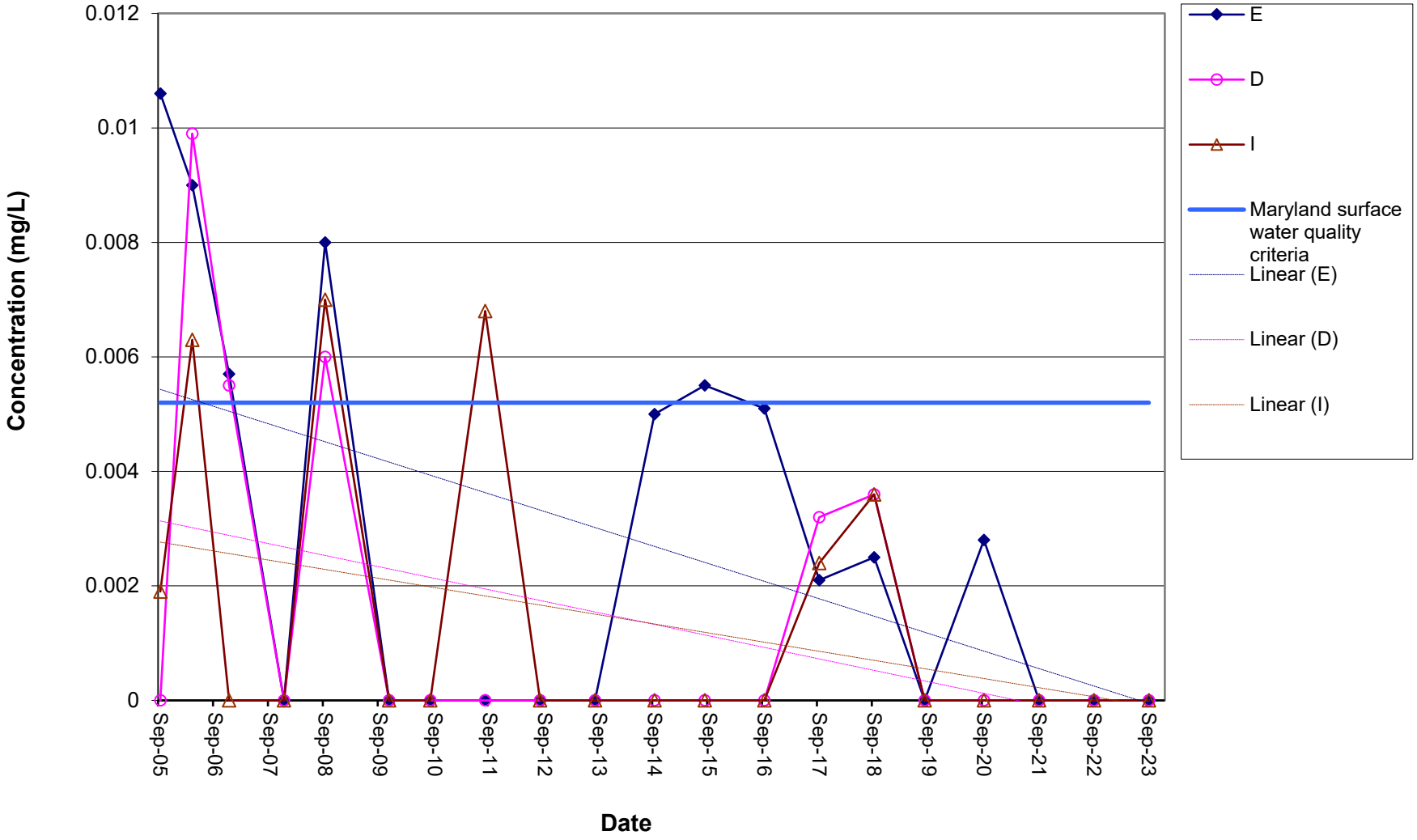


*The accuracy of the 06-Q1 concentrations from MW-60, 72, & 73 (reported as less than 1 mg/L) is uncertain. Therefore, this data was not plotted.

Figure 4-5
Fluoride in Groundwater near the Property Boundary

Figure 4-6

Free Cyanide Concentration Trends in Surface Water
Quantum Maryland, LLC



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Certificate of Analysis

Project Name: 31222314
PSS Project No.: 23052316

May 23, 2023

Kevin Plocek
GTA - Baltimore
1414 Key Highway, Ste. 201P
Baltimore, MD 21230

Reference: PSS Project No: **23052316**
Project Name: 31222314
Project Location: Frederick, MD
Project ID.: 31222314

Dear Kevin Plocek:

This report includes the analytical results from the analyses performed on the samples received under the project name referenced above and identified with the Phase Separation Science (PSS) Project number(s) **23052316**.

All work reported herein has been performed in accordance with current NELAP standards, referenced methodologies, PSS Standard Operating Procedures and the PSS Quality Assurance Manual unless otherwise noted in the Case Narrative Summary. PSS is limited in liability to the actual cost of the sample analysis done.

PSS reserves the right to return any unused samples, extracts or related solutions. Otherwise, the samples are scheduled for disposal, without any further notice, on June 27, 2023, with the exception of air canisters which are cleaned immediately following analysis. This includes any samples that were received with a request to be held but lacked a specific hold period. It is your responsibility to provide a written request defining a specific disposal date if additional storage is required. Upon receipt, the request will be acknowledged by PSS, thus extending the storage period.

This report shall not be reproduced except in full, without the written approval of an authorized PSS representative. A copy of this report will be retained by PSS for at least 5 years, after which time it will be disposed of without further notice, unless prior arrangements have been made.

We thank you for selecting Phase Separation Science, Inc. to serve your analytical needs. If you have any questions concerning this report, do not hesitate to contact us at 410-747-8770 or info@phaseonline.com.

Sincerely,

Cathy Thompson
QA Officer

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Explanation of Qualifiers

Project Name: 31222314
PSS Project No.: 23052316

Project ID: 31222314

The following samples were received under chain of custody by Phase Separation Science (PSS) on 05/23/2023 at 02:20 pm

PSS Sample ID	Sample ID	Matrix	Date/Time Collected
23052316-001	EMP-GW1	GROUND WATER	05/23/23 00:00
23052316-002	EMP-GW2	GROUND WATER	05/23/23 00:00
23052316-003	EMP-GW3	GROUND WATER	05/23/23 00:00

Please reference the Chain of Custody and Sample Receipt Checklist for specific container counts and preservatives. Any sample conditions not in compliance with sample acceptance criteria are described in Case Narrative Summary.

Notes:

1. The presence of a common laboratory contaminant such as methylene chloride may be considered a possible laboratory artifact. Where observed, appropriate consideration of data should be taken.
2. Unless otherwise noted in the case narrative, results are reported on a dry weight basis with the exception of pH, flashpoint, moisture, and paint filter test.
3. Drinking water samples collected for the purpose of compliance with SDWA may not be suitable for their intended use unless collected by a certified sampler [COMAR 26.08.05.07.C.2].
4. The analyses of 1,2-dibromo-3-chloropropane (DBCP) and 1,2-dibromoethane (EDB) by EPA 524.2 and calcium, magnesium, sodium and iron by EPA 200.8 are not currently promulgated for use in testing to meet the Safe Drinking Water Act and as such cannot be used for compliance purposes. The listings of the current promulgated methods for testing in compliance with the Safe Drinking Water Act can be found in the 40 CFR part 141.1, for the primary drinking water contaminates, and part 141.3, for the secondary drinking water contaminates.
5. Sample prepared under EPA 3550C with concentrations greater than 20 mg/Kg should employ the microtip extraction procedure if required to meet data quality objectives.
6. The analysis of acrolein by EPA 624 must be analyzed within three days of sampling unless pH is adjusted to 4-5 units [40 CFR part 136.3(e)].
7. Method 180.1, The Determination of Turbidity by Nephelometry, recommends samples over 40 NTU be diluted until the turbidity falls below 40 units. Routine samples over 40 NTU may not be diluted as long as the data quality objectives are not affected.
8. Alkalinity results analyzed by EPA 310.2 that are reported by dilution are estimated and are not in compliance with method requirements.

Standard Flags/Abbreviations:

B	A target analyte or common laboratory contaminant was identified in the method blank. Its presence indicates possible field or laboratory contamination.
C	Results Pending Final Confirmation.
E	The data exceeds the upper calibration limit; therefore, the concentration is reported as estimated.
Fail	The result exceeds the regulatory level for Toxicity Characteristic (TCLP) as cited in 40 CFR 261.24 Table 1.
J	The target analyte was positively identified below the reporting limit but greater than the MDL.
MDL	This is the Laboratory Method Detection Limit which is equivalent to the Limit of Detection (LOD). The LOD is the minimum result, which can be reliably discriminated from a blank with a predetermined confidence level. This value will remain constant across multiple similar instrumentation and among different analysts. An LOD is analyte and matrix specific. instrumentation and among different analysts. An LOD is analyte and matrix specific.
ND	Not Detected at or above the reporting limit.
RL	PSS Reporting Limit.
U	Not detected.

Certifications:

NELAP Certifications: PA 68-03330, VA 460156
State Certifications: MD 179, WV 303
Regulated Soil Permit: P330-12-00268
NSWC USCG Accepted Laboratory
LDBE MWAA LD1997-0041-2015

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Certificate of Analysis

Project Name: 31222314
PSS Project No.: 23052316

Sample ID: EMP-GW1 **Date/Time Sampled: 05/23/2023 00:00** **PSS Sample ID: 23052316-001**
Matrix: GROUND WATER **Date/Time Received: 05/23/2023 14:20**

Inorganic Anions: Fluoride — Analytical Method: EPA 300.0 — Preparation Method: E300.0P

Qualifier(s): See Sample Receipt section on Case Narrative.

	Result	Units	RL	Flag	Dil	MDL	Prepared	Analyzed	Analyst
Fluoride	**0.14**	mg/L	0.25	J	1	0.04	05/23/23	05/23/23 14:41	1053

Sample ID: EMP-GW2 **Date/Time Sampled: 05/23/2023 00:00** **PSS Sample ID: 23052316-002**
Matrix: GROUND WATER **Date/Time Received: 05/23/2023 14:20**

Inorganic Anions: Fluoride — Analytical Method: EPA 300.0 — Preparation Method: E300.0P

Qualifier(s): See Sample Receipt section on Case Narrative.

	Result	Units	RL	Flag	Dil	MDL	Prepared	Analyzed	Analyst
Fluoride	**5.6**	mg/L	0.25		1	0.04	05/23/23	05/23/23 15:04	1053

Sample ID: EMP-GW3 **Date/Time Sampled: 05/23/2023 00:00** **PSS Sample ID: 23052316-003**
Matrix: GROUND WATER **Date/Time Received: 05/23/2023 14:20**

Inorganic Anions: Fluoride — Analytical Method: EPA 300.0 — Preparation Method: E300.0P

Qualifier(s): See Sample Receipt section on Case Narrative.

	Result	Units	RL	Flag	Dil	MDL	Prepared	Analyzed	Analyst
Fluoride	**0.36**	mg/L	0.25		1	0.04	05/23/23	05/23/23 15:27	1053

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800-932-9047
www.phaseonline.com

Project Name: 31222314

PSS Project No.: 23052316

Any holding time exceedances, deviations from the method specifications, regulatory requirements or variations to the procedures outlined in the PSS Quality Assurance Manual are outlined below.

Matrix spike and matrix spike duplicate analyses may not be performed due to insufficient sample quantity. In these instances, a laboratory control sample and laboratory control sample duplicate are analyzed unless otherwise noted or specified in the method.

Sample Receipt:

No sampling time recorded on COC or container labels.

NELAP accreditation was held for all analyses performed unless noted below. See www.phaseonline.com for complete PSS scope of accreditation.

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Lab Chronology

Project Name: 31222314
PSS Project No.: 23052316

Method	Client Sample ID	Analysis Type	PSS Sample ID	Mtx	Prep Batch	Analytical Batch	Prepared	Analyzed
EPA 300.0	EMP-GW1	Initial	23052316-001	W	95542	203706	05/23/2023 14:32	05/23/2023 14:41
	EMP-GW2	Initial	23052316-002	W	95542	203706	05/23/2023 14:32	05/23/2023 15:04
	EMP-GW3	Initial	23052316-003	W	95542	203706	05/23/2023 14:32	05/23/2023 15:27
	95542-1-BKS	BKS	95542-1-BKS	W	95542	203706	05/23/2023 10:24	05/23/2023 12:00
	95542-1-BLK	BLK	95542-1-BLK	W	95542	203706	05/23/2023 10:24	05/23/2023 11:37
	20230522-104 S	MS	23052218-002 S	W	95542	203706	05/23/2023 10:59	05/23/2023 13:09
	20230522-104 SD	MSD	23052218-002 S	W	95542	203706	05/23/2023 10:59	05/23/2023 13:32

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QC Summary

Project Name 31222314
PSS Project No.: 23052316

Analytical Method: EPA 300.0

Prep Method: E300.0P
Seq Number: 203706
Matrix: Water
Date Prep: 05/23/23
MB Sample Id: 95542-1-BLK
LCS Sample Id: 95542-1-BKS

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	Limits	Units	Flag
Fluoride	<0.04000	2.500	2.466	99	90-110	mg/L	

F = RPD exceeded the laboratory control limits
X = Recovery of MS, MSD or both outside of QC Criteria
H= Recovery of BS,BSD or both exceeded the laboratory control limits
L = Recovery of BS,BSD or both below the laboratory control limits

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QC Summary

Project Name 31222314
PSS Project No.: 23052316

Analytical Method: EPA 300.0
Seq Number: 203706 Matrix: Water
CCV Sample Id: CCV-01 Analyzed Date: 05/23/23 10:51

Parameter	Spike Amount	CCV Result	CCV %Rec	Limits	Units	Flag
Fluoride	2.500	2.508	100	90-110	mg/L	

Analytical Method: EPA 300.0
Seq Number: 203706 Matrix: Water
CCV Sample Id: CCV-02 Analyzed Date: 05/23/23 13:55

Parameter	Spike Amount	CCV Result	CCV %Rec	Limits	Units	Flag
Fluoride	2.500	2.557	102	90-110	mg/L	

Analytical Method: EPA 300.0
Seq Number: 203706 Matrix: Water
CCV Sample Id: CCV-03 Analyzed Date: 05/23/23 15:50

Parameter	Spike Amount	CCV Result	CCV %Rec	Limits	Units	Flag
Fluoride	2.500	2.530	101	90-110	mg/L	

Analytical Method: EPA 300.0
Seq Number: 203318 Matrix: Water
Parent Sample Id: ICV-01 ICV Sample Id: ICV-01 Analyzed Date: 05/08/23 16:22

Parameter	Spike Amount	ICV Result	ICV %Rec	Limits	Units	Flag
Fluoride	2.500	2.491	100	90-110	mg/L	

X = Recovery outside of QC Criteria

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CHAIN OF CUSTODY FORM

All fields must be completed accurately. Shaded sections for lab use only.

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① PSS CLIENT: GTA | OFFICE LOCATION: BALTIMORE | PSS Work Order #: 23052316 | PAGE 1 OF 1

BILL TO (if different): | PHONE #: 443 286 5506

CONTACT: KEVIN FLOCEK | EMAIL: kflocek@gtaeng.com

PROJECT NAME: 31222314 | PROJECT #: 31222314

SITE LOCATION: FREDERICK, MD | P.O. #: 31222314

SAMPLER(S): KF | DW CERT #:

Matrix Codes: **SW**=Surface Water **DW**=Drinking Water **GW**=Ground Water **WW**=Waste Water **O**=Oil **S**=Soil **SOL**=Solid **A**=Air **WI**=Wipe

Preservative Codes: 1 - HCL; 2 - H_2SO_4; 3 - HNO_3; 4 - NaOH; 5 - E624KIT; 6 - ICE; 7 - Sodium Thiosulfate; 8 - Ascorbic Acid; 9 - TerraCore Kit

② ③

PSS ID	SAMPLE IDENTIFICATION	DATE SAMPLED	TIME SAMPLED	MATRIX Use Codes	# OF CONTAINERS	SAMPLE TYPE: C=COMPOSITE G=GRAB	Preservatives Use Codes / Analysis/ Method Required: FLORIDE
1	EMP-GW1	5/23/23		GW	1	G	/
2	EMP-GW2	↓		↓	1	G	/
3	EMP-GW3	↓		↓	1	G	/

④

⑤

	Date	Time	Received By:
Relinquished By: (1) KEVIN FLOCEK	5/23/23	2:20 PM	
Relinquished By: (2)	Date	Time	Received By:
Relinquished By: (3)	Date	Time	Received By:
Relinquished By: (4)	Date	Time	Received By:

Requested TAT (One TAT per COC)
☐ 5-Day ☐ 3-Day ☐ 2-Day
☐ Next Day ☒ Emergency ☐ Other

STATE RESULTS REPORTED TO:
☐ MD ☐ DE ☐ PA ☐ VA ☐ WV
☐ OTHER

COMPLIANCE?
☐ DW ☐ WW

EDD FORMAT TYPE

Special Instructions:

Ice Present: ABS

Custody Seal: ABS

Coolers: 0 Temp: 22.9-24.3°C

Shipping Carrier: Client

This chain of custody is a legal document. The client (PSS Client), by signing, or having client's agent sign, this "Chain of Custody Form", agrees to pay for the above requested services per the latest version of the Service Brochure or PSS-provided quotation including any and all attorney's or other reasonable fees if collection becomes necessary.

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Sample Receipt Checklist

Project Name: 31222314
PSS Project No.: 23052316

Client Name GTA - Baltimore
Disposal Date 06/27/2023

Received By Tyler Enwright
Date Received 05/23/2023 02:20:00 PM
Delivered By Client
Tracking No Not Applicable
Logged In By Tyler Enwright

Shipping Container(s)
No. of Coolers 0

		Ice	Absent
Custody Seal(s) Intact?	N/A	Temp (deg C)	24.3
Seal(s) Signed / Dated?	N/A	Temp Blank Present	No

Documentation

		Sampler Name	Kevin Plocek
COC agrees with sample labels?	Yes	MD DW Cert. No.	N/A
Chain of Custody	Yes		

Sample Container

		Custody Seal(s) Intact?	Not Applicable
Appropriate for Specified Analysis?	Yes	Seal(s) Signed / Dated	Not Applicable
Intact?	Yes		
Labeled and Labels Legible?	Yes		

Holding Time

		Total No. of Samples Received	3
All Samples Received Within Holding Time(s)?	Yes	Total No. of Containers Received	3

Preservation

Total Metals	(pH<2)	N/A
Dissolved Metals, filtered within 15 minutes of collection	(pH<2)	N/A
Orthophosphorus, filtered within 15 minutes of collection		N/A
Cyanides	(pH>12)	N/A
Sulfide	(pH>9)	N/A
TOC, DOC (field filtered), COD, Phenols	(pH<2)	N/A
TOX, TKN, NH3, Total Phos	(pH<2)	N/A
VOC, BTEX (VOA Vials Rcvd Preserved)	(pH<2)	N/A
Do VOA vials have zero headspace?		N/A
624 VOC (Rcvd at least one unpreserved VOA vial)		N/A
524 VOC (Rcvd with trip blanks)	(pH<2)	N/A

Comments: (Any "No" response must be detailed in the comments section below.)

For any improper preservation conditions, list sample ID, preservative added (reagent ID number) below as well as documentation of any client notification as well as client instructions. Samples for pH, chlorine and dissolved oxygen should be analyzed as soon as possible, preferably in the field at the time of sampling. Samples which require thermal preservation shall be considered acceptable when received at a temperature above freezing to 6°C. Samples that are hand delivered on the day that they are collected may not meet these criteria but shall be considered acceptable if there is evidence that the chilling process has begun such as arrival on ice.

No sampling time recorded on COC or container labels.

Samples Inspected/Checklist Completed By: Tyler Enwright — Date: 05/23/2023

PM Review and Approval: Lynn Jackson — Date: 05/23/2023

Appendix B3: Table of Historic Groundwater Data from Abandoned Wells

Analyte	Well ID:	MW-34	MW-37	MW-38	MW-43	MW-46	MW-97
Free Cyanide	ug/L	4.7	-	-	0.5	13.7	34.2
	Date	6/14/2005	-	-	6/21/2005	6/14/2005	6/22/2005
Total Cyanide	mg/L	-	-	-	-	0.088	-
	Date	-	-	-	-	3/19/1988	-
Total Fluoride	mg/L	7.36	-	-	0.91	2.39	3.13
	Date	6/14/2005	-	-	6/21/2005	6/14/2005	6/22/2005
Total Calcium	mg/L	-	-	-	-	160	66.5
	Date	-	-	-	-	10/9/1987	6/22/2005
Total Iron	mg/L	-	-	-	-	0.47	-
	Date	-	-	-	-	10/9/1987	-
Total Aluminum	mg/L	-	-	-	-	<0.01	-
	Date	-	-	-	-	6/8/1987	-
Total Magnesium	mg/L	-	-	-	-	-	10.9
	Date	-	-	-	-	-	6/22/2005

Appendix B4: Historic Groundwater Data for Select VOCs

Analyte	Well ID:	Current Monitoring Wells										Abandoned Wells							
		MW-4	MW-29	MW-45	MW-56	MW-63	MW-74	MW-75	MW-103	MW-107	MW-108	MW-34	MW-37	MW-38	MW-43	MW-46	MW-97	MW-100	MW-101
1, 1-Dichloroethene (DCE)	ug/L	<1	<1	<1	<1	<1	<1	<1	-	-	-	-	-	-	-	<1	-	-	-
	Date	8/22/2006	6/22/1988	11/22/1988	9/23/1999	3/16/2016	3/17/2016	3/17/2016	-	-	-	-	-	-	-	3/19/1988	-	-	-
Cis-1, 2-Dichloroethene	ug/L	<1	1	-	<1	<1	<1	<1	-	-	-	-	-	-	-	-	-	-	-
	Date	8/22/2006	1/14/2004	-	9/23/1999	3/16/2016	3/17/2016	3/17/2016	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethene (PCE)	ug/L	3.9	1	1	2	<1	<1	<1	-	-	-	-	-	-	-	<1	-	-	-
	Date	8/22/2006	1/14/2004	11/22/1988	9/23/1999	3/16/2016	3/17/2016	3/17/2016	-	-	-	-	-	-	-	3/19/1988	-	-	-
Trichloroethene (TCE)	ug/L	0.93	1	<1	1	<1	<1	<1	-	-	-	-	-	-	-	<1	-	-	-
	Date	8/22/2006	1/14/2004	11/22/1988	9/23/1999	3/16/2016	3/17/2016	3/17/2016	-	-	-	-	-	-	-	3/19/1988	-	-	-
Vinyl chloride	ug/L	<1	1	<1	<1	<1	<1	<1	-	-	-	-	-	-	-	<1	-	-	-
	Date	8/22/2006	1/14/2004	6/22/1989	9/23/1999	3/16/2016	3/17/2016	3/17/2016	-	-	-	-	-	-	-	3/19/1988	-	-	-

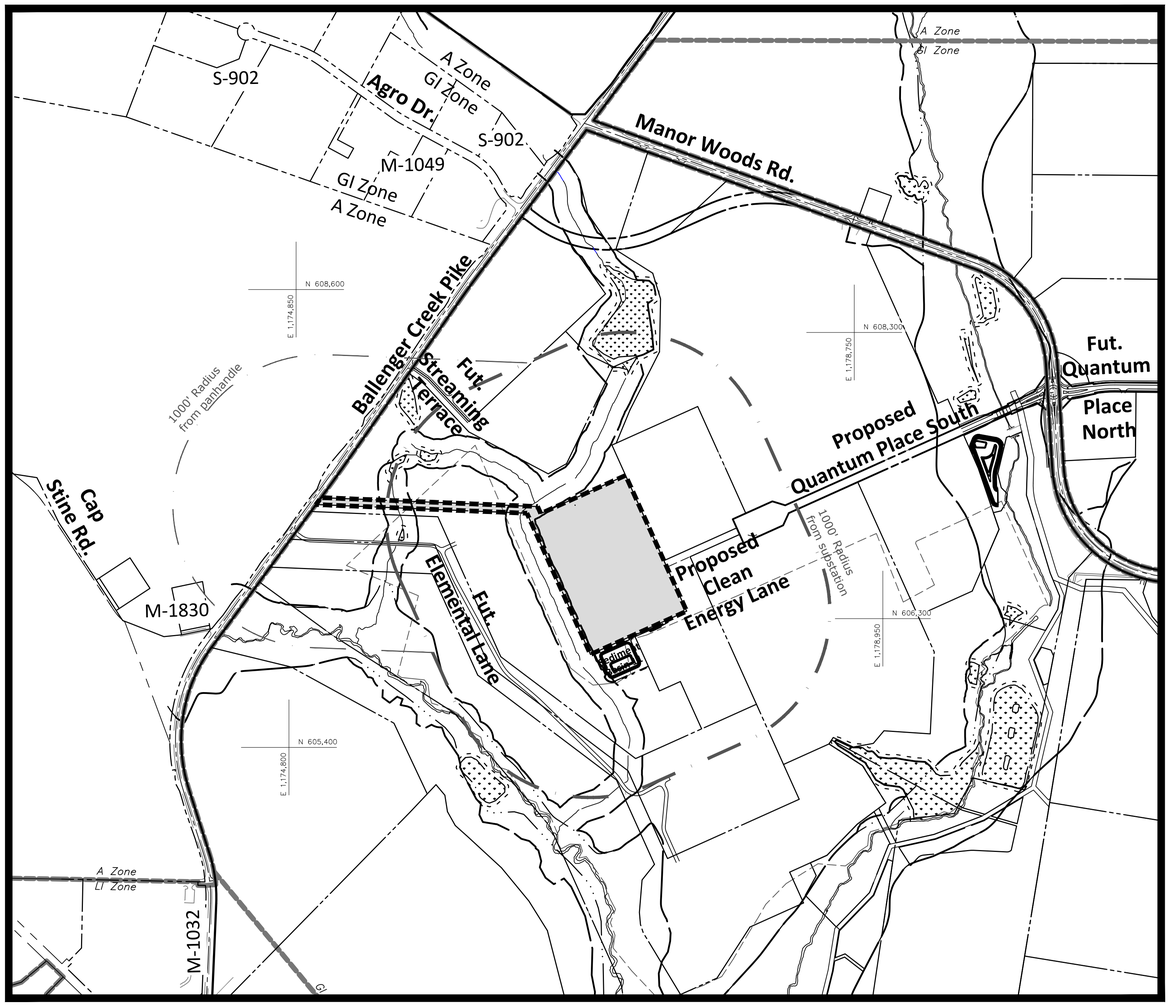
Appendix C

Substation Improvement Plan Drawings

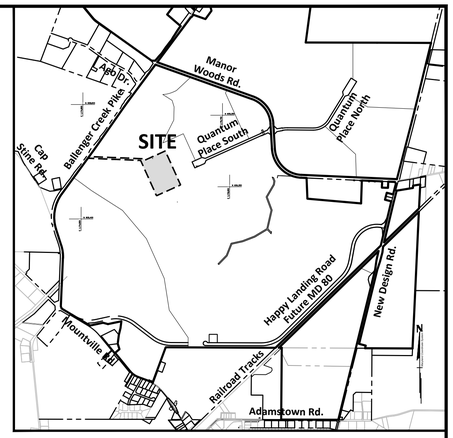
Quantum Frederick
Lot 112A Substation
Combined Stormwater Management Development and Improvement Plan

GENERAL NOTES:

1. This Improvement Plan is for Critical Digital Infrastructure Electric Substation.
2. Total area of approved amended Preliminary Plan PP273774 is +/-1,053.78 Acres. This Site Plan falls within the approved preliminary plan area and includes +/-16.2 acres. The combined development / improvement plan is zoned GI, has a land use designation of General Industrial per the 2010 Comprehensive Plan, and is in the Adamstown Planning Region.
3. The combined development / improvement plan is comprised of part of Parcel 70, Tax Map 94 recorded in Liber 15038 at folio 393.
4. The combined development / improvement plan is located on Frederick County Tax Map 94 and Frederick County Soils Map 94.
5. Boundary information as shown on this site plan was taken from August 2021 field boundary surveys conducted by Rodgers Consulting, Inc., and other available deed and plat information.
6. Topography is shown hereon at 2 foot contour intervals per photogrammetric mapping compiled by McKenzieSnyder, Inc., based on aerial photography and LiDAR data collected in April 2021.
7. Survey datum is the Maryland Coordinate System [NAD83(2011), SPCS zone 1900(MD), U.S. Survey Feet], based on static GPS observations post-processed by the National Geodetic Survey's Online Positioning User Service (OPUS). Measured points include RCI control points 9501 and 9504. The average combined (map scale x elevation) factor for the site is 0.99997061.
   9501 N 609450.579 E 1184241.605
   9504 N 604476.704 E 1174468.799
   Vertical datum is NAVD88, based on static GPS observations post-processed by the National Geodetic Survey's Online Positioning User Service (OPUS). Measured points include RCI control points 9501 and 9504.
   9501 NAVD88 orthometric height 300.656
   9504 NAVD88 orthometric height 377.729
8. The 100 Year Floodplain is a compilation of several sources of data per Section 1-19-9.100 of the Frederick County Zoning Code. The extents of the floodplain includes the greatest extent of the following: FEMA, Frederick County Floodplain Soils, and wetlands adjacent to other floodplain sources. A minimum setback of 25 feet shall be provided from all Floodplain district boundaries, except as otherwise approved through the mitigation process described in § 1-19-9.110(B)(7) or a minimum setback of 50 feet shall be provided from the bank of any perennial or intermittent stream, whichever is greater. All setback areas shall be maintained or planted with natural vegetation.
9. Wetlands were delineated in September of 1996 and reconfirmed in Spring 2021 by RCI staff, in conformance with the 1987 U.S. Corps of Engineers' delineation manual. No wetlands are present within the limits of this Site Plan. Some wetland delineations were revised in Summer 2022 in conjunction with MDE review.
10. A Preliminary Forest Conservation Plan was approved under F266567 on 2021.12.15. There are no wetlands present within the limits of this plan. A Final Forest Conservation Plan was approved under F274907 on 2022.12.21. FRO mitigation has been provided by easement recordation at L.16283 F.250 on 2023.01.04.
11. Stormwater Management quality and Quantity control is being provided through a combination of ESDv and end of line extended detention storage. ESDv is being provided to the maximum extent practicable in a proposed submerged gravel wetland and existing grass swale along Clean Engery Lane. CPv is being provided in Existing Sediment Basin DA-11 installed with improvement plans PW# 275128.
12. Cross access easements for lots 112A - 112D will be provided on the final record plats with up to two ingress/egress easements intended for access to each lot.
13. The alignments of the proposed utilities (dry utilities, storm drain) are preliminary and subject to change.
14. This site met the requirements of APFO at preliminary plan (PP266504) approval and is therefore exempt from further APFO testing and consideration at site plan. (§1-20-7(E)). It is subject to an executed Letter of Understanding. All signage and markings will be in accordance with Maryland MUTCD.
15. Common driveway easements must be recorded prior to lot recordation.
16. All proposed intersections meet the Intersection Design criteria as outlined in Frederick County Design Manual. All public road fillet radii at intersections will be 30 feet, unless otherwise shown on the plan.
17. Site Plans and Improvement Plans will comply with the Frederick County 2018 Bikeways and Trails Plan.
18. No buildings, structures, or impervious surfaces, and no activities requiring clearing or grading over 5,000 square feet will be permitted in waterbody buffers, except for stormwater management facilities, structures and appurtenant conveyances; environmental restoration or mitigation projects; utilities; public and private roads; driveways; bikeways, and trails unless otherwise permitted per1-19-9.400.
19. The waterbody buffers shown on this plan were delineated based on Section 1-19-9.400(C) of the Frederick County Code (the waterbody buffer ordinance). First, a minimum 100' buffer was delineated on each side of intermittent and perennial streams. Second, 175-foot cross-sections were taken at 50-foot intervals along each stream. The buffer was expanded to 150 feet along these cross sections when 60% of the cross-section contained slopes between 15%- >25%. The buffer was expanded to 175 feet along these cross sections when 60% of the cross-section contained slopes 25% and greater. The buffer was adjusted to the top of the crest per the waterbody buffer ordinance when applicable. This site plan is outside of the Linganore Watershed Protection Area. After the cross-sections were taken the waterbody buffer was expanded to include wetlands and floodplains, including flooding soils, that extend outside of the calculated waterbody buffer area.
20. All existing or proposed sidewalks, shared use paths, and trails will comply with all state and federal accessibility standards.
21. All easements necessary to provide public access/maintenance/etc are referenced on this combined development / improvement plan.
22. The approval of this site plan does not grant the right to, or set the precedent for, the use of shared utility easements. The location, orientation, and grading through and around all water and sewer easements outside of the public right of way are subject to approval by DWSU with the improvement plans. In the event of conflicting requirements between agencies, the developer agrees that a revision of this site plan may be necessary.
23. The property addresses and street signs and directional signs shall be fabricated and posted in accordance with the Frederick County Premise Identification Ordinance #05-01-362. A detail of a sample street sign shall be provided on the appropriate drawings, but no later than the Improvement Plans. A copy of the ordinance is available from the County Fire Marshal by contacting 301-600-1479 or at www.co.frederick.md.us/FED.
24. Fire lanes will be established by the Fire Marshal. Fire lanes will be required to be painted traffic yellow and with signs posted every 75' (minimum).



Location Map



VICINITY MAP: 1"=2000'
Tax Map 94
Parcel 70 (Tax Acct. #01-000152)

SHEET INDEX		
Sheet 1	Cover Sheet	CS-1
Sheet 2	Sediment Control Plan	SC-1
Sheet 3	Sediment Control Notes and Details	SC-2
Sheet 4	Site Improvement Plan	SP-1
Sheet 5	Storm Drain Plan, Profile, Notes and Details	SD-1
Sheet 6	Stormwater Management Drainage Area Map	SWM-1
Sheet 7	Stormwater Facility Plan, Notes and Details	SWM-2
Sheet 8	Landscape Plan	LA-1
Sheet 9	Landscape Notes and Details	LA-2

NORTH

0 500 1000 1500 2000 feet
1" = 500'

Fire & Rescue Notes:

1. Fire Department access roads shall be accessible during all types of weather and at all times.
2. Fire Department access roads shall be capable of supporting Fire apparatus at all times and be a minimum of 20 feet wide.
3. Fire Department access shall be provided and maintained to all structures undergoing construction, alteration, or demolition.
4. The access roadways shall provide a minimum turning radii of 40 to 45 feet.
5. Fire lanes shall be established by the Fire Marshall.
6. Fire hydrants not at intersections shall be located in relation to property lines in order to avoid interference with driveways.
7. Fire hydrants shall be located at street intersections at the point of curvature or truncation of property line fillet.
8. Fire hydrants shall be located in the front and rear of buildings or complexes.
9. Fire hydrants shall not be more than 300 feet apart, as measured along an improved road (single family residential).
10. Each town house shall have a street address off the road which the front of the house faces.
11. Plowable fire hydrant markers will be located 6" from CL of roadway on side closest to fire hydrant. The reflector will be blue.

CALL "MISS UTILITY" AT 1-800-257-7777
72 Hours Before Start Of Construction

ENGINEER/ARCHITECT DESIGN CERTIFICATION

"I hereby certify that the plans have been designed in accordance with local ordinances, COMAR 26.17.01, and 2011 Maryland Standards and Specifications for Soil and Sediment Control."

Phillip Wagner — Signature | 29782 — Reg. No. | _____ — Date

CERTIFICATION OF THE QUANTITIES

I hereby certify that the estimated total amount of excavation and fill as shown on these plans has been computed to 1,420 c.y. of excavation, 4,875 c.y. of fill and the total area to be disturbed as shown on these plans has been determined to be 704,844 square feet, or 16.2 acres.

Phillip Wagner — Design Engineer Signature | 6/3/2022 — Date

PHILLIP THOMAS WAGNER — Printed Name | 29782 — Registration Number

Note:
These figures are estimated quantities for Sediment Control purposes only, i.e., not for bidding purposes.

OWNER'S/DEVELOPER'S CERTIFICATION

I certify that this plan of Sediment Control will be implemented to the fullest extent, and all structures will be installed to the design and specifications as spelled out in this plan and that any responsible personnel involved in construction project will have a certification of attendance at a Department of Natural Resources approved training program for the control of sediment and erosion before beginning the project. I also authorized periodic on site evaluation by the Frederick Soil Conservation District personnel and cooperating agencies.

Owner/Developer Certificate

Date: _____ By: _____ Authorized Person

Quantum Frederick Project Information & History

TAX MAP #:	94
TAX ACCOUNT #:	01-000152
COUNTY FILE	S-1179
SECTION 1 PRELIMINARY FRO	F266567
SECTION 2 FINAL FRO	F274907
SWM CONCEPT	PP266351
PRELIMINARY PLAN	PP266504
1ST AMENDED PRELIMINARY PLAN	PP273774
QUANTUM PLACE SOUTH IP	PW275128
HAPPY LANDING ROAD IP	PW273379
LOT 112A SITE PLAN	SP273757
LOT 112A IP	PW275268

INTERNAL USE ONLY DEVELOPMENT REVIEW
FILE #: S-1179
A/P #: PW275268
DUE DATE:

PROFESSIONAL CERTIFICATION

"I hereby certify that these documents were prepared or approved by me that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 29782 , Expiration Date: 01/16/2025 ".

STATE OF MARYLAND — PHILLIP THOMAS WAGNER — 29782 — PROFESSIONAL ENGINEER
04/21/2023
FOR REVIEW ONLY

REVISION	DATE	REVISION	DATE

	BY	DATE
BASE DATA	CADD	
DESIGNED		
DRAWN		
REVIEWED		

RELEASE FOR _____ BY _____ DATE _____

Submittal 2023.04.21

OUTSIDE LAND USE COUNCIL:
Saul Ewing LLP
1001 Fleet Street
Baltimore, MD 21202
Contact: Greg Rapisarda
Office: 410-332-8963
Mobile: 410-948-1778

Cover Sheet

RODGERS CONSULTING
19847 Century Boulevard, Suite 200, Germantown, Maryland 20874
Ph: 301.948.4700 Fx: 301.948.6256 www.rodgers.com

Quantum Frederick Critical Digital Infrastructure Electric Substation
Combined SWM Development and Improvement Plan
Lot 112A Substation
PW #275268
Liber 15038, Folio 393
ELECTION DISTRICT NO. 1
FREDERICK COUNTY, MARYLAND

SCALE: AS SHOWN
JOB No. 1367A
INDEX No. CS-1
SHEET No. 1 OF 9

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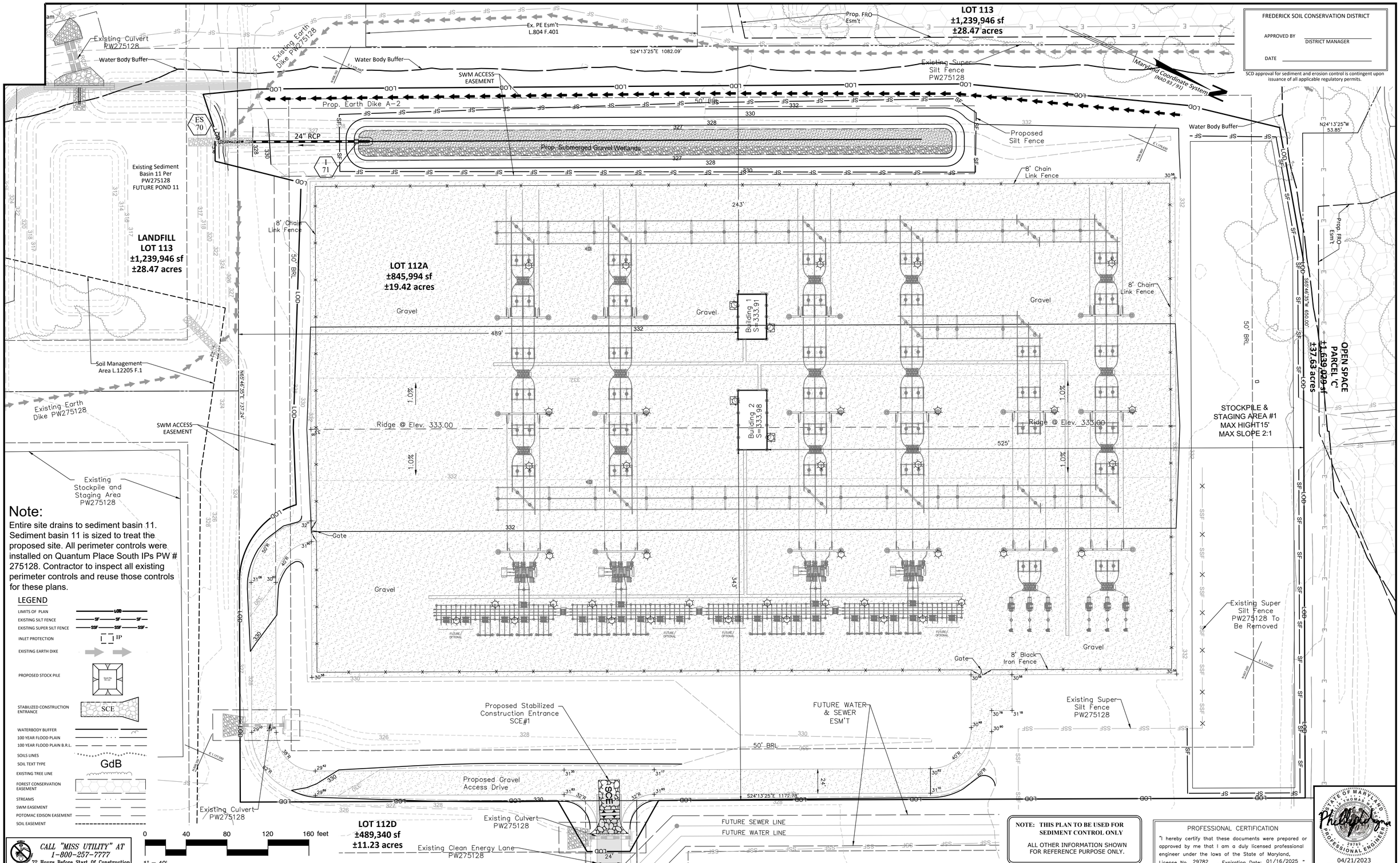


FREDERICK SOIL CONSERVATION DISTRICT

APPROVED BY _____ DISTRICT MANAGER

DATE _____

SCD approval for sediment and erosion control is contingent upon issuance of all applicable regulatory permits.

Note:

Entire site drains to sediment basin 11. Sediment basin 11 is sized to treat the proposed site. All perimeter controls were installed on Quantum Place South IPs PW # 275128. Contractor to inspect all existing perimeter controls and reuse those controls for these plans.

LEGEND

- LIMITS OF PLAN — LOD
- EXISTING SILT FENCE — SF
- EXISTING SUPER SILT FENCE — SSF
- INLET PROTECTION — IP
- EXISTING EARTH DIKE
- PROPOSED STOCK PILE
- STABILIZED CONSTRUCTION ENTRANCE — SCE
- WATERBODY BUFFER
- 100 YEAR FLOOD PLAIN
- 100 YEAR FLOOD PLAIN B.R.L.
- SOILS LINES
- SOIL TEXT TYPE — GdB
- EXISTING TREE LINE
- FOREST CONSERVATION EASEMENT
- STREAMS
- SWM EASEMENT
- POTOMAC EDISON EASEMENT
- SOIL EASEMENT

CALL "MISS UTILITY" AT 1-800-257-7777
72 Hours Before Start Of Construction

0 40 80 120 160 feet
1" = 40'

NOTE: THIS PLAN TO BE USED FOR SEDIMENT CONTROL ONLY

ALL OTHER INFORMATION SHOWN FOR REFERENCE PURPOSE ONLY.

PROFESSIONAL CERTIFICATION

"I hereby certify that these documents were prepared or approved by me that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 29782, Expiration Date: 01/16/2025".

STATE OF MARYLAND PHILLIP THOMAS WAGNER 29782 PROFESSIONAL ENGINEER

04/21/2023
FOR REVIEW ONLY

REVISION	DATE	REVISION	DATE

	BY	DATE
BASE DATA	CADD	
DESIGNED		
DRAWN		
REVIEWED		
RELEASE FOR		
BY	DATE	

OUTSIDE LAND USE COUNCIL:
Saul Ewing LLP
1001 Fleet Street
Baltimore, MD 21202
Contact: Greg Rapisarda
Office: 410-332-8963
Mobile: 410-948-1778

Sediment Control Plan

RODGERS CONSULTING
19847 Century Boulevard, Suite 200, Germantown, Maryland 20874
Ph: 301.948.4700 Fx: 301.948.6256 www.rodgers.com

Quantum Frederick Critical Digital Infrastructure Electric Substation
Combined SWM Development and Improvement Plan

Lot 112A Substation

PW #275268
Liber 15038, Folio 393
ELECTION DISTRICT NO. 1
FREDERICK COUNTY, MARYLAND

SCALE: 1"=40'
JOB No. 1367A
INDEX No. SC-1
SHEET No. 2 OF 9

Submittal 2023.04.21

N:\MD-FREDERICK\ALCOA\AUTOCAD\PLOT PLANS\IMPROVEMENT PLANS\SAGE SUBSTATION\02-SEDIMENT CONTROL PLAN.DWG

SEDIMENT AND EROSION CONTROL NOTES

1. ALL EROSION/SEDIMENT CONTROL MEASURES SHALL BE INSTALLED AND MAINTAINED IN CONTINUOUS COMPLIANCE WITH THE LATEST VERSION OF THE MARYLAND STANDARDS AND SPECIFICATION FOR SOIL EROSION AND SEDIMENT CONTROL.

2. ALL UTILITIES, SUCH AS; STORM DRAIN, PUBLIC WATER, SANITARY SEWER, ELECTRIC POWER, TELEPHONE, CABLE AND GAS LINES, THAT ARE NOT IN PAVED AREAS AND ARE NOT UNDERGOING ACTIVE GRADING SHALL BE TEMPORARILY OR PERMANENTLY STABILIZED WITHIN 3 DAYS OF INITIAL DISTURBANCE.

3. THE OWNER/DEVELOPER OR THEIR DESIGNATE IS RESPONSIBLE FOR CONDUCTING ROUTINE INSPECTIONS AND REQUIRED MAINTENANCE. THE SITE AND CONTROLS SHOULD BE INSPECTED WEEKLY AND THE NEXT DAY AFTER EACH RAIN EVENT**. ANY ACCUMULATED SEDIMENT SHALL BE REMOVED AND DISPOSED OF IN A SUITABLE AREA AND SHALL BE TEMPORARILY OR PERMANENTLY STABILIZED.

   **ANY PROJECT THAT HAS A STATE ISSUED N.O.I PERMIT MUST DOCUMENT EACH INSPECTION AND MAINTAIN AN INSPECTION LOG (PLEASE SEE THE N.O.I. FOR DETAILS).

STANDARD STABILIZATION NOTE

FOLLOWING INITIAL SOIL DISTURBANCE OR RE-DISTURBANCE, PERMANENT OR TEMPORARY STABILIZATION MUST BE COMPLETED WITHIN:

A) THREE (3) CALENDAR DAYS AS TO THE SURFACE OF ALL PERIMETER DIKES, SWALES, DITCHES, PERIMETER SLOPES, AND ALL SLOPES STEEPER THAN 3 HORIZONTAL TO 1 VERTICAL (3:1); AND

B) SEVEN (7) CALENDAR DAYS AS TO ALL OTHER DISTURBED OR GRADED AREAS ON PROJECT SITE NOT UNDER ACTIVE GRADING.

FOR UTILITY WORK ONLY OR OFF-SITE UTILITY WORK

1. DISTURBANCE OUTSIDE OF LOD CAN NOT EXCEED 5000 SQUARE FEET.
2. PLACE ALL EXCAVATED MATERIAL ON HIGH SIDE OF TRENCH.
3. ONLY DO AS MUCH WORK AS CAN BE DONE ON ONE DAY SO BACKFILLING, FINAL GRADING, SEEDING AND MULCHING CAN OCCUR.
4. ANY SEDIMENT CONTROL MEASURES DISTURBED BY CONSTRUCTION WILL BE REPAIRED THE SAME DAY.

NOTE: NO WORK WITHIN WETLANDS EXCEPT THOSE AREAS SHOWN ON THIS PLAN AUTHORIZED BY MDE.

FOR SECONDARY UTILITY WORK ONLY

1. ALL DISTURBANCE FROM SECONDARY UTILITIES SUCH AS PHONE, CABLE, ELECTRIC CABLE, T.V. CABLE, ETC. WILL BE SUBCONTRACTORS RESPONSIBLE TO BRING WORK AREA BACK TO GRADE LEVEL THAT WAS EXISTING AND SEED AND MULCH ANY DISTURBANCE FROM INSTALLATION OF LINES OR CONDUITS.
2. SUBCONTRACTORS WILL BE RESPONSIBLE FOR RE-INSTALLATION OR REPAIRING ANY SILT-FENCE OR SEDIMENT CONTROLS THAT WERE EXISTING TO MAINTAIN PROPER SEDIMENT CONTROL THAT MIGHT HAVE BEEN DAMAGED.

STOCKPILE NOTES

1. EXISTING STOCKPILE NEEDS TO BEINSPECTED AND SEDIMENT CONTROL ADDED OR REPAIRED AS NEEDED.
2. NO STOCKPILING ALLOWED ON ASPHALT.
3. ALL STOCKPILES LEFT AT THE END OF THE DAY NEED TO BE STABILIZED UNTIL THE NEXT RE-DISTURBANCE.

TEMPORARY SEEDING NOTES

1. SCOPE: PLANT FAST GROWING VEGETATION TO PROVIDE COVER ON DISTURBED SOILS WHERE GROUND COVER IS NEEDED FOR A PERIOD OF 6 MONTHS OR LESS.
2. STANDARDS: TEMPORARY SEEDING SHALL CONFORM TO ALL REQUIREMENTS OF "2011 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION SEDIMENT CONTROL" PUBLISHED JOINTLY BY MARYLAND DEPARTMENT OF THE ENVIRONMENT, NATURAL RESOURCES CONSERVATION SERVICE, AND THE STATE SOIL CONSERVATION COMMITTEE.
3. SEDIMENT & EROSION CONTROL: ALL PERIMETER CONTROL MUST BE STABILIZED IN 3 DAYS. ALL INTERIOR CONTROLS MUST BE STABILIZED IN 7 DAYS.

   SPECIFICATIONS

1. SITE PREPARATIONS:
   A.) PRIOR TO SEEDING INSTALL ALL REQUIRED SEDIMENT AND EROSION CONTROL MEASURES.
   B.) FINAL GRADING NOT REQUIRED FOR TEMPORARY SEEDING.
2. SOIL AMENDMENTS:
   A.) FERTILIZER SHALL BE APPLIED AT THE RATE OF 436 LBS/ACRE USING 10-20-20 OR EQUIVALENT.
   B.) ACID SOILS SHALL BE LIMED AT A RATE OF 2 TONS/ ACRE.
3. SEEDBED PREPARATION:
   A.) SOIL SHALL BE LOOSENED TO A DEPTH OF 3 INCHES BY RAKING, DISKING, OR OTHER ACCEPTABLE MEANS PRIOR TO SEEDING.
4. SEEDING:
   A.) SELECT A MIXTURE FROM TABLE B.1 IN STANDARD SPECIFICATIONS.
   B.) APPLY SEED UNIFORMLY WITH A CYCLONE SEEDER DRILL, CULTIPACKER OR HYDRO SEEDER.
5. MULCHING:
   A.) MULCH SHALL BE APPLIED IMMEDIATELY AFTER SEEDING. MULCH MATERIALS AND APPLICATIONS SHALL CONFORM TO THE STANDARD SPECIFICATIONS.

CALL "MISS UTILITY" AT 1-800-257-7777
72 Hours Before Start Of Construction

PERMANENT SEEDING & SOD NOTES

GENERAL

1. PLANTING PERMANENT, LONG LIVED PERENNIAL GRASSES AND LEGUMES ON GRADED OR CLEARED AREAS WHERE GROUND COVER IS NEED FOR 6 MONTHS OR MORE.
2. STANDARDS: PERMANENT SEEDING SHALL CONFORM TO ALL REQUIREMENTS OF "2011 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION SEDIMENT CONTROL" PUBLISHED JOINTLY BY WATER RESOURCES ADMINISTRATION, NATURAL RESOURCES CONSERVATION SERVICE, AND THE STATE SOIL CONSERVATION COMMITTEE.

   SPECIFICATIONS
3. SITE PREPARATIONS:
   A.) PRIOR TO SEEDING INSTALL ALL REQUIRED SEDIMENT AND EROSION CONTROL MEASURES.
4. SOIL AMENDMENTS:
   A.) FERTILIZER SHALL BE APPLIED AT THE RATE OF 1000 LBS/ACRES USING 10-20-20 OR EQUIVALENT.
   B.) ACID SOILS SHALL BE LIMED AT A RATE OF 2 TONS/ACRE.
5. SEEDBED PREPARATION:
   A.) SOIL SHALL BE LOOSENED TO A DEPTH OF 2 TO 4 INCHES BY RAKING, DISKING, OR OTHER ACCEPTABLE MEANS PRIOR TO SEEDING.
   B.) APPLY SEED UNIFORMLY WITH A CYCLONE SEEDER DRILL, CULTIPACKER OR HYDRO SEEDER (SLURRY INCLUDES SEED AND FERTILIZER ON A FIRM, MOIST SEEDBED). MAXIMUM SEEDING DEPTH SHOULD BE 1/4" INCH ON CLAYEY SOILS AND 1/2 INCH ON SANDY SOILS, WHEN USING OTHER THAN HYDROSEEDER METHOD OF APPLICATION. NOTE: IF HYDROSEEDING IS USED AND THE SEED AND FERTILIZER IS MIXED, THEY WILL BE MIXED ON SITE AND THE SEEDING SHALL BE IMMEDIATE WITHOUT INTERRUPTION.
6. SEEDING:
   A.) SELECT A MIXTURE FROM TABLE B.3 BASED ON SITE CONDITION OR PURPOSE FOUND ON TABLE B.2. IN STANDARD SPECIFICATIONS.
   B.) APPLY SEED UNIFORMLY WITH A CYCLONE SEEDER DRILL, CULTIPACKER OR HYDRO SEEDER.

PERMANENT STABILIZATION WITH SOD

1. ALL SPECIFICATIONS, SITE PREPARATION, INSTALLATION AND MAINTENANCE OF SOD FOR PERMANENT, LONG LIVED VEGETATIVE COVER SHALL CONFORM TO SECTION 'B' OF "2011 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION SEDIMENT CONTROL" PUBLISHED JOINTLY BY WATER RESOURCES ADMINISTRATION, NATURAL RESOURCES CONSERVATION SERVICE, AND THE STATE SOIL CONSERVATION COMMITTEE.

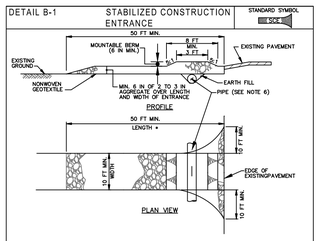
SEQUENCE OF CONSTRUCTION

1. OBTAIN ALL REQUIRED APPROVALS AND PERMITS. CONTACT MISS UTILITY 5 DAYS PRIOR TO PRE-CONSTRUCTION MEETING. CONTACT THE FREDERICK COUNTY ENVIRONMENTAL COMPLIANCE SECTION AT LEAST 5 DAYS BEFORE STARTING AUTHORIZED ACTIVITIES (CALL 301-600-3507).
2. CONTRACTOR SHALL PERFORM STAKEOUT OF THE SEDIMENT CONTROL DEVICES AND INSPECT SEDIMENT BASIN 11 CONDITIONS (PRIOR TO THE PRE-CONSTRUCTION MEETING). SEDIMENT BASIN DA-11 IS A WORKING SWM FACILITY AND AS SUCH, WORK AROUND SEDIMENT BASIN 11 SHOULD BE DONE WITH CARE TO PREVENT SEDIMENTATION.
3. HOLD PRE CONSTRUCTION MEETING WITH FREDERICK COUNTY ECS 24 HOURS IN ADVANCE 7AM-9AM.
4. UPON INSPECTOR'S APPROVAL, CLEAR AND GRUB WITHIN LIMITS OF DISTURBANCE FOR INSTALLATION OF SEDIMENT CONTROL DEVICES ONLY.
5. INSTALL STABILIZED CONSTRUCTION ENTRANCE, AS SHOWN ON PLAN.
6. INSPECT EXISTING SILT FENCE AND SUPER SILT FENCE AS SHOWN ON PLAN.
7. UPON COMPLETING INSPECTION AND INSTALLATION OF THE SEDIMENT CONTROL DEVICES CONTACT ECS INSPECTOR AT (301) 600-3507 FOR INSPECTION BEFORE ANY GRADING OR OTHER CONSTRUCTION ACTIVITIES BEGIN. REPAIR/REPLACE/STABILIZE AS NECESSARY OR AS DIRECTED BY INSPECTOR.
8. CONTRACTOR SHALL BEGIN SITE GRADING. UPON REACHING ACCEPTABLE GRADES, CONTRACTOR SHALL INSTALL PAVING AS SHOWN ON THIS PLAN AND STABILIZE ANY AREAS LAYING IDLE ONCE SITE GRADING IS COMPLETE USING APPROPRIATE TEMPORARY AND/OR PERMANENT STABILIZATION MEASURES AS DESCRIBED IN THE LATEST EDITION OF THE 2011 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL - SECTION B.
9. INSTALL SUBMERGED GRAVEL WETLAND AND STORM DRAIN STRUCTURES, PIPE AND UNDERDRAIN. FACILITY SHALL BE SURROUNDED WITH SILT FENCE AND TOPPED WITH BARRIER FABRIC. ALSO BLOCK UNDERDRAIN PIPE INLETS TO PREVENT SEDIMENT FROM ENTERING THE STONE AND MEDIA. ONCE SUBMERGED GRAVEL WETLAND DRAINAGE AREA IS STABILIZED BLOCKAGES AND SEDIMENT CONTROL CAN BE REMOVED.
10. WHEN ALL UPSTREAM AREAS ARE STABILIZED AND UPON PERMISSION FROM SEDIMENT CONTROL INSPECTOR THE CONTRACTOR SHALL REMOVE THE SEDIMENT CONTROL DEVICES.
11. DEPENDING ON SITE CONDITIONS, PHASING OR CONSTRUCTION SEQUENCING, AND STABILIZATION METHODS, ADDITIONAL SEDIMENT CONTROLS (OTHER THAN AS SHOWN HEREON) MAY BE REQUIRED BY THE INSPECTOR.
12. OWNER AND CONTRACTOR ARE RESPONSIBLE FOR ANY ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES NEEDED DURING DISTURBANCE IN CONJUNCTION WITH PROPOSED PLAN IF ISSUES ARISE. (CONSULT SEDIMENT AND EROSION INSPECTOR FOR GUIDANCE.)

FOR SITES 1.0 ACRE OR MORE, THE FOLLOWING ARE REQUIRED:

A. MARYLAND DEPARTMENT OF THE ENVIRONMENT, GENERAL PERMIT FOR STORMWATER WITH A CONSTRUCTION ACTIVITY, NPDES PERMIT NUMBER MDRC0000, STATE DISCHARGE PERMIT NUMBER 20CP0000, OR AN INDIVIDUAL PERMIT
B. THE MARYLAND DEPARTMENT OF THE ENVIRONMENT (GENERAL/ INDIVIDUAL PERMIT- NOTICE OF INTENT- NOI) APPLICATION AND PERMIT SHALL BE POSTED AND/OR AVAILABLE ON-SITE AT ALL TIMES.
C. DURING CONSTRUCTION, ALL SOIL EROSION AND SEDIMENT CONTROL PRACTICES (BMP'S) SHALL BE INSPECTED AND RECORDED ON THE "STANDARD INSPECTION FORM, GENERAL PERMIT FOR STORMWATER ASSOCIATED WITH CONSTRUCTION ACTIVITY" PER THE MARYLAND DEPARTMENT OF THE ENVIRONMENT (GENERAL/ INDIVIDUAL PERMIT- NOTICE OF INTENT- NOI).
D. ONCE ALL PORTIONS OF A SITE HAVE BEEN PERMANENTLY STABILIZED, AND ALL STORMWATER DISCHARGES FROM CONSTRUCTION SITES THAT ARE AUTHORIZED BY THE PERMIT ARE ELIMINATED, THE AUTHORIZED PERMITTEE SHALL SUBMIT THE MARYLAND DEPARTMENT OF THE ENVIRONMENT, GENERAL/ INDIVIDUAL PERMIT- NOTICE OF TERMINATION- NOT.

DETAIL B-1 STABILIZED CONSTRUCTION ENTRANCE — STANDARD SYMBOL SCE

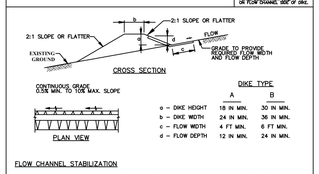


CONSTRUCTION SPECIFICATIONS

1. PLACE STABILIZED CONSTRUCTION ENTRANCE IN ACCORDANCE WITH THE APPROVED PLAN. VEHICLES MUST TRAVEL OVER THE ENTIRE LENGTH OF THE SCE. USE MINIMUM LENGTH OF 50 FEET (+30 FEET FOR SINGLE RESIDENCE LOT). USE MINIMUM WIDTH OF 10 FEET. FLARE SCE 10 FEET MINIMUM AT THE EXISTING ROAD TO PROVIDE A TURNING RADIUS.
2. PIPE ALL SURFACE WATER FLOWING TO OR DIVERTED TOWARD THE SCE UNDER THE ENTRANCE, MAINTAINING POSITIVE DRAINAGE. PROTECT PIPE INSTALLED THROUGH THE SCE WITH A MOUNTABLE BERM WITH 5:1 SLOPES AND A MINIMUM OF 12 INCHES OF STONE OVER THE PIPE. PROVIDE PIPE AS SPECIFIED ON APPROVED PLAN. WHEN THE SCE IS LOCATED AT A HIGH SPOT AND HAS NO DRAINAGE TO CONVEY, A PIPE IS NOT NECESSARY. A MOUNTABLE BERM IS REQUIRED WHEN SCE IS NOT LOCATED AT A HIGH SPOT.
3. PREPARE SUBGRADE AND PLACE NONWOVEN GEOTEXTILE, AS SPECIFIED IN SECTION H-1 MATERIALS.
4. PLACE CRUSHED AGGREGATE (2 TO 3 INCHES IN SIZE) OR EQUIVALENT RECYCLED CONCRETE (WITHOUT REBAR) AT LEAST 6 INCHES DEEP OVER THE LENGTH AND WIDTH OF THE SCE.
5. MAINTAIN ENTRANCE IN A CONDITION THAT PREVENTS TRACKING OF SEDIMENT ONTO STONE OR MAKE WHATEVER MODIFICATIONS DEMAND TO MAINTAIN CLEAN SURFACE. MOUNTABLE BERM, AND SPECIFIED DIMENSIONS. IMMEDIATELY REMOVE STONE AND/OR SEDIMENT SPILLED, DROPPED, OR TRACKED ONTO ADJACENT ROADWAY BY VACUUMING, SCRAPING, AND/OR SWEEPING. WASHING ROADWAY TO REMOVE MUD TRACKED ONTO PAVEMENT IS NOT ACCEPTABLE UNLESS WASH WATER IS DIRECTED TO AN APPROVED SEDIMENT CONTROL PRACTICE.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL		
U.S. DEPARTMENT OF AGRICULTURE, NATURAL RESOURCES CONSERVATION SERVICE	2011	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL C-1 EARTH DIKE — STANDARD SYMBOL A-1 — PLACEHOLDER, DO NOT USE



DIKE TYPE

	A	B
a – DIKE HEIGHT	18 IN MIN.	30 IN MIN.
b – DIKE WIDTH	24 IN MIN.	36 IN MIN.
c – FLOW WIDTH	4 FT MIN.	6 FT MIN.
d – FLOW DEPTH	12 IN MIN.	24 IN MIN.

FLOW CHANNEL STABILIZATION

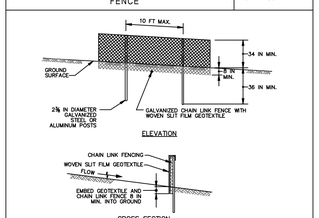
A-1	SEED WITH STRAW MULCH AND TACK. (NOT ALLOWED FOR CLEAR WATER DIVERSION.)
A-2/B-2	SEED WITH SOIL STABILIZATION MATTING OR LINE WITH SOD.
A-3/B-3	4 TO 7 INCH STONE OR EQUIVALENT RECYCLED CONCRETE PRESSED INTO SOIL A MINIMUM OF 7 INCHES AND FLUSH WITH GROUND.

CONSTRUCTION SPECIFICATIONS

1. REMOVE AND DISPOSE OF ALL TREES, BRUSH, STUMPS, OBSTRUCTIONS, AND OTHER OBJECTIONABLE MATERIAL SO AS NOT TO INTERFERE WITH PROPER FUNCTION OF EARTHDIKE.
2. EXCAVATE OR SHAPE EARTH DIKE TO LINE, GRADE, AND CROSS SECTION AS SPECIFIED. BANK PROJECTIONS OR OTHER IRREGULARITIES ARE NOT ALLOWED.
3. COMPACT FILL.
4. CONSTRUCT FLOW CHANNEL ON AN UNINTERRUPTED, CONTINUOUS GRADE, ADJUSTING THE LOCATION DUE TO FIELD CONDITIONS AS NECESSARY TO MAINTAIN POSITIVE DRAINAGE.
5. PROVIDE OUTLET PROTECTION AS REQUIRED ON APPROVED PLAN.
6. STABILIZE EARTH DIKE WITHIN THREE DAYS OF INSTALLATION. STABILIZE FLOW CHANNEL FOR CLEAR WATER DIVERSION WITHIN 24 HOURS OF INSTALLATION.
7. MAINTAIN LINE, GRADE, AND CROSS SECTION. REMOVE ACCUMULATED SEDIMENT AND DEBRIS, AND MAINTAIN POSITIVE DRAINAGE. KEEP EARTH DIKE AND POINT OF DISCHARGE FREE OF EROSION, AND CONTINUOUSLY MEET REQUIREMENTS FOR ADEQUATE VEGETATIVE ESTABLISHMENT IN ACCORDANCE WITH SECTION B—4 VEGETATIVE STABILIZATION.
8. UPON REMOVAL OF EARTH DIKE, GRADE AREA FLUSH WITH EXISTING GROUND. WITHIN 24 HOURS OF REMOVAL STABILIZE DISTURBED AREA WITH TOPSOIL, SEED, AND MULCH, OR AS SPECIFIED ON APPROVED PLAN.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL		
U.S. DEPARTMENT OF AGRICULTURE, NATURAL RESOURCES CONSERVATION SERVICE	2011	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL E-3 SUPER SILT FENCE — STANDARD SYMBOL SSF

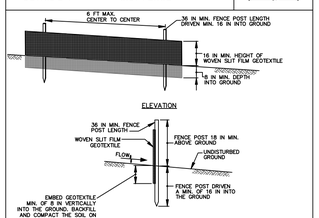


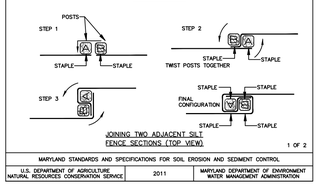
CONSTRUCTION SPECIFICATIONS

1. INSTALL 2½ INCH DIAMETER GALVANIZED STEEL POSTS OF 0.095 INCH WALL THICKNESS AND SIX FOOT LENGTH SPACED NO FURTHER THAN 10 FEET APART. DRIVE THE POSTS A MINIMUM OF 36 INCHES INTO THE GROUND.
2. FASTEN 9 GAUGE OR HEAVIER GALVANIZED CHAIN LINK FENCE (2¼ INCH MAXIMUM OPENING) 42 INCHES IN HEIGHT SECURELY TO THE FENCE POSTS WITH WIRE TIES OR HOG RINGS.
3. FASTEN WOVEN SLIT FILM GEOTEXTILE AS SPECIFIED IN SECTION H-1 MATERIALS, SECURELY TO THE UPSLOPE SIDE OF CHAIN LINK FENCE WITH TIES SPACED EVERY 24 INCHES AT THE TOP AND MID-SECTION. EMBED GEOTEXTILE AND CHAIN LINK FENCE A MINIMUM OF 8 INCHES INTO THE GROUND.
4. WHERE ENDS OF THE GEOTEXTILE COME TOGETHER, THE ENDS SHALL BE OVERLAPPED BY 6 INCHES, FOLDED, AND STAPLED TO PREVENT SEDIMENT BY PASS.
5. EXTEND BOTH ENDS OF THE SUPER SILT FENCE A MINIMUM OF FIVE HORIZONTAL FEET UPSLOPE AT 45 DEGREES TO THE MAIN FENCE ALIGNMENT TO PREVENT RUNOFF FROM GOING AROUND THE ENDS OF THE SUPER SILT FENCE.
6. PROVIDE MANUFACTURER CERTIFICATION TO THE INSPECTION/ENFORCEMENT AUTHORITY SHOWING THAT GEOTEXTILE USED MEETS THE REQUIREMENTS IN SECTION H-1 MATERIALS.
7. REMOVE ACCUMULATED SEDIMENT AND DEBRIS WHEN BULGES DEVELOP IN FENCE OR WHEN SEDIMENT REACHES 25% OF FENCE HEIGHT. REPLACE GEOTEXTILE IF TORN. IF UNDERMINING OCCURS, REINSTALL CHAIN LINK FENCING AND GEOTEXTILE.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL		
U.S. DEPARTMENT OF AGRICULTURE, NATURAL RESOURCES CONSERVATION SERVICE	2011	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL E-1 SILT FENCE — STANDARD SYMBOL SF





JOINING TWO ADJACENT SILT FENCE SECTIONS (TOP VIEW)

1 OF 2

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL		
U.S. DEPARTMENT OF AGRICULTURE, NATURAL RESOURCES CONSERVATION SERVICE	2011	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL E-1 SILT FENCE — STANDARD SYMBOL SF

CONSTRUCTION SPECIFICATIONS

1. USE WOOD POSTS 1½ X 1½ ± ¼ INCH (MINIMUM) SQUARE OUT OF SOUND QUALITY HARDWOOD, AS AN ALTERNATIVE TO WOODEN POST USE STANDARD "T" OR "U" SECTION STEEL POSTS WEIGHING NOT LESS THAN 1 POUND PER LINEAR FOOT.
2. USE 36 INCH MINIMUM POSTS DRIVEN 16 INCH MINIMUM INTO GROUND NO MORE THAN 6 FEET APART.
3. USE WOVEN SLIT FILM GEOTEXTILE AS SPECIFIED IN SECTION H-1 MATERIALS AND FASTEN GEOTEXTILE SECURELY TO UPSLOPE SIDE OF FENCE POSTS WITH WIRE TIES OR STAPLES AT TOP AND MID-SECTION.
4. PROVIDE MANUFACTURER CERTIFICATION TO THE AUTHORIZED REPRESENTATIVE OF THE INSPECTION/ENFORCEMENT AUTHORITY SHOWING THAT THE GEOTEXTILE USED MEETS THE REQUIREMENTS IN SECTION H-1 MATERIALS.
5. EMBED GEOTEXTILE A MINIMUM OF 8 INCHES VERTICALLY INTO THE GROUND. BACKFILL AND COMPACT THE SOIL ON BOTH SIDES OF FABRIC.
6. WHERE TWO SECTIONS OF GEOTEXTILE ADJOIN: OVERLAP, TWIST, AND STAPLE TO POST IN ACCORDANCE WITH THIS DETAIL.
7. EXTEND BOTH ENDS OF THE SILT FENCE A MINIMUM OF FIVE HORIZONTAL FEET UPSLOPE AT 45 DEGREES TO THE MAIN FENCE ALIGNMENT TO PREVENT RUNOFF FROM GOING AROUND THE ENDS OF THE SILT FENCE.
8. REMOVE ACCUMULATED SEDIMENT AND DEBRIS WHEN BULGES DEVELOP IN SILT FENCE OR WHEN SEDIMENT REACHES 25% OF FENCE HEIGHT. REPLACE GEOTEXTILE IF TORN. IF UNDERMINING OCCURS, REINSTALL FENCE.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL		
U.S. DEPARTMENT OF AGRICULTURE, NATURAL RESOURCES CONSERVATION SERVICE	2011	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

2 OF 2

Table B.1: Temporary Seeding for Site Stabilization

Plant Species	Seeding Rate [1]		Seeding Depth [2] (inches)	Recommended Seeding Dates by Plant Hardiness Zone [3]		
	lb/ac	lb/1000 ft²		5b and 6a	6b	7a and 7b
Cool-Season Grasses						
Annual Ryegrass (*Lolium perenne ssp. multiflorum*)	40	1.0	0.5	Mar 15 to May 31; Aug 1 to Sep 30	Mar 1 to May 15; Aug 1 to Oct 15	Feb 15 to Apr 30; Aug 15 to Nov 30
Barley (*Hordeum vulgare*)	96	2.2	1.0	Mar 15 to May 31; Aug 1 to Sep 30	Mar 1 to May 15; Aug 1 to Oct 15	Feb 15 to Apr 30; Aug 15 to Nov 30
Oats (*Avena sativa*)	72	1.7	1.0	Mar 15 to May 31; Aug 1 to Sep 30	Mar 1 to May 15; Aug 1 to Oct 15	Feb 15 to Apr 30; Aug 15 to Nov 30
Wheat (*Triticum aestivum*)	120	2.8	1.0	Mar 15 to May 31; Aug 1 to Sep 30	Mar 1 to May 15; Aug 1 to Oct 15	Feb 15 to Apr 30; Aug 15 to Nov 30
Cereal Rye (*Secale cereale*)	112	2.8	1.0	Mar 15 to May 31; Aug 1 to Oct 31	Mar 1 to May 15; Aug 1 to Nov 15	Feb 15 to Apr 30; Aug 15 to Dec 15
Warm-Season Grasses						
Foxtail Millet (*Setaria italica*)	30	0.7	0.5	Jun 1 to Jul 31	May 16 to Jul 31	May 1 to Aug 14
Pearl Millet (*Pennisetum glaucum*)	20	0.5	0.5	Jun 1 to Jul 31	May 16 to Jul 31	May 1 to Aug 14

TABLE B.1 NOTES

1. SEEDING RATES FOR THE WARM-SEASON GRASSES ARE IN POUNDS OF PURE LIVE SEED (PLV). ACTUAL PLANTING RATES SHALL BE ADJUSTED TO REFLECT PERCENT OF SEED GERMINATION AND PURITY AS TESTED. ADJUSTMENTS ARE USUALLY NOT NEEDED FOR THE COOL-SEASON GRASSES.
   SEEDING RATES LISTED ABOVE ARE FOR TEMPORARY SEEDLINGS, WHEN PLANTED ALONE. WHEN PLANTED AS A NURSE CROP WITH PERMANENT SEED MIXES, USE 1/3 OF THE SEEDING RATE LISTED ABOVE FOR BARLEY, OATS AND WHEAT. FOR SMALLER-SEEDED GRASSES (ANNUAL RYEGRASS, PEARL MILLET, FOXTAIL MILLET), DO NOT EXCEED MORE THAN 5% (BY WEIGHT) OF THE OVERALL PERMANENT SEEDING MIX. CEREAL RYE GENERALLY SHOULD NOT BE USED AS A NURSE CROP, UNLESS PLANTING WILL OCCUR IN VERY LATE FALL BEYOND THE SEEDING DATES FOR OTHER TEMPORARY SEEDINGS. CEREAL RYE HAS ALLELOPATHIC PROPERTIES THAT INGIBIT THE GERMINATION AND GROWTH OF OTHER PLANTS. IF IT MUST BE USED AS A NURSE CROP, SEED AT 1/3 OF THE RATE LISTED ABOVE.
   OATS ARE THE RECOMMENDED NURSE CROP FOR WARM-SEASON GRASSES.
2. FOR SANDY SOILS, PLANT SEEDS AT TWICE THE DEPTH LISTED ABOVE.
3. THE PLANTING DATES LISTED ARE AVERAGES FOR EACH ZONE AND MAY REQUIRE ADJUSTMENT TO REFLECT LOCAL CONDITIONS, ESPECIALLY NEAR THE BOUNDARIES OF THE ZONE.

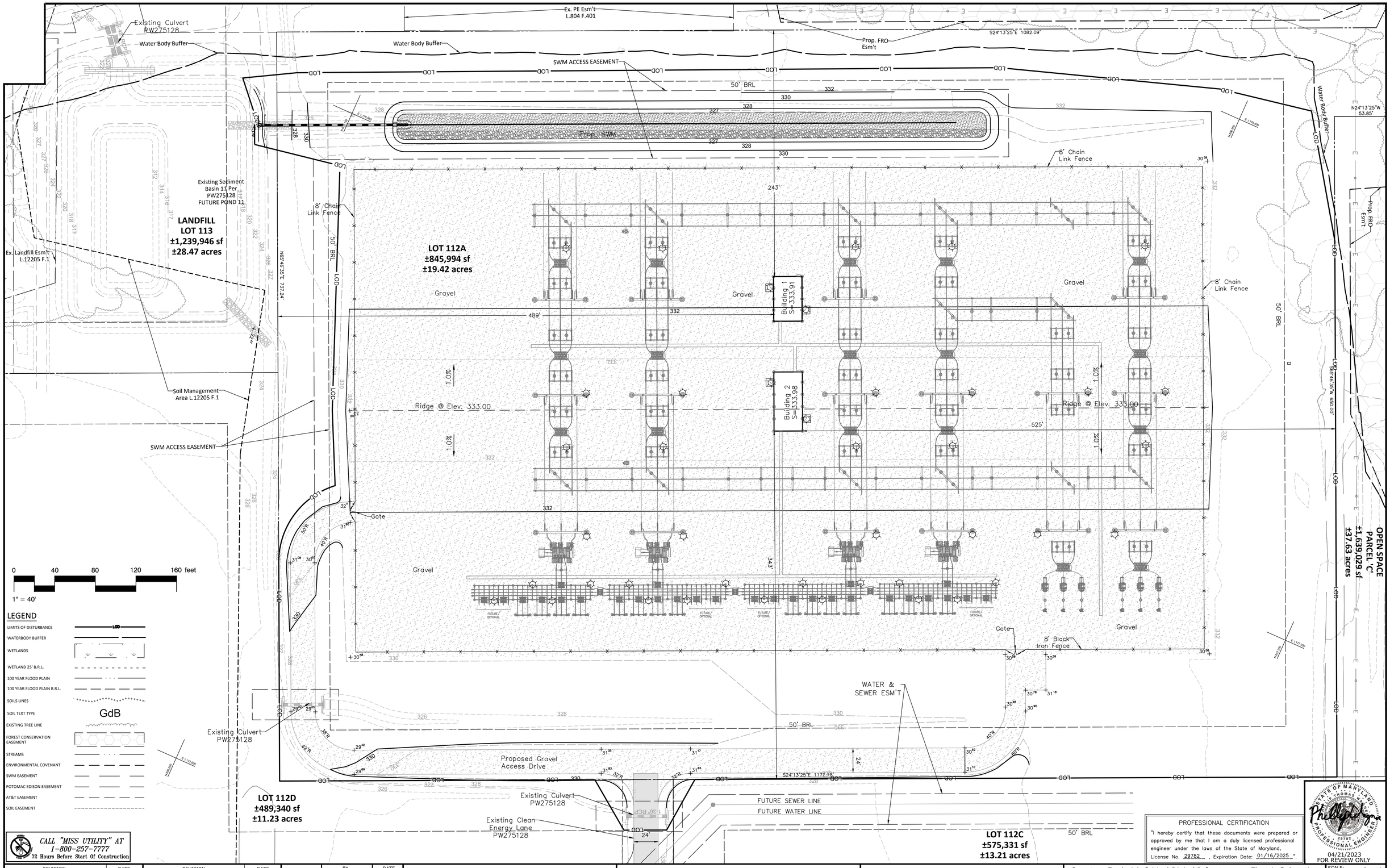
SEDIMENT CONTROL/STORMWATER MANAGEMENT REQUIRED INSPECTION

YOU MUST NOTIFY THE ENVIRONMENTAL COMPLIANCE SECTION AT 301-600-3507 BEFORE 9:00 AM, 24 HOURS PRIOR TO THE REQUIRED INSPECTION. FAILURE TO NOTIFY THIS OFFICE WILL RESULT IN A STOP WORK ORDER OR OTHER PENALTIES AS OUTLINED IN FREDERICK COUNTY CODES.

●●●●●●● NOTICE ●●●●●●

THIS LIST IS FOR SEQUENCE OF CONSTRUCTION ONLY. THIS OFFICE ASSUMES NO RESPONSIBILITY OR LIABILITY FOR IMPROPER INSTALLATION OF ANY ITEM ON THIS CHECKLIST. THIS OFFICE RECOMMENDS THAT A PROFESSIONAL ENGINEER BE PRESENT FOR EACH OF THE REQUIRED INSPECTIONS.

TYPE OF INSPECTION	MISC. COMMENT	INITIALS
1. PRECONSTRUCTION MEETING		
2. COMPLETION OF SEDIMENT CONTROL MEASURES (IF USING BASIN SEE #6 BELOW)		
3. PRIOR TO MODIFICATION OR REMOVAL OF SEDIMENT CONTROL		
4. INFILTRATION SYSTEMS		
A. SITE READINESS PER SEQUENCE OF CONSTRUCTION		
B. INFILTRATION AREA PROTECTED FROM SEDIMENTATION		
C. DIMENSIONS		
D. FILTERING MATERIAL (TYPE/DEPTH)		
E. FILL MATERIAL		
F. SIZE, PLACEMENT, TYPE OF PIPING (IF APPLICABLE)		
G. OBSERVATION WELL		
H. COVER/STABILIZATION		
5. OPENCHANNEL FLOW ATTENUATION		
A. SITE READINESS PER SEQUENCE OF CONSTRUCTION		
B. CROSS SECTION CONFORMANCE		
C. MATERIAL (TYPE/SIZE)		
D STABILIZATION		
6. RETENTION/DETENTION STRUCTURES (BASINS/PONDS)		
A. SUBGRADE PREPARATION		
1. CORE TRENCH		
2. SUITABLE MATERIAL/COMPACTION		
B. EMBANKMENT CONSTRUCTION		
1. SUITABLE MATERIAL/COMPACTION		
2. SLOPE GRADE		
3. DIMENSIONS		
C. BARREL AND RISER ASSEMBLY		
1. CORRECT MATERIAL ONSITE		
2. SIZING		
3. ANTI-SEEP COLLARS		
4. ANTI-FLOATATION DEVICE		
5. CONCRETE CRADLE (RCP ONLY)		
6. INSTALLATION/BACKFILL/COMPACTION		
D. CONCRETE STRUCTURES		
1. FOOTER DIMENSIONS		
2. REINF



0 40 80 120 160 feet

1" = 40'

LEGEND

- LIMITS OF DISTURBANCE — LOD
- WATERBODY BUFFER
- WETLANDS
- WETLAND 25' B.R.L.
- 100 YEAR FLOOD PLAIN
- 100 YEAR FLOOD PLAIN B.R.L.
- SOILS LINES
- SOIL TEXT TYPE — GdB
- EXISTING TREE LINE
- FOREST CONSERVATION EASEMENT
- STREAMS
- ENVIRONMENTAL COVENANT
- SWM EASEMENT
- POTOMAC EDISON EASEMENT
- AT&T EASEMENT
- SOIL EASEMENT

CALL "MISS UTILITY" AT
1-800-257-7777
72 Hours Before Start Of Construction

REVISION	DATE	REVISION	DATE

	BY	DATE
BASE DATA	CADD	
DESIGNED		
DRAWN		
REVIEWED		

RELEASE FOR ☐

BY DATE

OUTSIDE LAND USE COUNCIL:
Saul Ewing LLP
1001 Fleet Street
Baltimore, MD 21202
Contact: Greg Rapisarda
Office: 410-332-8963
Mobile: 410-948-1778

Site Improvement Plan

RODGERS CONSULTING
19847 Century Boulevard, Suite 200, Germantown, Maryland 20874
Ph: 301.948.4700 Fx: 301.948.6256 www.rodgers.com

Quantum Frederick Critical Digital Infrastructure Electric Substation
Combined SWM Development and Improvement Plan
Lot 112A Substation
PW #275268
Liber 15038, Folio 393
ELECTION DISTRICT NO. 1
FREDERICK COUNTY, MARYLAND

SCALE:	1"=40'
JOB No.	1367A
INDEX No.	SP-1
SHEET No.	4 OF 9

PROFESSIONAL CERTIFICATION

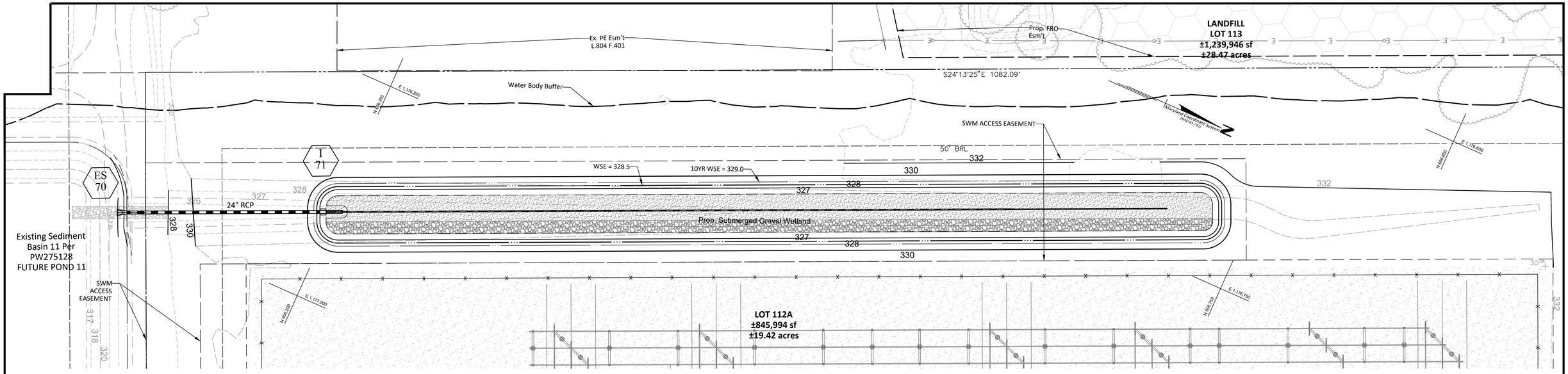
"I hereby certify that these documents were prepared or approved by me that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 29782 , Expiration Date: 01/16/2025 ".

STATE OF MARYLAND · PHILLIP THOMAS · 29782 · PROFESSIONAL ENGINEER

04/21/2023
FOR REVIEW ONLY

1 Submittal 2023.04.21

N: \MD-FREDERICK\ALCOA\AUTOCAD\PLOT PLANS\IMPROVEMENT PLANS\SAGE SUBSTATION\04-SITE IMPROVEMENT PLAN.DWG



SEE SHEET 7 FOR STORM DRAIN PROFILE.

STORM DRAINAGE GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH MARYLAND STATE HIGHWAY ADMINISTRATION GENERAL SPECIFICATIONS.
2. ALL CONSTRUCTION IS UNDER GENERAL SUPERVISION OF THE DESIGN ENGINEER AND/OR DULY APPOINTED DESIGNEE, AS WELL AS THE FREDERICK COUNTY DEPARTMENT OF PUBLIC WORKS.
3. THE TYPES OF STORM DRAINAGE STRUCTURES REFER TO MARYLAND STATE HIGHWAY ADMINISTRATION STANDARD OR APPROVED EQUALS.
4. ALL INLETS AND MANHOLES SHALL HAVE A PAVED INVERT AND THOSE WITH THROUGH PIPES SHALL HAVE A ROUNDED CHANNEL IN ACCORDANCE WITH FREDERICK COUNTY REQUIREMENTS UNLESS NOTED OTHERWISE.
5. INFORMATION CONCERNING UNDERGROUND UTILITIES WAS OBTAINED FROM AVAILABLE RECORDS AND DESIGN DRAWINGS AND MUST BE CONFIRMED BY THE CONTRACTOR BY DIGGING A TEST PIT AT CROSSINGS WELL IN ADVANCE OF TRENCHING. IF LOCATION AND CLEARANCES ARE NOT AS SHOWN ON THIS PLAN, CONTACT THE ENGINEERS BEFORE PROCEEDING WITH CONSTRUCTION.
6. ALL AREAS DISTURBED BY CONSTRUCTION, ACCESS ROUTES, ETC., ARE TO BE GRADED FOR POSITIVE DRAINAGE AND STABILIZED.
7. CONTRACTOR SHALL NOTIFY MISS UTILITY (1-800-257-7777) 48 HOURS IN ADVANCE OF ANY EXCAVATION.
8. MAINTAIN 1' MINIMUM VERTICAL AND 5' HORIZONTAL CLEARANCE BETWEEN STORM DRAIN SYSTEM AND ALL OTHER UTILITIES.
9. ALL STORM DRAIN PIPE BEDDING SHALL MEET MSHA REQUIREMENTS FOR PIPE INSTALLATION AND BEDDING, AASHTO M-145 UNLESS OTHERWISE NOTED.
10. WHERE ANY PART OF THE STORM DRAIN SYSTEM IS LOCATED IN A FILL SECTION, PROVIDED SELECT FILL MATERIAL COMPACTED TO 95 % AASHTO T-180 DENSITY FROM APPROVED SUBGRADE TO THE STRUCTURE BOTTOM SLAB AND/OR THE PIPE BEDDING.
11. ALL CURB INLETS TO BE DESIGNED FOR MSHA "TYPE D" 6" CURB & GUTTER UNLESS NOTED OTHERWISE.
12. THE PERMANENT S.W.M. FACILITY MUST HAVE DESIGN APPROVAL AND GUARANTEE.

PIPE SCHEDULE

DIA (IN)	TYPE *	LENGTH (LF) PUBLIC	LENGTH (LF) PRIVATE	TOTAL (LF)
24	RCPR CL IV	–	162	162

NOTES:
1. PIPE LENGTHS SHOWN ON SCHEDULE ARE BASED UPON PROFILE LENGTHS FROM INSIDE WALL OF STRUCTURE TO INSIDE WALL OF STRUCTURE FOR ALL STRUCTURES.
2. INSPECTOR IS TO VERIFY MATERIALS AND INSPECT AND/OR PRESSURE TEST RCPR PER INDUSTRY STANDARDS PRIOR TO BACKFILLING.
3. * RCPR INDICATES WATERTIGHT REINFORCED CONCRETE PIPE WITH RUBBER GASKET LINING PER ASTM C361 OR ASTM C443/AASHTO M198 (OR APPROVED EQUAL).

STRUCTURE SCHEDULE : LOT 112A SUBSTATION

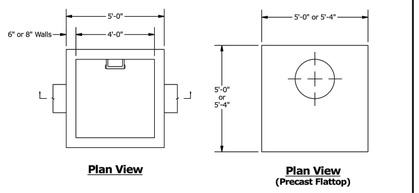
STR. No.	STRUCTURE TYPE	STRUCTURE LOCATION EASTING	STRUCTURE LOCATION NORTHING	STRUCTURE TOP ELEVATION	MSHA STD. NO.	BASE	REMARKS
ES-70	YARD INLET	1176998.13	606070.29	INVERT OUT = 323.8	368.01		
I-71	YARD INLET	1176943.04	606193.10	WEIR @ ELEV. 328.5			CP&P 48" SQUARE SHALLOW MANHOLE W/ STORMRAX FLAT ROOF OR EQUIVALENT, WEIR @ ELEV. 328.5

GRATE/YARD INLET — PIPE — END SECTION

● DENOTES TOP OF STRUCTURE FOR/ STATIONS AND COORDINATES.

NOTES:
1. STATIONS AND OFFSETS REFER TO THE DOWNSTREAM EDGE OF THE OUTSIDE WALL FOR CURB INLETS ON GRADE, THE CENTER OF THE OUTSIDE WALL FOR CURB INLETS AT SUMP, THE CENTER OF THE STRUCTURE FOR MANHOLES, GRATE/ YARD INLETS AND COMB. GRATE/ SLOT OPENING INLETS (AS INDICATED BELOW) UNLESS OTHERWISE NOTED IN THE REMARKS.
2. ELEVATIONS ARE PROVIDED AT THE TOP OF CURB FOR CURB INLETS, THE CENTER OF THE STRUCTURE FOR MANHOLES, THE TOP OF GRATE FOR GRATE ONLY INLETS, INVERT OF SLOT FOR COMB. GRATE/ SLOT OPENING INLETS AND INVERT AT END OF END SECTION & END WALLS.
3. ALL CURB INLETS SHALL BE CAST FOR 6" CURB & GUTTER, PER ROAD TYPICAL SECTION.
4. ALL CURB INLETS SHALL HAVE 2" DEPRESSION WITH 6" CURB & GUTTER.
5. PRECAST MANUFACTURER SHALL MODIFY STRUCTURES TO ACCOMMODATE PIPE DIAMETERS ENTERING THE STRUCTURE.
6. PRECAST STRUCTURES ARE FREDERICK PRECAST OR APPROVED EQUAL.

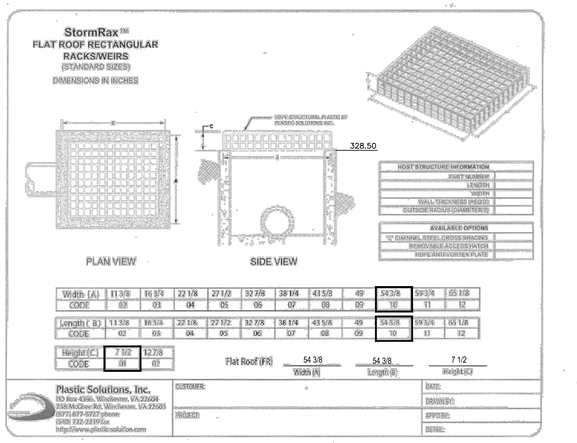
MSHA Drainage Structures 20170629TED01



Notes
1) This design is intended for precast structures produced by CP&P only.
2) Concrete to be mix No.6 (4,000 psi) minimum.
3) Bar reinforcement conforms to ASTM A615 or A706, Grade 60 min. WWR reinforcement conforms to ASTM A1064, Grade 65 min.
4) Reinforcing designed by CP&P.
5) Equivalent WWR may be used for rebar shown.
6) Lifting devices provided for handling at manufacturer's discretion.
7) Grade and slope adjustments to be completed in the field by contractor.
8) Pipe openings to be provided as required. For size, location, and invert elevations refer to construction plans.
9) Knockouts or holes for underdrain connections to be provided and located as directed on constructions plans.
10) Steps provided at 15" spacing, aligned vertically.
11) Invert shaping to be constructed in field by contractor.
12) Structure designed for HS-25 loading, according to AASHTO LRFD Bridge Design Specifications.

TITLE	DATE
Precast 48" Square Shallow Manhole (MD 383.00)	05-16-17

CP&P CONCRETE PIPE & PRECAST LLC



CALL "MISS UTILITY" AT 1-800-257-7777 72 Hours Before Start Of Construction

REVISION	DATE	REVISION	DATE

	BY	DATE
BASE DATA	CADD	
DESIGNED		
DRAWN		
REVIEWED		

RELEASE FOR _____ BY _____ DATE

OUTSIDE LAND USE COUNCIL:
Saul Ewing LLP
1001 Fleet Street
Baltimore, MD 21202
Contact: Greg Rapisarda
Office: 410-332-8963
Mobile: 410-948-1778

Storm Drain Plan, Profile, Notes and Details

RODGERS CONSULTING
19847 Century Boulevard, Suite 200, Germantown, Maryland 20874
Ph: 301.948.4700 Fx: 301.948.6256 www.rodgers.com

Quantum Frederick Critical Digital Infrastructure Electric Substation
Combined SWM Development and Improvement Plan
Lot 112A Substation
PW #275268
Liber 15038, Folio 393
ELECTION DISTRICT NO. 1
FREDERICK COUNTY, MARYLAND

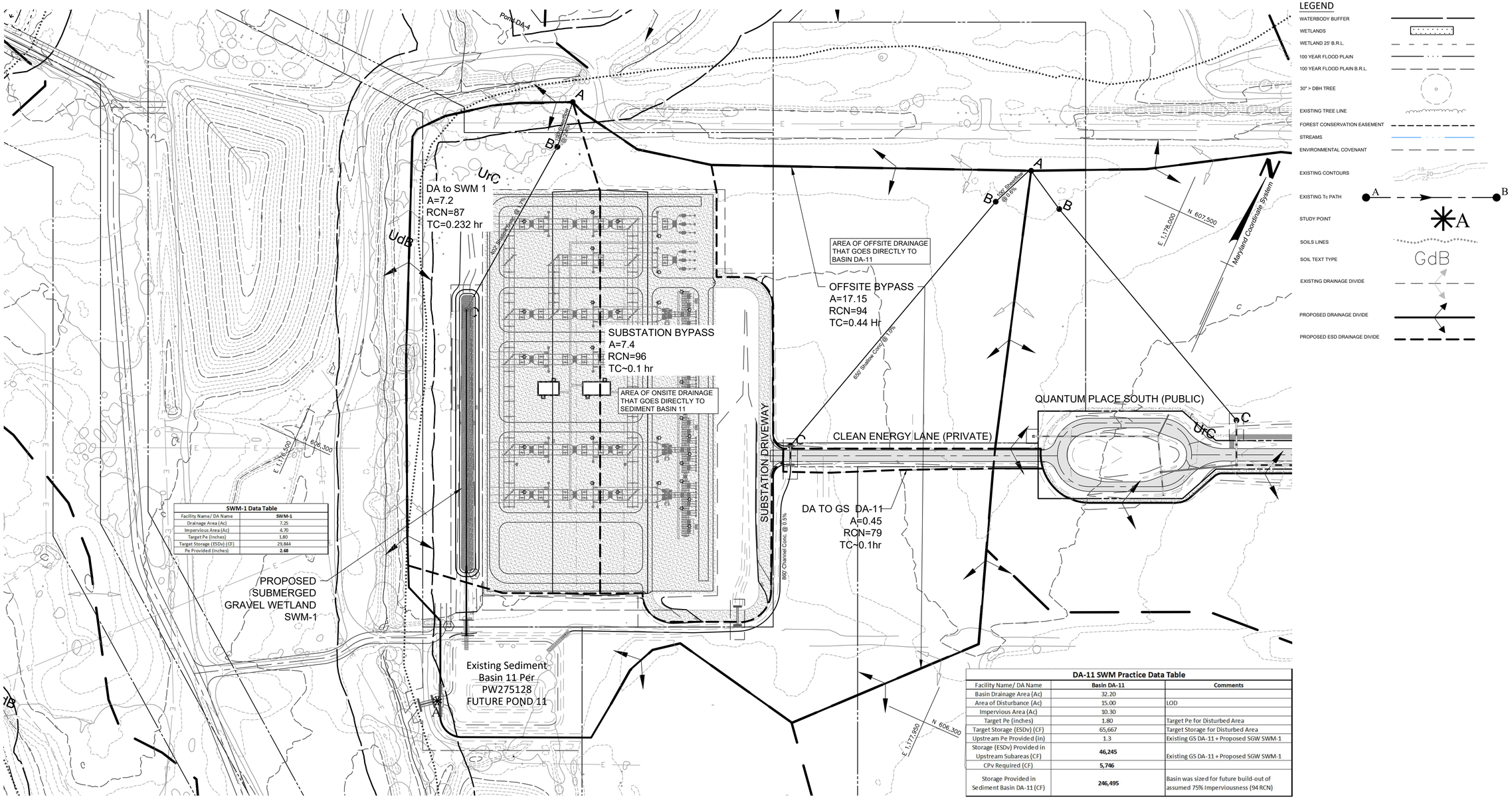
SCALE: AS NOTED
JOB No. 1367A
INDEX No. SD-1
SHEET No. 5 OF 9

PROFESSIONAL CERTIFICATION
"I hereby certify that these documents were prepared or approved by me that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 29782 , Expiration Date: 01/16/2025 ".

STATE OF MARYLAND — THOMAS PHILLIP GRIMA — 29782 — PROFESSIONAL ENGINEER
04/21/2023
FOR REVIEW ONLY

● Submittal 2023.04.21

N: \MD-FREDERICK\ALCOA\AUTOCAD\PLOT PLANS\IMPROVEMENT PLANS\SAGE SUBSTATION\05-STORM DRAIN PLAN AND PROFILE.DWG



SWM-1 Data Table	
Facility Name/ DA Name	SWM-1
Drainage Area (Ac)	7.25
Impervious Area (Ac)	4.70
Target Pe (inches)	1.80
Target Storage (ESDv) (CF)	29,844
Pe Provided (inches)	**2.68**

DA-11 SWM Practice Data Table		
Facility Name/ DA Name	Basin DA-11	Comments
Basin Drainage Area (Ac)	32.20	
Area of Disturbance (Ac)	15.00	LOD
Impervious Area (Ac)	10.30	
Target Pe (inches)	1.80	Target Pe for Disturbed Area
Target Storage (ESDv) (CF)	65,667	Target Storage for Disturbed Area
Upstream Pe Provided (in)	1.3	Existing GS DA-11 + Proposed SGW SWM-1
Storage (ESDv) Provided in Upstream Subareas (CF)	**46,245**	Existing GS DA-11 + Proposed SGW SWM-1
CPv Required (CF)	**5,746**	
Storage Provided in Sediment Basin DA-11 (CF)	**246,495**	Basin was sized for future build-out of assumed 75% Imperviousness (94 RCN)

GRAPHIC SCALE

100' 0 50' 100' 200' 400'

1 INCH = 100 FT

Symbol	Soil Type/Classification	HSG
UdB	Udorthents, Smooth, 0 to 8 percent slopes, rocky	C
UrC	Urban Land, 3 to 15 percent slopes	D

FREDERICK SOIL CONSERVATION DISTRICT

APPROVED BY _____
DISTRICT MANAGER

DATE _____

SCD approval for sediment and erosion control is contingent upon issuance of all applicable regulatory permits.

PROFESSIONAL CERTIFICATION

"I hereby certify that these documents were prepared or approved by me that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 29782 , Expiration Date: 01/16/2025 ".

STATE OF MARYLAND · PHILIP THOMAS WAGNER · 29782 · PROFESSIONAL ENGINEER

04/21/2023
FOR REVIEW ONLY

CALL "MISS UTILITY" AT 1-800-257-7777
72 Hours Before Start Of Construction

REVISION	DATE	REVISION	DATE

	BY	DATE
BASE DATA	CADD	
DESIGNED		
DRAWN		
REVIEWED		

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1001 Fleet Street
Baltimore, MD 21202
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STORMWATER MANAGEMENT DRAINAGE AREA MAP

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Quantum Frederick Critical Digital Infrastructure Electric Substation
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PW #275268
Liber 15038, Folio 393
ELECTION DISTRICT NO. 1
FREDERICK COUNTY, MARYLAND

SCALE: 1"=100'
JOB No. 1367A
INDEX No. SWM-1
SHEET No. 6 OF 9

Submittal 2023.04.21

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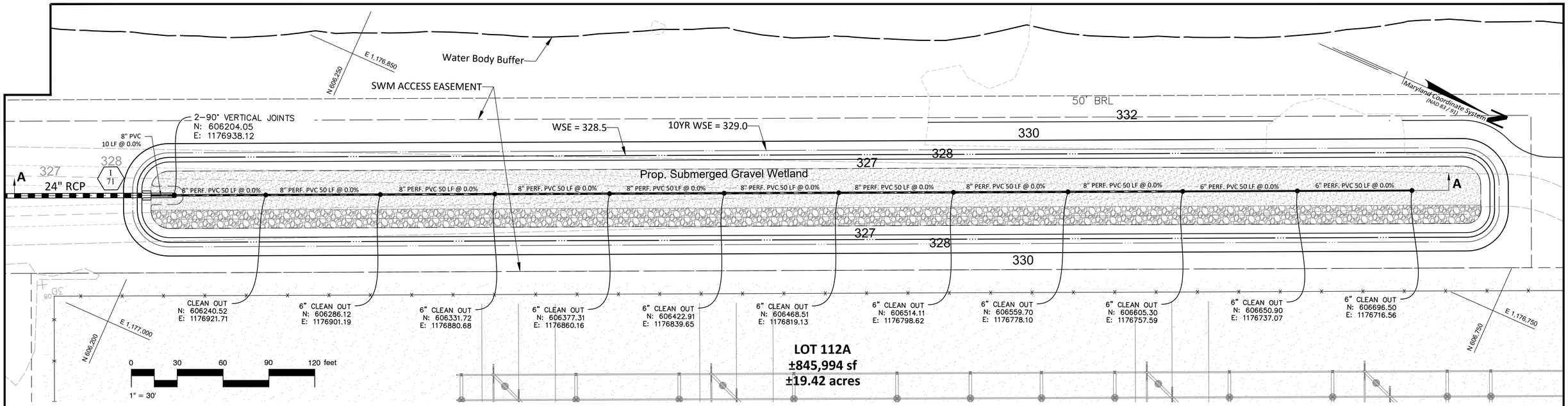


Submerged Gravel Wetland Construction Criteria:

1. Site Disturbance: All on-site disturbed areas should be stabilized prior to allowing runoff to enter the newly constructed wetland.

2. Underdrain Installation: The underdrain pipe consists of 6-inch and 8-inch diameter schedule 40 perforated PVC pipe at 0.00% slope. The underdrain pipe will be placed in the gravel layer. Six inches of gravel must be placed under the pipe, with a minimum of 3 inches of gravel over the top. Perforations must be $\frac{3}{8}$ inch in diameter and must be located 4 inches on center, every 90 degrees around the pipe. Perforated pipe must begin at least 5 ft. inside the filter media. Filter fabric must NOT be wrapped around the underdrain pipe. Clean-outs for each pipe should extend 6 inches above the top of the planting media and have a removable waterproof cap.

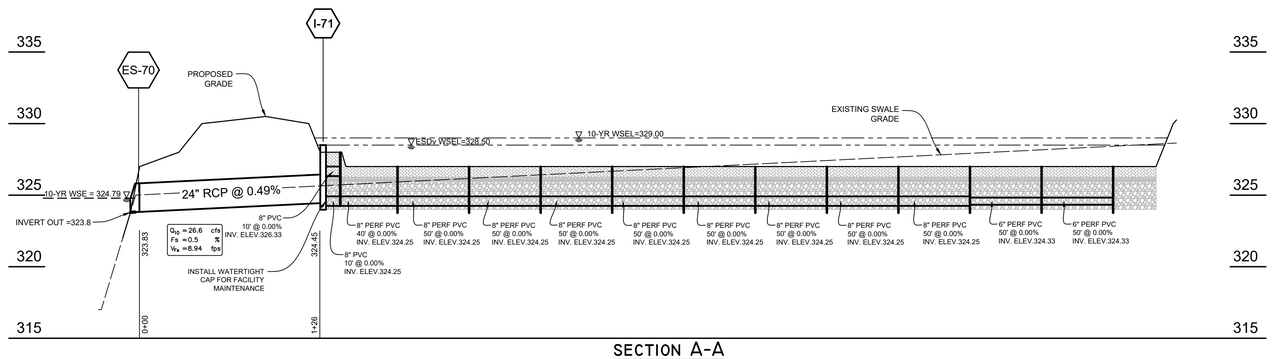
3. Gravel Bed: Gravel for the underdrain system should be clean, washed, and free of fines. Underdrain pipes should be checked to ensure that both the material and perforations meet specifications. The upstream ends of the underdrain pipe should be capped prior to installation.

Inspection:
Regular inspections shall be made during the following stages of construction:

- *During excavation to subgrade.*
- *During placement of backfill of perforated inlet pipe and observation wells.*
- *During placement of geotextiles and all filter media.*
- *During construction of appurtenant conveyance systems such as diversion structures, inlets, outlets and flow distribution structures.*
- *Upon completion of final grading and establishment of permanent stabilization.*

Maintenance Criteria:
The following items should be addressed to ensure proper maintenance and long-term performance of submerged gravel wetlands:

- *Privately owned practices shall have a maintenance plan and shall be protected by easement, deed restriction, ordinance, or other legal measures preventing its neglect, adverse alteration, and removal.*
- During the first year of operation, inspections should be conducted after every major storm and poorly established areas re-vegetated.
- Sediment accumulation in the pretreatment areas should be removed as necessary.
- Signs of uneven flow distribution within the wetland may mean that the gravel or underdrain is clogged. The gravel and/or underdrain may need to be removed, cleaned, and replaced.
- A dense stand of wetland vegetation should be maintained through the life of the facility with plantings replaced as needed.
- Inlets and outlets to each submerged gravel wetland cell should be free from debris to prevent clogging.
- Erosion at inflow points should be repaired. Flow splitters should be functional to prevent bypassing of the facility.



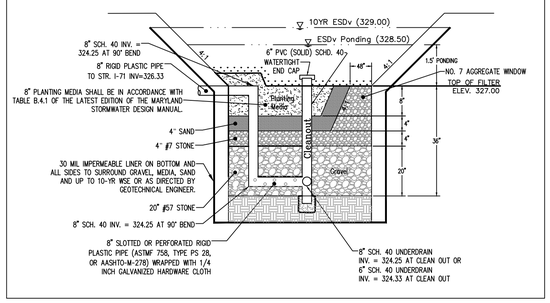
SECTION A-A

Appendix B.4. Construction Specifications for Environmental Site Design Practices

Table B.4.1 Materials Specifications for Micro-Bioretention, Rain Gardens & Landscape Infiltration-

Material	Specification	Size	Notes
Plantings	see Appendix A, Table A.4	n/a	plantings are site-specific
Planting soil [2' to 4' deep]	loamy sand (60 - 65%) & compost (35 – 40%) or sandy loam (30%), coarse sand (30%) & compost (40%)	n/a	USDA soil types loamy sand or sandy loam; clay content < 5%
Organic content	Min. 10% by dry weight (ASTM D 2974)		
Mulch	shredded hardwood		aged 6 months, minimum; no pine or wood chips
Pea gravel diaphragm	pea gravel: ASTM-D-448	NO. 8 OR NO. 9 (1/8" TO 3/8")	
Curtain drain	ornamental stone: washed cobbles	stone: 2" to 5"	
Geotextile		n/a	PE Type 1 nonwoven
Gravel (underdrains and infiltration berms)	AASHTO M-43	NO. 57 OR NO. 6 AGGREGATE (3/8" to 3/4")	
Underdrain piping	F 758, Type PS 28 or AASHTO M-278	4" to 6" rigid schedule 40 PVC or SDR35	Slotted or perforated pipe; 3/8" perf. @ 6" on center, 4 holes per row; minimum of 3" of gravel over pipes; not necessary underneath pipes. Perforated pipe shall be wrapped with ½-inch galvanized hardware cloth
Poured in place concrete (if required)	MSHA Mix No. 3; f'c = 3500 psi @ 28 days, normal weight, air-entrained; reinforcing to meet ASTM-615-60	n/a	on-site testing of poured-in-place concrete required: 28 day strength and slump test; all concrete design (cast-in-place or pre-cast) *not using previously approved State or local standards* requires design drawings sealed and approved by a professional structural engineer licensed in the State of Maryland - design to include meeting ACI Code 350.R/89; vertical loading [H-10 or H-20]; allowable horizontal loading (based on soil pressures); and analysis of potential cracking
Sand	AASHTO-M-6 or ASTM-C-33	0.02" to 0.04"	Sand substitutions such as Diabase and Graystone **(AASHTO)** #10 are not acceptable. No calcium carbonated or dolomitic sand substitutions are acceptable. No "rock dust" can be used for sand.

SUBMERGED GRAVEL WETLAND SWM-1
(TYPICAL SECTION N.T.S.)



THIS SUBMERGED GRAVEL WETLAND IS NOT MD 378 FACILITY.

PROFILE SCALE
HORZ. 1" = 50'
VERT. 1" = 5'

FREDERICK SOIL CONSERVATION DISTRICT

APPROVED BY _____ DISTRICT MANAGER

DATE _____

SCD approval for sediment and erosion control is contingent upon issuance of all applicable regulatory permits.

PROFESSIONAL CERTIFICATION

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STATE OF MARYLAND · THOMAS PHILLIP GRAMA · 29782 · PROFESSIONAL ENGINEER

04/21/2023
FOR REVIEW ONLY

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72 Hours Before Start Of Construction

REVISION	DATE	REVISION	DATE

	BY	DATE
BASE DATA	CADD	
DESIGNED		
DRAWN		
REVIEWED		

RELEASE FOR _____ BY DATE

OUTSIDE LAND USE COUNCIL:
Saul Ewing LLP
1001 Fleet Street
Baltimore, MD 21202
Contact: Greg Rapisarda
Office: 410-332-8963
Mobile: 410-948-1778

Stormwater Management Plan

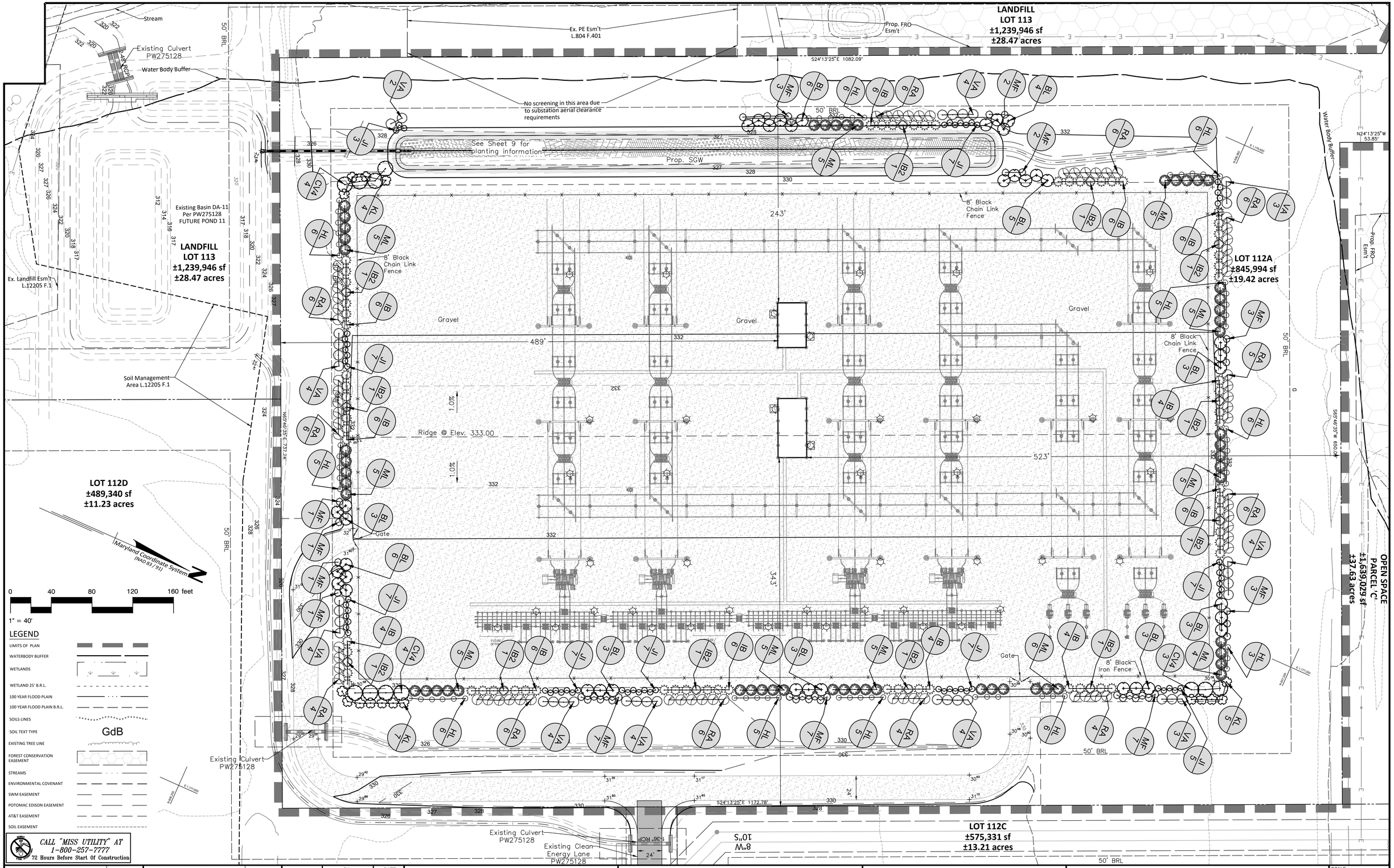
RODGERS CONSULTING
19847 Century Boulevard, Suite 200, Germantown, Maryland 20874
Ph: 301.948.4700 Fx: 301.948.6256 www.rodgers.com

Quantum Frederick Critical Digital Infrastructure Electric Substation
Combined SWM Development and Improvement Plan
Lot 112A Substation
PW #275268
Liber 15038, Folio 393
ELECTION DISTRICT NO. 1
FREDERICK COUNTY, MARYLAND

SCALE: AS NOTED
JOB No. 1367A
INDEX No. SWM-2
SHEET No. 7 OF 9

Submittal 2023.04.21

N:\MD-FREDERICK\ALCOA\AUTOCAD\PLOT PLANS\IMPROVEMENT PLANS\SAGE SUBSTATION\07-SWM FACILITY PLAN, NOTES AND DETAILS.DWG



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BY DATE

OUTSIDE LAND USE COUNCIL:
Saul Ewing LLP
1001 Fleet Street
Baltimore, MD 21202
Contact: Greg Rapisarda
Office: 410-332-8963
Mobile: 410-948-1778

Landscape, Buffering, and Screening Plan

RODGERS CONSULTING
19847 Century Boulevard, Suite 200, Germantown, Maryland 20874
Ph: 301.948.4700 Fx: 301.948.6256 www.rodgers.com

Quantum Frederick Critical Digital Infrastructure Electric Substation
Combined SWM Development and Improvement Plan
Lot 112A Substation
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Liber 15038, Folio 393
ELECTION DISTRICT NO. 1
FREDERICK COUNTY, MARYLAND

SCALE: 1"=40'
JOB No. 1367A
INDEX No. LP-1
SHEET No. 8 OF 9

Submittal 2023.04.21

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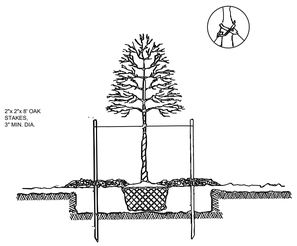
STAKED TREE SPECIFICATION (2)

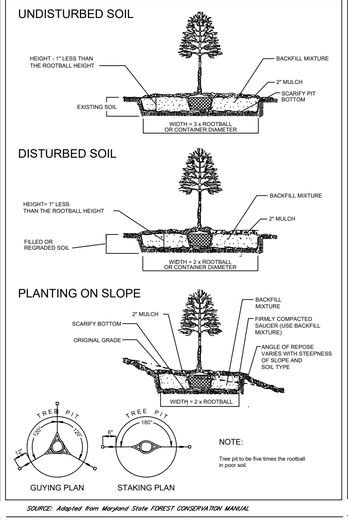


NOTES:

1. The staking of trees may be used only when specified on the planting plan.
2. Stakes and wires must be removed no later than 12 months after planting.
3. Tree pit preferred to be five times the rootball size, particularly in poor soil.

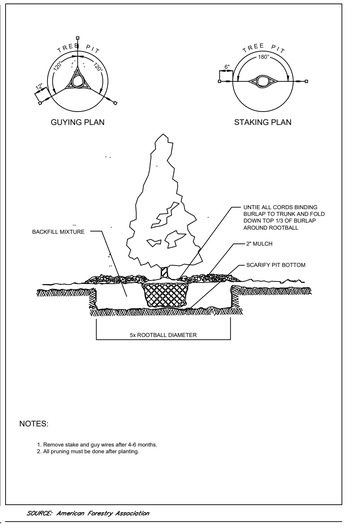
SOURCE: Adapted from Maryland State FOREST CONSERVATION MANUAL

DECIDUOUS TREE PLANTING
CONTAINER GROWN AND BALLED & BURLAPPED STOCK



SOURCE: Adapted from Maryland State FOREST CONSERVATION MANUAL

EVERGREEN TREE PLANTING

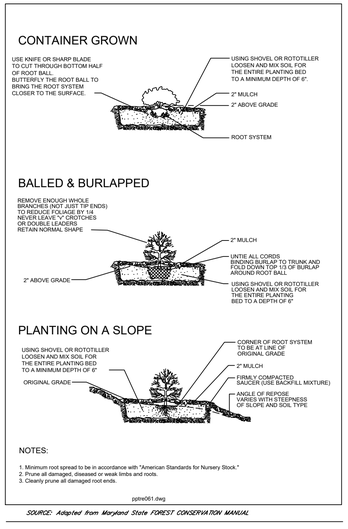


NOTES:

1. Remove stake and guy wires after 4-6 months.
2. All pruning must be done after planting.

SOURCE: American Forestry Association

SHRUB PLANTING



NOTES:

1. Minimum root spread to be in accordance with "American Standards for Nursery Stock."
2. Prune all damaged, diseased or weak limbs and roots.
3. Cleanly prune all damaged root ends.

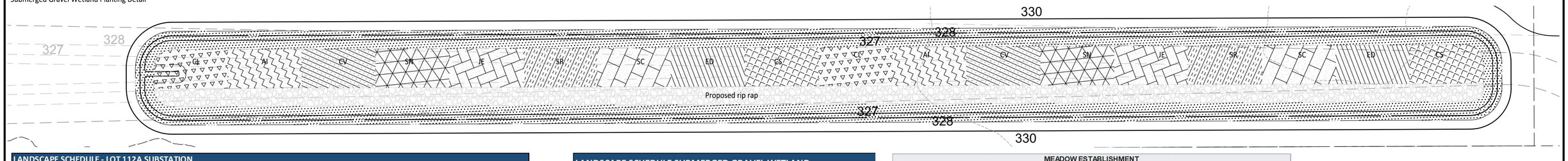
pshr061.dwg

SOURCE: Adapted from Maryland State FOREST CONSERVATION MANUAL

Landscape General Notes:

1. Plants shall conform to current "American Standards for Nursery Stock" by the American Nursery & Landscape Association (ANLA), particularly with regards to site, growth, and size of ball and density of branch structure.
2. Contractor to insure conformance to national and local building codes and ordinances.
3. All plants (B&B or container) shall be properly identified by weatherproof labels securely attached hereto before delivery to project site. Labels shall identify plants by name, species and size. Labels shall not be removed until the final inspection by the owners representative.
4. Any material and/or work may be rejected by the owners representative if it does not meet the requirements of the specifications. The contractor shall remove all rejected materials from the site.
5. The contractor shall furnish all plants in quantities and sizes to complete the work as specified in plant schedule. The landscape contractor shall be responsible to verify all plant quantities on the plans prior to commencement of work. Quantities in the plant schedule are for the contractors convenience only and do not constitute the final count.
6. Substitutions in plant species or size shall not be permitted except with the written approval of the owners' representative. See table below for permitted and excluded species.
7. Plants shall be located as shown on the drawings and by scaling or as designated in the field by the owners representative. All locations are to be approved by the owners representative before excavation.
8. Contractor shall locate and mark all underground utility lines and irrigation systems prior to excavating plant beds or pits. All utility easement areas where no planting shall take place shall also be marked on the site, prior to locating and digging the tree pits. If utility lines are encountered in excavation of tree pits, other locations for the trees shall be selected by the owners representative. Such changes shall be made by the contractor without additional compensation. No changes of location shall be made without the approval of the owners representative.
9. All equipment and tools shall be placed so as not to interfere or hinder the pedestrian and vehicular traffic flow.
10. During planting operations, excess and waste materials shall be promptly and frequently removed from the site.
11. All plant shrub beds are to be dug to a minimum of 24" deep and all existing soil, construction debris, roots and other foreign material are to be removed and discarded off site. All plant shrub beds are to be excavated to the width shown on the plans.
12. All tree pits are to be excavated to a minimum depth to allow the tree root ball to be a minimum of 4" higher than finish grade. The tree root ball is to rest on undisturbed soil, or a compacted bed must be prepared for the tree root ball to rest on and which will not subside causing the tree to sink below finish grade. All tree pits are to be a minimum of 12" larger on every side of the trees root ball.
13. The planter beds are to be entirely cleaned out to the undisturbed soil level. All existing soil, construction debris, roots and other foreign material are to be removed and discarded offsite.
14. The topsoil to be used to fill the tree pits, shrub beds and planters is to be plant specific. The topsoil for the trees, shrubs and planter shall consist of a maximum 2/3 existing topsoil from the site, which is cleaned and free of clay, a minimum of 1/3 peat moss, or other approved organic material or imported new loamy topsoil and 10% cow manure. All of these materials are to be mixed prior to placing in the planter or backfilling when planting.
15. The contractor is responsible to ensure that all tree pits, shrub beds and planter are well drained. The landscape contractor without cost to the owner will replace all plant material, which is affected by poor drainage.
16. All lawn areas are to be seeded with grass seed appropriate for each of the sunlight conditions, which exist on the site.
17. All lawn areas are to be tilled to a depth of 6" and all foreign material removed which will inhibit the healthy growth of the lawn. All old grass and grass roots are to be removed from the site. New topsoil of a minimum 4" is to be placed over the areas to be sodded. The grass areas are to be fine graded to ensure that no undulations occur in the lawn. The lawns are to be graded in such a way as to appear perfectly well tailored and even. The lawn topsoil is to be rolled and lightly irrigated prior to placing of the seed. The seed is not to be laid on frozen or soaked soil.
18. Existing trees are to be protected during the preparation of the lawn areas. The roots of the trees are to be undisturbed during the cleaning of the topsoil.
19. The trees and shrubs are to be handled with the best care and attention to ensure that the plants are not bruised, broken, torn, damaged in any way which will affect the plants general appearance and well being.
20. The trees and shrubs are to be planted with the accepted standards of the American Association of Nurserymen. The plants are to be properly watered and backfilled during the planting. All care must be taken to ensure that the plants are upright, a plant's best side is exposed to the point of the plants greatest visibility.
21. The trees must be staked in accordance with acceptable nursery practice to ensure that they are secure in the ground and will grow straight and uniform. The trees are to be wrapped if the contractor deems it necessary to protect the trees from sun scald or insect attack.
22. The Landscape Contractor is to provide a 1-year guarantee for all plant material and other work done on site.
23. Large growing plants are not to be planted in front of windows, under building overhangs, or in drainage swales. Shrubs planted near HVAC units to be located so that shrubs at maturity will maintain 1 foot airspace between unit and plant.
24. Contractor to slightly adjust plant locations in the field as necessary to be clear of drainage swales and utilities. Finished planting beds shall be graded so as not to impede drainage away from buildings.
25. Trees shall be located a minimum of 3 feet from walls and walks.
26. Quantities as shown on the plan shall govern over plant list quantities. Contractor to verify plant list totals with quantities shown on plan.
27. Groups of shrubs shall be placed in a continuous mulch bed with smooth continuous lines. All mulched bed edges shall be curvilinear in shape following the contour of the plant mass. Trees located within 4 feet of shrub beds shall share same mulch bed.
28. Plant material shall be maintained such to not interfere with sight distance. Maintenance of these plants shall conform to Frederick section 2.04.02 of the Frederick County Roads & Streets Design Manual.
29. All landscape must be maintained in a living condition.
30. Vegetation used to establish a visual screen shall not be trimmed so as to stunt upward and outward growth or to otherwise limit the effectiveness of the visual screen.

Submerged Gravel Wetland Planting Detail



LANDSCAPE SCHEDULE - LOT 112A SUBSTATION

EVERGREEN TREES	QUANTITY	BOTANICAL NAME	COMMON NAME	CONTAINER	SIZE	MATURE HEIGHT	NATIVE	NOTES
JI	62	Juniperus virginiana 'Idyllwild'	Idyllwild Eastern Redcedar	B & B	6'-7' H	12'-18'	NATIVE	Full to ground
ML	55	Magnolia grandiflora 'Little Gem'	Little Gem Dwarf Southern Magnolia	B & B	6'-7' H	15'-20'	NATIVE	Full to ground
TOTAL	**117**			**117**	**of**	**117**	**100%**	**NATIVE PLANTS**
ORNAMENTAL TREES	QUANTITY	BOTANICAL NAME	COMMON NAME	CONTAINER	SIZE	MATURE HEIGHT	NATIVE	NOTES
BL	38	Betula nigra 'Little King'	Fox Valley® Dwarf River Birch	B & B	1" Cal	10'-12'	NATIVE	
CV4	11	Chionanthus virginicus	White Fringetree	B & B	1" Cal	15'-20'	NATIVE	
TOTAL	**49**			**49**	**of**	**49**	**100%**	**NATIVE PLANTS**
SHRUBS	QUANTITY	BOTANICAL NAME	COMMON NAME	CONTAINER	SIZE	MATURE HEIGHT	NATIVE	NOTES
HL	59	Hamamelis virginiana 'Little Suzie'	Little Suzie Witch Hazel	Cont.	#3	4'-5'	NATIVE	
IB2	12	Ilex x meserveae 'Blue Boy'	Blue Boy Holly	Cont.	#3	10'-15'		Full to ground
IB	64	Ilex x meserveae 'Blue Princess'	Blue Princess Holly	Cont.	#3	12'-16'		Full to ground
KL	16	Kalmia latifolia	Mountain Laurel	Cont.	#3	8'-15'	NATIVE	
MF	38	Myrica cerifera 'Fairfax'	Fairfax Wax Myrtle	Cont.	#3	6'-8'	NATIVE	
RA	65	Rhus aromatica Gro-low	Gro-Low Fragrant Sumac	Cont.	#3	2'-3'	NATIVE	
VA	36	Viburnum dentatum	Arrowwood Viburnum	Cont.	#3	8'-15'	NATIVE	
TOTAL	**290**			**214**	**of**	**290**	**74%**	**NATIVE PLANTS**
			OVERALL SCREENING PLANTS	**380**	**of**	**456**	**83%**	**NATIVE PLANTS**

LANDSCAPE SCHEDULE SUBMERGED GRAVEL WETLAND

Quantity	Symbol	Scientific Name	Common Name	Size
FILTER AREA				
224	AI	*Asclepias incarnata*	swamp milkweed	1 quart
222	CS	*Carex stricta*	tussock sedge	1 quart
224	CV	*Carex vulpinoidea*	fox sedge	1 quart
222	CL	*Chasmanthium latifolium*	northern sea oats	1 quart
224	ED	*Eutrochium dubium 'Little Joe'*	Little Joe Pye weed	1 quart
224	JE	*Juncus effusus*	soft rush	1 quart
224	SC	*Scirpus cyperinus*	woolgrass bulrush	1 quart
224	SR	*Solidago rugosa*	wrinkleleaf goldenrod	1 quart
224	SN	*Symphyotrichum novae-angliae*	New England aster	1 quart
2012		TOTAL PLANTS		
SIDE SLOPES				
9800		SHA LOWLAND SEED MIX	(in square feet)	

100% of plants in filter area are native to the Chesapeake Bay watershed.

MEADOW ESTABLISHMENT
LOWLAND MEADOW SEED

FORBS Select 8	PURE LIVE SEED* GRAM PER yd²	PURE LIVE SEED* LB PER ACRE	GRASSES, SEDGES and RUSHES Include All	PURE LIVE SEED* GRAM PER yd²	PURE LIVE SEED* LB PER ACRE
Common Boneset	0.019	0.2	Big Bluestem	0.188	2
Eastern Purple Coneflower	0.113	1.2	Eastern Gamagrass	0.188	2
Common Evening Primrose	0.019	0.2	Hard Fescue	1.876	20
Lanceleaf Tickseed	0.141	1.5	Indiangrass	0.188	2
Maximilian Sunflower	0.047	0.5	Kentucky Bluegrass	0.469	5
New England Aster	0.019	0.2	Switchgrass	0.094	1
New York Ironweed	0.019	0.2	Virginia Wildrye	0.047	0.5
Bearded Beggarticks	0.019	0.2			
Stiff Goldenrod	0.028	0.3			
Swamp Verbena	0.066	0.7			
Trumpetweed or Spotted Trumpetweed	0.019	0.2			

Note: *The rate shown is Pure Live Seed. Use germination and purity data from the seed tag to calculate the actual seeding rate needed to obtain the seeding rate in Pure Live Seed.

SHA 707 Meadow Establishment or approved equal.

REGION	SEEDING SEASON - MONTH/DAY				
	Spring	Summer	Fall	Late Fall	Winter
	SHA Wet Meadow Seed, SHA Lowland Meadow Seed, SHA Upland Meadow Seed				
1	3/1 to 6/14	6/15 to 7/31	8/1 to 9/30	10/1 to 11/30	12/1 to 2/29
2	3/1 to 5/14	5/15 to 7/31	8/1 to 10/14	10/15 to 11/30	12/1 to 2/29
3	3/1 to 4/30	5/1 to 7/31	8/1 to 10/31	11/1 to 11/30	12/1 to 2/29
All Regions	Plus Additive A*	Plus Additive B*	Plus Additive B*	Plus Additive D*	Plus Additive A*
	Plus Additive B*	Plus Additive C*	Plus Additive D*	Plus Additive E*	Plus Additive E*

Notes *

Additive A for Lowland Meadow and Upland Meadow = Garden Cosmos

Additive B for Lowland Meadow and Upland Meadow = Plains Coreopsis

Additive C for Lowland Meadow and Upland Meadow = Tall Fescue

Additive C for Wet Meadow = Perennial Ryegrass

Additive D for Lowland Meadow and Upland Meadow = Corn Poppy

Additive E for all Meadow Establishment = Common Oat

See SHA Section 707 for additional Lowland Meadow establishment details

County Plant Species Notes:

Exhibit K - Partial List of Invasive, Exotics Tree and Shrub Species in Frederick County

Trees:

Scientific Name	Common Name
Ailanthus altissima	Tree of Heaven
Acer platanoides	Norway Maple (including cultivars "Crimson King", "Variegata", etc.)
Elaeagnus angustifolia	Russian Olive
Elaeagnus umbellata	Autumn Olive
Morus alba	White Mulberry
Prunus avium	Sweet Cherry/Bird Cherry
Paulownia tomentosa	Empress Tree
Pyrus calleryana	Bradford Pear (including cultivars "Bradford", "Aristocrat" and "Chanticleer")

Shrubs:

Scientific Name	Common Name
Rosa multiflora	Multiflora Rose
Lonicera spp.	Bush Honeysuckle (including cultivars "Belle", "Amur", "Morrow", and "Tatarian"
Berberis thunbergii	Japanese Barberry
Spirea japonica	Japanese Spirea

Vines:

Scientific Name	Common Name
Lonicera japonica	Japanese Honeysuckle
Celastrus orbiculatus	Oriental Bittersweet
Vinca minor	Periwinkle/Vinca
Hedera helix	English Ivy

Exhibit L1 - List of Native Overstory Trees in Frederick County

Source: 1) Geography & Geology of Maryland-- Commission of Maryland Geological Survey, by Harold E. Vokes 1961, 1966
2) (Parenthesis) Indicate Scientific or Common Name updates, assessed by DPDR, Planning Section
*3) *Asterisks indicate additions to List made because of naturalization or other reasons, assessed by DPDR, Planning Section*

Conifers - (and Broad-leafed Evergreens)	Scientific Name	Common Name (s)
	Juniperus virginiana,	(Eastern) Red Cedar
	Pinus echinata,	Shortleaf Pine
	Pinus pungens,	Table Mountain Pine
	Pinus rigida	Pitch Pine
	Pinus strobus,	White Pine
	Pinus virginiana,	Virginia Pine
	*Taxodium distichum	*Bald Cypress
	Tsuga canadensis	Eastern Hemlock

Hardwoods:	Scientific Name	Common Name (s)
	Acer negundo,	Box-Elder
	Acer nigrum,	Black Maple
	Acer pennsylvanicum,	Striped Maple
	Acer rubrum,	Red Maple
	Acer saccharinum,	Silver Maple (Invasive Native – not recommended)
	Acer saccharum,	Sugar Maple
	Acer spicatum	Mountain Maple
	Alnus rugosa, (serrulata)	Smooth Alder (Hazel Alder)
	Aralia spinosa,	Hercules Club
	Betula lenta,	Black Birch (Sweet Birch)
	Betula lutea, (alleghaniensis)	Yellow Birch
	Betula nigra,	River Birch (Black Birch)
	Carpinus caroliniana,	Blue Beech (American Hornbeam, Musclewood, Ironwood)
	(Carya) cordiformis,	Bitternut Hickory
	(Carya) glabra,	Pignut Hickory
	(Carya) laciniosa,	Shellbark Hickory
	(Carya) ovata,	Shagbark Hickory
	(Carya) ovalis,	Small Pignut Hickory (Red Hickory, Sweet Pignut Hickory, Oval Pignut Hickory)
	(Carya) tomentosa.	Mockernut Hickory

Temporary Indefinite Ban on Ash Trees in Frederick County

Scientific Name	Common Name (s)
Castanea dentata,	(American) Chestnut
Castanea pumila,	Chinkapin (Eastern or Allegheny Chinkapin)
Celtis occidentalis,	Hackberry
Fagus grandifolia,	(American) Beech
Fraxinus americana,	White Ash
Fraxinus nigra,	Black Ash
Fraxinus pennsylvanica,	Red Ash
Fraxinus pennsylvanica Lanceolata,	Green Ash
Juglans cinerea,	Butternut
Juglans nigra,	Black Walnut
*Liquidambar styraciflua	* Sweet Gum
Liriodendron tulipifera,	Tulip Tree (Yellow Popular, Tulip Popular
Magnolia acuminata,	Cucumber Tree (Cucumber Magnolia)
Morus rubra,	Red Mulberry
Nyssa sylvatica,	Black Gum (Black Tupelo, Sour-gum)
Ostrya virginiana,	Hop Hornbeam (Eastern Hophornbeam, Ironwood)
Platanus occidentalis,	Sycamore
Populus deltoids,	(Eastern Cottonwood, Eastern Poplar)
Populus grandidentata,	Large-toothed Aspen
Populus tremuloides,	(Quaking) Aspen
Quercus alba,	White Oak
Quercus bicolor,	Swamp White Oak
Quercus borealis Maxima, (rubra)	Northern Red Oak
Quercus coccinea,	Scarlet Oak
*Quercus falcata	*Southern Red Oak
Quercus lyrata,	Scrub Oak (Bear Oak)
Quercus macrocarpa,	Shingle Oak
Quercus macrocarpa,	Burr Oak
Quercus marylandica,	Black Jack Oak
Quercus montana, (prinus)	Chestnut Oak
Quercus muehlenbergii,	Chinquapin Oak
Quercus palustris,	Pin Oak
*Quercus phellos	* Willow Oak
Quercus stellata,	Post Oak
Quercus velutina,	Black Oak
Robinia pseudoacacia,	Black Locust
Salix nigra,	Black Willow
Sorbus americana,	(American) Mountain Ash
Tilia dasyra,	Basswood (American Linden)
Ulmus americana,	American Elm
Ulmus fulva,	Slippery Elm

Exhibit L2 - List of Native Understory Trees & Shrubs in Frederick County

Source: 1) Geography & Geology of Maryland-- Commission of Maryland Geological Survey, by Harold E. Vokes 1961, 1966
2) (Parenthesis) Indicate Scientific or Common Name updates, assessed by DPDR, Planning Section
*3) *Asterisks indicate additions to List made because of naturalization or other reasons, assessed by DPDR, Planning Section*

Conifers - (and Broad-leafed Evergreens)	Scientific Name	Common Name (s)
	* Ilex opaca	* American Holly
	Kalmia latifolia,	Mountain Laurel

Hardwoods:	Scientific Name	Common Name (s)
	(Amelanchier arborea)	(Serviceberry, Juneberry)
	Amelanchier canadensis,	Serviceberry (Canadian Serviceberry)
	Asimina triloba,	Pine-Pine
	Cercis canadensis,	Red Bud
	Cornus alternifolia,	Blue Dogwood (Alternate Dogwood)
	Cornus florida,	(Flowering) Dogwood
	Cornus racemosa)	(Gray Dogwood)
	Cornus sericea)	(Redosier Dogwood)
	Crataegus crus-galli	Cockspur
	Crataegus pedicellata,	Scarlet Haw
	Diospyros virginiana,	(Common) Persimmon
	Hamamelis virginiana,	Witch Hazel
	Magnolia tripetala,	Umbrella Tree (Umbrella Magnolia)
	*Magnolia virginiana	* Sweet Bay
	Malus coronaria,	Sweet Crab (Sweet Crabapple)
	Prunus americana,	(American) Wild Plum
	Prunus pensylvanica,	Fire Cherry
	Prunus serotina,	(Wild) Black Cherry
	Prunus virginiana,	Choke Cherry
	Rhododendron, maximum,	Great Rhododendron
	Rhus copallina,	Dwarf Sumac
	Rhus typhina,	Staghorn Sumac
	Sambucus canadensis,	Sweet Elder (Common Elderberry, American Elder)
	Sassafras officinale, (albidum)	Sassafras
	*Vaccinium angustifolium	Late Lowbush Blueberry
	*Vaccinium corymbosum	Highbush Blueberry
	Viburnum prunifolium,	Black-Haw (Viburnum under several)

CALL "MISS UTILITY" AT 1-800-257-7777
72 Hours Before Start Of Construction

REVISION	DATE	REVISION	DATE

	BY	DATE
BASE DATA	CADD	
DESIGNED		
DRAWN		
REVIEWED		

RELEASE FOR _____ BY _____ DATE _____

OUTSIDE LAND USE COUNCIL:
Saul Ewing LLP
1001 Fleet Street
Baltimore, MD 21202
Contact: Greg Rapisarda
Office: 410-332-8963
Mobile: 410-948-1778

Landscape - Notes & Details

RODGERS CONSULTING
19847 Century Boulevard, Suite 200, Germantown, Maryland 20874
Ph: 301.948.4700 Fx: 301.948.6256 www.rodgers.com

Quantum Frederick Critical Digital Infrastructure Electric Substation
Combined SWM Development and Improvement Plan
Lot 112A Substation
PW #275268
Liber 15038, Folio 393
ELECTION DISTRICT NO. 1
FREDERICK COUNTY, MARYLAND

SCALE: 1" = 20'
JOB No. 1367A
INDEX No. LA-2
SHEET No. 9 OF 9

Submittal 2023.04.21

N:\MD-FREDERICK\ALCOA\AUTOCAD\PLOT PLANS\IMPROVEMENT PLANS\SAGE SUBSTATION\09-LANDSCAPE NOTE AND DETAILS.DWG

Appendix D

Substation Grouting Design

May 12, 2023
Kleinfelder Project No. 20234867.001A

Ms. Kara Quartararo
FirstEnergy
76 South Main Street
Akron, OH 44308

SUBJECT: Karst Mitigation Grouting Design Summary
Sage Substation
Frederick County, Maryland

Dear Ms. Quartararo:

Kleinfelder prepared this letter to summarize our karst mitigation grouting design services for the proposed FirstEnergy Sage Substation in Frederick County, Maryland (site).

BACKGROUND

The proposed Sage Substation Site is located within a geologic formation susceptible to karst features. Terracon Consultants, Inc. (Terracon) performed a geotechnical engineering evaluation for the proposed substation, and issued a report dated May 2, 2023. The subsurface explorations performed by Terracon encountered karst features at various locations throughout the site (pinnacled rock surface, voids, loose materials, etc.).

We understand that FirstEnergy would like to improve subsurface conditions for the substation to mitigate the risk of future subsidence and impacts to the operation of the substation (karst mitigation grouting). FirstEnergy has requested the karst mitigation grouting include the area of proposed structures, perimeter fencing, and portions of access drives. Based on the subsurface conditions encountered in Terracon's exploration program, Kleinfelder recommends a low mobility grouting program be performed. The purpose of the grouting will be to fill voids/openings into rock encountered and to help compact and improve overburden soils to help mitigate the risk of future subsidence in the areas where grouting is performed.

Our grouting program design is based on the following:

- "Sage Substation Geotechnical Engineering Report" dated May 2, 2023, prepared by Terracon Consultants, Inc;
- Drawing PE-1252-14-01 titled "Sage, General Arrangement, Plan View, 230kV-34.5kV Yard with Capacitor Banks" dated 7/29/2022 by Burns & McDonnell;
- Drawing Sheet 4 of 9 titled "Site Improvement Plan – Lot 112A Substation" dated 1/16/2023 by Rodgers Consulting;
- Our communications with the project team; and
- Our experience with similar projects.

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KLEINFELDER | 180 Sheree Blvd., Suite 3800, Exton, PA 19341 p | 610.594.1444 f | 610.594.2743

GROUTING PROGRAM DESIGN SUMMARY

To improve subsurface conditions, attempt to fill voids, and help mitigate the risk of future subsidence, Kleinfelder has designed a karst mitigation low mobility grouting program for the Sage Substation project. Attachment 1 shows a total of 1,307 proposed primary grout injection locations. Coordinates of the proposed primary injection locations are provided separately in electronic format (Excel file). The primary injection pattern for proposed substation structure/equipment areas is generally based on a 15-foot grid spacing with some variations. Grout injection spacing for the fence line and access road areas is generally based on a 20-foot spacing with some variations. The actual primary grout injection locations may be modified in the field based on existing site conditions and features at the time of grouting. For most locations, the grout holes should be drilled at least 5 feet into rock or to a minimum depth of 15 feet, whichever is deeper. For areas where rock socketed piers are planned, grout holes should be drilled at least 10 feet into rock or to a minimum depth of 15 feet, whichever is deeper. Areas designated for 10 feet into rock are highlighted in orange on Attachment 1 and designated with an “X” in the numbering.

The depths of the grout injection holes and amount of grouting to be performed will depend on the conditions encountered throughout the grouting process and cannot be predicted in advance. Depending on grout takes and subsurface conditions encountered, additional (secondary, tertiary, quaternary, etc.) grout injection locations will be provided by FirstEnergy or their grouting designer. For preliminary planning purposes, an additional 60 percent of secondary/tertiary/quaternary/etc. grout injection locations can be considered. The actual number and location of secondary/tertiary/quaternary/etc. points will be determined as the grouting progresses and may be more or less.

As part of our grouting program design, Kleinfelder prepared Compaction Grouting Specifications included as Attachment 2. The specifications outline labor, equipment, materials, and performance of operations associated with mixing and injecting grout for karst mitigation.

LIMITATIONS

This work was performed in a manner consistent with that level of care and skill ordinarily exercised by other members of Kleinfelder’s profession practicing in the same locality, under similar conditions and at the date the services are provided. Our conclusions, opinions, and recommendations are based on a limited number of observations and data known to date. It is possible that conditions could vary between or beyond the data evaluated. Kleinfelder makes no other representation, guarantee, or warranty, express or implied, regarding the services, communication (oral or written), report, opinion, or instrument of service provided.

The work performed was based on project information provided by Client. If Client does not retain Kleinfelder to review any plans and specifications, including any revisions or modifications to the plans and specifications, Kleinfelder assumes no responsibility for the suitability of our recommendations. In addition, if there are any changes in the field to the plans and specifications, Client must obtain written approval from Kleinfelder’s engineer that such changes do not affect our recommendations. Failure to do so will vitiate Kleinfelder’s recommendations.

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This letter may be used only by FirstEnergy and the registered design professional in responsible charge and only for the purposes stated for this specific engagement within a reasonable time from its issuance, but in no event later than 1 year from the date of the letter.

CLOSING

We appreciate the opportunity to provide our services for this project. If you have questions regarding this letter or if we may be of further assistance, please contact the undersigned.

Sincerely,
KLEINFELDER, INC.

Jonathan Morrison, PE
Project Manager

James Beideman, PE
Program Manager

Attachments:
1 – Primary Grout Injection Location Plan
2 - Compaction Grouting Specifications

JKM/JB

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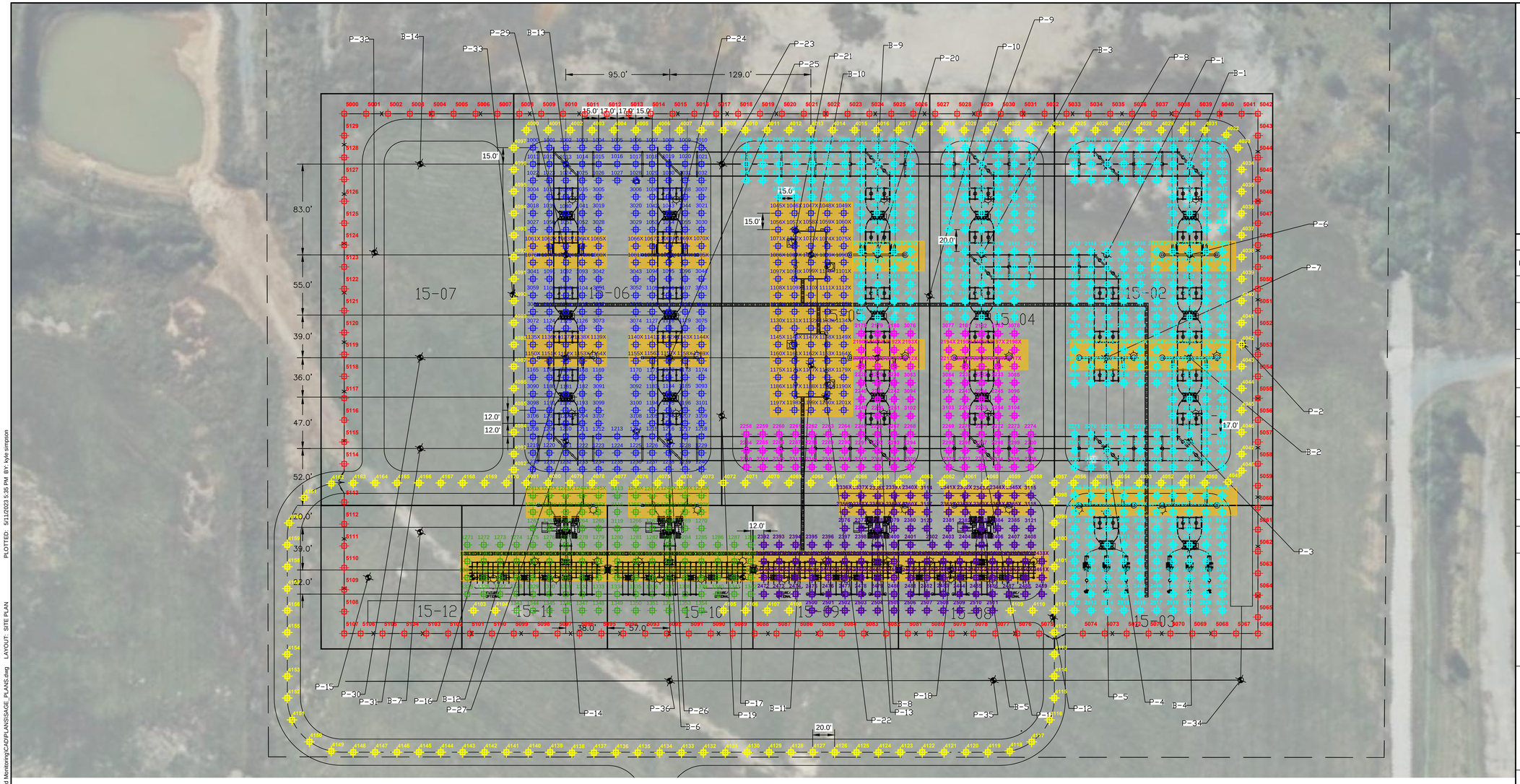
ATTACHMENT 1
PRIMARY GROUT INJECTION LOCATION PLAN



NOTES:

1. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO BE AWARE OF AND INFORM ALL PERSONNEL OF THE DANGERS OF WORKING NEAR HIGH VOLTAGE FACILITIES. THIS SHOULD BE ADDRESSED IN DAILY SAFETY MEETINGS. PHYSICAL CONTACT WITH CONDUCTORS OR SUBSTATION EQUIPMENT IS NOT REQUIRED FOR ELECTRICITY TO FLOW IN UNWANTED DIRECTIONS.
2. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE LATEST EDITION OF FIRSTENERGY UTILITIES/FIRSTENERGY TRANSMISSION CONTRACTOR SAFETY REQUIREMENTS. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR SITE SAFETY AND THE SAFETY OF THEIR PERSONNEL.
3. THE CONTRACTOR IS PERMITTED TO PLACE MATERIALS AND EQUIPMENT ONLY WHERE NESC AND OSHA CLEARANCE REQUIREMENTS ARE NOT VIOLATED. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY ALL CLEARANCES BEFORE CONSTRUCTION BEGINS AND DAILY/WEEKLY THROUGHOUT THE DURATION OF THE PROJECT. CONDUCTOR POSITION DOES CHANGE, PARTICULARLY IN EXTREME WEATHER CONDITIONS, AND MUST BE CHECKED TO ENSURE COMPLIANCE.
4. ANY EXISTING UTILITY LOCATIONS SHOWN ON THE PLANS ARE APPROXIMATE AND SHALL BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO THE START OF ANY CONSTRUCTION ACTIVITY.
5. THE CONTRACTOR IS RESPONSIBLE FOR LOCATING ALL PUBLIC OR PRIVATE UTILITIES WHICH LIE IN OR ADJACENT TO THE GROUTING AREA. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPAIR, AT HIS OR HER EXPENSE, OF ALL EXISTING UTILITIES DAMAGED DURING GROUTING.
6. PRIOR TO EXCAVATION A ONE CALL SHALL BE PLACED BY THE GROUTING CONTRACTOR FOR THE WORK AREA. UTILITY CLEARANCE BY THE CONTRACTOR SHALL ALSO INCLUDE GEOPHYSICAL METHODS USED TO HELP IDENTIFY/CLEAR PRIVATE UTILITIES THAT MAY BE PRESENT IN THE AREA. SOFT-DIG TECHNIQUES SHOULD ALSO BE USED AS NEEDED BY THE CONTRACTOR TO PROVIDE UTILITY CLEARANCE.
7. THE GROUTING CONTRACTOR SHALL COORDINATE ALL OPERATIONS WITH FIRSTENERGY REGARDING, BUT NOT LIMITED TO, WORK HOURS, DRIVE/LOT CLOSURES, WORKSPACE REQUIREMENTS, SEQUENCING OF GROUTING AREAS, EQUIPMENT LOCATIONS, AND LAYDOWN AREAS.
8. THE GROUTING CONTRACTOR SHALL TAKE PRECAUTIONS TO AVOID DAMAGE TO EXISTING SITE FEATURES INCLUDING, BUT NOT LIMITED TO, EXISTING UTILITY POLES, OVERHEAD ELECTRIC LINES, UNDERGROUND UTILITIES, AND PAVEMENTS.
9. THE WORK AREA SHALL BE KEPT IN A CLEAN CONDITION AND ALL GARBAGE AND DEBRIS MUST BE REMOVED FROM THE SITE TO A LAWFULLY APPROPRIATE LANDFILL.
10. NO WORK OR EQUIPMENT STORAGE IS ALLOWED BEYOND THE SUBSTATION PROPERTY.
11. WORK AREAS MUST BE MAINTAINED AND LEFT IN A CONDITION EQUAL TO OR BETTER THAN BEFORE GROUTING.
12. THE CONTRACTOR SHALL PERFORM THE GROUTING PROGRAM IN ACCORDANCE WITH THE PROJECT'S COMPACTION GROUTING SPECIFICATIONS.
13. CONSTRUCTION SITE SAFETY AND LAYOUT OF THE WORK IS THE SOLE RESPONSIBILITY OF THE GROUTING CONTRACTOR. LAYOUT OF GROUT INJECTION LOCATIONS SHALL BE PERFORMED BY THE CONTRACTOR AND SHALL INCLUDE SURVEY LAYOUT THAT IS ACCURATE TO WITHIN 6-INCHES.
14. THE GROUTING SHALL BE PERFORMED AT THE PRIMARY INJECTION LOCATIONS SHOWN. THE SEQUENCING/PROGRESSION OF GROUTING FOR THE VARIOUS AREAS/PHASES SHALL BE COORDINATED WITH FIRSTENERGY. ACTUAL GROUT INJECTION LOCATIONS MAY BE MODIFIED IN THE FIELD BASED ON UTILITY CLEARANCE AND EXISTING SITE FEATURES AND DISCUSSION WITH FIRSTENERGY AND THE GROUTING DESIGNER. DEPENDING ON GROUT TAKES AND CONDITIONS ENCOUNTERED, ADDITIONAL (SECONDARY, TERTIARY, ETC.) GROUT INJECTION LOCATIONS WILL BE RECOMMENDED. FOR PRELIMINARY PLANNING PURPOSES, AN ADDITIONAL 60 PERCENT OF SECONDARY/TERTIARY GROUT INJECTION LOCATIONS CAN BE CONSIDERED. THE ACTUAL NUMBER OF SECONDARY/TERTIARY LOCATIONS WILL BE DETERMINED AS THE GROUTING PROGRESSES.
15. GROUT PIPES SHALL GENERALLY BE INSTALLED FROM THE GROUND SURFACE TO AT LEAST 5 FEET INTO ROCK OR A MINIMUM OF 15 FEET, WHICHEVER IS GREATER. GROUT PIPES WITHIN HIGHLIGHTED AREAS SHOWN ON THE PLAN SHALL BE INSTALLED AT LEAST 10 FEET INTO ROCK OR A MINIMUM OF 15 FEET, WHICHEVER IS GREATER.
16. ALL GROUTING OPERATIONS SHALL BE PERFORMED IN THE PRESENCE OF A REPRESENTATIVE OF THE GROUTING DESIGNER. SPECIFIC PROCEDURES SHALL BE DETERMINED BY CONDITIONS ENCOUNTERED AND MAY BE MODIFIED AT ANY TIME BY THE GROUTING DESIGNER AND APPROVED BY FIRSTENERGY.
17. ALL WORK SHALL CONFORM TO THE LATEST EDITION OF FIRSTENERGY'S SPECIFICATION FOR SUBSTATION CONSTRUCTION (SUBSTATION CONSTRUCTION - FE-CONST-1).
18. DURING GROUTING OPERATIONS THE GROUTING CONTRACTOR SHALL PREVENT STORMWATER FROM ENTERING UNGROUTED HOLE LOCATIONS AND LIMIT THE AMOUNT OF UNGROUTED HOLES TO WHAT CAN BE GROUTED WITHIN ABOUT 2 WORKING DAYS.
19. PROPOSED PRIMARY GROUTING LOCATIONS INCLUDED HEREIN ARE BASED ON THE SITE LAYOUT DRAWING SHEET 4 OF 9 TITLED "SITE IMPROVEMENT PLAN - LOT 112A SUBSTATION" DATED 1/16/2023 BY RODGERS CONSULTING. ANY CHANGES TO THE SITE LAYOUT OR FOUNDATION TYPES/LOCATIONS SHALL BE PROVIDED TO KLEINFELDER, WHICH MAY RESULT IN MODIFICATION TO THIS GROUT INJECTION LAYOUT AND GROUTING PROGRAM DESIGN.
20. FIRSTENERGY (OR THEIR GEOTECHNICAL ENGINEER) SHALL REVIEW THE RESULTS OF THE GROUTING PROGRAM AS IT PROGRESSES AND ADJUST/ADD/REMOVE LOCATIONS ACCORDINGLY BASED ON THE CONDITIONS ENCOUNTERED.

LEGEND

- BORING/PROBE LOCATION
- PROPOSED PHASE I TRANSMISSION PRIMARY GROUT INJECTION LOCATION (281)
- PROPOSED PHASE 2 TRANSMISSION PRIMARY GROUT INJECTION LOCATION (105)
- PROPOSED PHASE 3 TRANSMISSION PRIMARY GROUT INJECTION LOCATION (384)
- PROPOSED PHASE 1 DISTRIBUTION PRIMARY GROUT INJECTION LOCATION (117)
- PROPOSED PHASE 2 DISTRIBUTION PRIMARY GROUT INJECTION LOCATION (119)
- PROPOSED ACCESS DRIVE PRIMARY GROUT INJECTION LOCATION (171)
- PROPOSED FENCE LINE PRIMARY GROUT INJECTION LOCATION (130)
- LOCATIONS TO BE INSTALLED AT LEAST 10 FEET INTO ROCK

THE CONTRACTOR IS RESPONSIBLE FOR LOCATING ALL PUBLIC OR PRIVATE UTILITIES WHICH LIE IN OR ADJACENT TO THE CONSTRUCTION SITE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPAIR, AT HIS OR HER EXPENSE, OF ALL EXISTING UTILITIES DAMAGED DURING CONSTRUCTION. FORTY-EIGHT HOURS PRIOR TO ANY EXCAVATION THE CONTRACTOR SHALL CALL MISS UTILITY 811 AT 800-257-7777. ALL EXISTING UTILITY LOCATIONS ARE APPROXIMATE AND SHALL BE FIELD VERIFIED PRIOR TO THE START OF ANY CONSTRUCTION ACTIVITY.

MISS UTILITY 811
Before you dig. Every dig. It's the law.
1-800-257-7777
MARYLAND STATE LAW REQUIRES THAT YOU CALL TWO DAYS BEFORE YOU DIG IN THE STATE OF MARYLAND.

KLEINFELDER
Bright People. Right Solutions.
180 Sheree Drive, Suite 3800
Exton, PA 19341
Phone: 610-594-1444
www.kleinfelder.com

Signed By:

REVISIONS

REV	DESCRIPTION	DSN / DWN	CHK / APP	DATE

ISSUED FOR CONTRACTOR BIDDING

SCALE VERIFICATION

THIS BAR IS 1 INCH IN LENGTH ON ORIGINAL DRAWING

0 — 1"

IF IT'S NOT 1 INCH ON THIS SHEET ADJUST YOUR SCALES ACCORDINGLY

0 — 50 — 100 — 150

SCALE: 1" = 50' SCALE IN FEET

ORIGINAL DRAWING SIZE IS 22 IN. x 34 IN.

PRIMARY GROUT INJECTION LOCATION PLAN

SAGE SUBSTATION
GROUTING PLAN
FREDERICK COUNTY, MARYLAND

FirstEnergy

PRIMARY GROUT INJECTION PLAN

PROJECT NO.	20234867.001A
ISSUE DATE	5/11/2023
CURRENT REVISION	0
DESIGNED BY	BAP
DRAWN BY	BAP
CHECKED BY	JKM
APPROVED BY	JKM

SHEET 1 of 1

1

PLOTTED: 5/11/2023 5:35 PM BY: kyle.simpson
CAD FILE: \\exterfelder.com\shares\EXTON-DATA\GROUPS\Company\Projects\20234867.001A FE Sage Substation Grouting Design And Field Monitoring\CAD\PLANS\SAGE_PLANS.dwg LAYOUT: SITE PLAN

ATTACHMENT 2
COMPACTION GROUTING SPECIFICATIONS

COMPACTION GROUTING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Geotechnical Report:
- "Sage Substation Geotechnical Engineering Report" dated May 2, 2023, prepared by Terracon Consultants, Inc.

B. Substation Plans:
- Drawing PE-1252-14-01 titled "Sage, General Arrangement, Plan View, 230kV-34.5kV Yard with Capacitor Banks" dated 7/29/2022 by Burns & McDonnell.

C. Site Plans:
- Drawing Sheet 4 of 9 titled "Site Improvement Plan – Lot 112A Substation" dated 1/16/2023 by Rodgers Consulting.

D. Grouting Plans:
- Drawing titled "Primary Grout Injection Location Plan – Sage Substation" prepared by Kleinfelder, Inc., dated May 11, 2023.

1.2 SUMMARY

A. This section includes all labor, plant, equipment, materials, and the performance of all operations in connection with mixing grout and injecting the grouting materials to fill voids encountered and to help compact and improve overburden soils to help mitigate the risk of future subsidence at the site.

B. Low mobility grouting is planned in areas of proposed substation structures, fence-line, and portions of proposed access drives associated with the FirstEnergy Sage Substation for karst mitigation purposes. Proposed primary injection locations are shown on the "Primary Grout Injection Location Plan" for Sage Substation. The purpose of the grouting will be to attempt to fill potential voids underneath the substation and improve subsurface conditions to help mitigate the risk of future subsidence in the areas that are improved with grouting. The grouting shall be performed at the primary injection locations shown and the sequencing/progression of grouting for the various phases and areas shall be coordinated with FirstEnergy. Actual grout injection locations may be modified in the field based on utility clearance and existing site features. The amount of grouting to be performed cannot be predicted in advance and will depend upon the conditions encountered as the work proceeds. Depending on grout takes and conditions encountered, additional (secondary, tertiary, etc.) grout injection locations will be recommended. For preliminary planning purposes, an additional 60 percent of secondary/tertiary/etc. grout injection locations can be considered. The actual number and location of secondary/tertiary/etc. locations will be determined as the grouting progresses and may be more or less.

1.3 DEFINITIONS

A. Admixture: Substance added to the grout to control bleed and/or shrinkage, improve flowability, reduce water content, retard setting time, or resist washout.

B. Foundation Engineer: Burns & McDonnell, 9400 Ward Parkway, Kansas City, Missouri 64114.

C. Grouting Designer: Kleinfelder, Inc., 180 Sheree Blvd., Suite 3800, Exton, Pennsylvania

19341.

D. Geotechnical Engineer: Terracon Consultants, Inc., 19955 Highland Vista Drive, #170, Ashburn, Virginia 20147.

E. Grout Take: Grout take is the quantity of grout measured in cubic feet per vertical foot of grout hole at any stage.

F. Injection Riser: The injection riser is a steel pipe, at least two-inch I.D., installed tightly in a drilled hole through which grout is injected.

G. Owner: FirstEnergy, 76 South Main Street, Akron, Ohio 44308.

H. Production Drill Hole: Production drill hole is any boring advanced for the purpose of facilitating grouting.

1.4 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM A 150 – Portland Cement
2. ASTM C 143 – Standard Test Method for Slump of Hydraulic-Cement Concrete
3. ASTM C 109 – Standard Test Method for Compressive Strength of Hydraulic Cement Mortars
4. ASTM C 618 – Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
5. ASTM C 937 – Standard Specification for Grout Fluidifier for Preplaced Aggregate Concrete

1.5 SUBMITTALS

A. Equipment: The Grouting Contractor shall submit descriptions of all equipment to be employed in the work two weeks prior to beginning of the work.

B. References: Provide references to substantiate having successfully completed at least three similar grouting projects of this magnitude in the past two years

C. Work Plan and Grout Mix Design: The Grouting Contractor shall submit a work plan with grout mix design(s), including details of all materials to be incorporated, and the methods and procedures that will be used for drilling holes, installing casing, and mixing and placing the grout to the Owner, Foundation Engineer, and Grouting Designer for review and approval. This submittal shall include certified test results verifying the acceptability of the proposed mix designs including strength testing results. The work plan with the grout mix designs shall be submitted two weeks prior to the beginning of work.

D. Grouting Records: Grouting records shall be maintained by the contractor and submitted weekly for each injection location and shall include:

1. Hole location/number, date drilled, and date grouted.

2. Drilled depth, soil/rock/void conditions encountered during drilling, and casing installation depth.

3. Beginning time, end time, and total time (minutes) of grouting at each location

4. Pumping rate in cubic feet per minute (cfm).

5. Gauge pressures (low/high and final pressure for each stage) (psi).

6. Volume of grout injected for each stage (CF) and total volume injected for each location (CY).

7. Termination criteria used at each stage and location.

8. Any unusual conditions encountered during drilling or grouting.

1.6 QUALIFICATIONS

A. Grouting Contractor Experience: The work shall be performed by a Grouting Contractor regularly specializing in grouting work for karst mitigation and having successfully completed at least three similar compaction grouting projects of this magnitude in the past two years. Provide a full-time grouting superintendent with at least three years' experience in the methods and procedures required by these specifications.

1.7 EXISTING CONDITIONS

A. Geotechnical Report: Geotechnical Borings, Air Track Probes, and an Electrical Resistivity Imaging Geophysical Investigation were performed as part of the geotechnical evaluation for the Sage Substation project by Terracon Consultants, Inc. The locations of the explorations are provided in the geotechnical reports identified in Section 1.1.A of this specification. Approximate locations of the borings and probes are also shown on the Primary Grout Injection Location Plan. The Grouting Contractor shall review the geotechnical reports to form their own conclusions and interpretations of the subsurface conditions at the Site to confirm the appropriateness of their proposed means and methods for completion of the compaction grouting program.

B. Any existing powerlines and substation equipment are to be considered energized at all times. Compliance is required for all National Electric Safety Code (NESC), and Occupational Safety Health Administration (OSHA) safe-working clearances between persons, conductive objects, and energized conductor/substation equipment. The Grouting Contractor is responsible for determining safe-working clearances from any existing conductors and substation equipment.

PART 2 – PRODUCTS

2.1 GROUT MATERIALS

A. Grout: Grout shall be composed of water, cement, and soil or sand with added mineral filler or water reducing agent as required for the work. The grout shall be a low mobility material having a maximum slump of three inches in accordance with ASTM C 143, measured at the pump hopper, and a high internal shear.

B. Water: Water for mixing grout shall be potable and shall be supplied by the grouting Contractor. Wash water shall not be reused as mix water.

C. Cement: Cement used in grout shall conform to the requirements of ASTM C 150, Type I or II Portland cement.

D. Sand/Soil: If used, soil for grout shall be composed of natural silty sand having a plasticity index of less than 10, less than 20 percent by weight passing the No. 200 sieve, and 100 percent passing the No. 4 sieve. The shape of the particles shall be generally rounded or cubical. If the sand is a combination of separately processed sizes or classification, the different components may be batched separately, or blended prior to delivery to the mixing plant. The sand may consist of a clean commercially available concrete sand with mineral fillers added in lieu of silt.

E. Mineral Filler: Mineral filler required for grouting shall be fly ash or other pozzolanic materials conforming to the requirements of ASTM C 618.

F. Water Reducing Agent: Water reducing agent shall be a compound possessing characteristics which will increase the flowability of the mixture, assist in dispersal of the cement grains, and neutralize the setting shrinkage of the grout. The material shall meet the requirements specified in ASTM C 937. Bentonite or other clays may not be used as a fluidifier.

G. Pea Gravel: If used, pea gravel shall consist of mineral aggregates of crushed or natural stones being retained between the ¼- and ½-inch sieves.

2.2 DELIVERY, STORAGE AND HANDLING

A. Cement: A sufficient quantity of cement shall be stored at or near the work site to ensure that grouting operations will not be delayed by cement shortages. In the event the cement is found to contain lumps or foreign matter of a nature and in amounts which may be deleterious to the grouting operations, screening through a standard 100-mesh screen may be required. No payment will be made for such screening. All cement shall be stored at temperatures above freezing.

B. Sand or Soil: The use of bulk sand or soil will be permitted provided the Grouting Contractor provides methods of handling, transporting, and storing that are satisfactory to the Grouting Designer; otherwise, only sand furnished in cloth or paper bags will be accepted for use in the work. A sufficient quantity of sand shall be stored at or near the site of the work to ensure that grouting operations will not be delayed by a shortage of sand or soil. In the event the sand or soil is found to contain foreign matter in amounts which may be deleterious to the grouting operations, screening through a Standard No. 4 sieve screen may be required. No payment will be made for such screening. Sand shall be stored at temperatures above freezing.

C. Mineral Filler: The use of bulk mineral filler will be permitted provided the Grouting Contractor uses methods of handling, transporting, and storing that are satisfactory to the Grouting Designer; otherwise, only mineral filler furnished in cloth or paper bags will be accepted for use. A sufficient quantity of mineral filler shall be stored at or near the site of the work so that grouting operations will not be delayed by shortages.

D. Reducing Agent: The use of a water reducing agent will be permitted provided the Grouting Contractor uses methods of handling, transporting, and storing that are satisfactory to the Grouting Designer. A sufficient quantity of water reducing agent shall be stored at or near the site of work to ensure that grouting operations will not be delayed by shortage of this material. All other admixtures must be approved by the Grouting Designer.

E. Ready-Mix Grout: The use of ready-mix grout will be permitted provided the quality of the materials utilized by the supplier meet those described above, and the delivered product meets the strength, consistency, etc., requirements specified in this document. Available quantities and timing of delivery of ready-mix grout shall be such that grouting production is not delayed and any grout hole that is lost due to inadequacy of grout supply shall be replaced by another hole, drilled, and grouted by the Grouting Contractor at his expense. Grout batch tickets will not be considered an adequate measure of material volume injected into the ground for payment purposes.

2.3 EQUIPMENT

A. General: All drilling and grouting equipment used shall be of a type, capacity, and mechanical condition suitable for doing the work, as described in the following paragraphs. The equipment, and the layout thereof, shall meet all applicable requirements of local, state and federal regulations and codes. The Grouting Contractor shall submit an equipment list at least two weeks prior to mobilization, specifying the manufacturer, model, type, and capacity of all equipment to be used. The Grouting Contractor shall demonstrate that the mechanical condition of the equipment is satisfactory in the presence of the Grouting Designer at the job site. If during the course of grouting the Grouting Designer determines that any piece of equipment is not operating satisfactorily, it shall be removed and replaced with satisfactory equipment. Responsibility for safety and maintenance of the equipment shall belong solely to the Grouting Contractor.

B. Pump: One positive displacement pump, piston-type with a relatively constant output, capable of injecting stiff soil cement grout at controllable rates from 0.5 cfm to 10.0 cfm at pressures up to 600 psi or more measured at the top of the grout pipe riser. The pump shall be calibrated by pumping into a container of known volume of at least one cubic foot or larger. The Grouting Contractor will provide equipment for the calibration and shall perform calibration at the start of the work and at other times as requested by the Grouting Designer. Calibration shall be performed at least once a week for each pump utilized.

C. Pressure Gauges: Calibrated pressure gauges with capacities of 0 to 600 psi shall be provided. Sufficient number of each shall be provided to cover replacement and recalibration without any delay in work. All gauges shall have a minimum face diameter of three inches. Calibration certificates for each gauge shall be submitted or a master gauge with certification shall be provided on site to calibrate each gauge before use. Gauges shall be provided at both the pump and the grout pipe riser. Gauge setups shall be such that they can be easily read by the Grout Designer and shall in no case be greater than 10 ft above the ground surface during pumping.

D. Other Items: Other items necessary for drilling and grouting, including drill rigs, casings, pressure hose piping, valves, fittings, gauge savers, and other incidentals necessary to accomplish the work, shall be provided by the Grouting Contractor.

E. Grout Plant: Grout plant shall be capable of supplying, mixing, stirring, pumping, and delivering the grout to the satisfaction of the Grouting Designer. Plant shall be maintained in good operating condition at all times, and any grout hole that is lost or damaged due to mechanical failure of equipment or inadequacy of grout supply shall be replaced by another hole, drilled, and grouted by the Grouting Contractor at his expense. The minimum grouting equipment to be furnished shall include one mechanically driven, screw or pug mill type grout mixer capable of effectively mixing and stirring stiff soil-cement grout having a slump of three inches or less. The mixing equipment shall be capable of continuously metering quantities of materials in the grout mix. Alternately, a batch mixer may be used where quantities of materials are measured and blended into each batch. The mixer shall have a means of dispensing stiff soil-cement grout directly to the grout pump.

F. Personal Protective Equipment (PPE): All on site personnel will be required to adhere to FirstEnergy and OSHA standards for required PPE. Refer to the latest edition of FirstEnergy Utilities/FirstEnergy Transmission Contractor Safety Requirements.

2.4 MIXES

A. Grout Mixes: Mixes shall be in the proportions contained in the approved mix design or as modified in the field with the approval of the Grouting Designer. The grout shall be soil/sand-cement consisting of cement, soil/sand, and water. Mineral filler and fluidifier shall be added as needed to improve pumpability while maintaining slump and strength requirements.

B. Mix Proportions: The constituents of the grout mix may be varied to include any or all of the constituents, to achieve a pumpable low mobility, low slump mix. The grout shall generally have a slump of three inches or less as measured at the pump hopper. Three-eighths inch pea gravel may be added to the grout where open voids are encountered.

The grout shall have a minimum 28-day compressive strength of 500 psi and maximum 28-day compressive strength of 2,000 psi in accordance with ASTM C 109.

2.5 MEASURING EQUIPMENT

A. Grout Measurement: Suitable equipment for performing accurate and rapid measurements of grout quantities injected, and quantities of water, soil/sand, cement, and additives used for mixing, shall be provided. The Grouting Contractor is responsible for accurately producing mixes confirmable by the Grouting Designer. All measurement systems and equipment must meet with the approval of the Grouting Designer. Measurement equipment shall be capable of measuring grout quantities to the nearest 0.25 cubic foot. Final grout measurements for payment shall only include grout injected into the ground for filling of voids and soil compaction/improvement. Total quantities will be calculated based on the Grouting Designer's field log(s). It will be the responsibility of the Grouting Contractor to confirm with the Grouting Designer at the end of the day, or completion of each hole, the grout quantities injected in each hole.

B. Movement Monitoring: Grouting Contractor shall provide equipment necessary to readily detect movements (vertically) of the ground surface and any existing nearby structures (vertically and horizontally). A minimum of two measuring instruments shall be provided by the Contractor for monitoring during the grouting operation. Monitoring instruments should be targeted on nearby structures or the ground surface in close proximity to the grouting injection location. Equipment used to measure movement shall be accurate to within 1/8 of an inch. In no case shall grouting proceed when monitoring devices are not in place and functioning. The instruments shall be easily read or have audible alarms to provide immediate feedback on any movements detected. Responsibility for safety and use of the monitoring equipment shall belong solely to the Grouting Contractor.

PART 3 – EXECUTION

3.1 GENERAL GROUTING PLAN

A. The grouting Contractor shall take precautions to avoid damaging existing site features including any underground utilities or structures.

B. Compliance is required for all FirstEnergy, National Electric Safety Code (NESC) and Occupational Safety Health Administration (OSHA), or more stringent codes for safe-working clearances between persons, conductive objects, and energized equipment. It is the responsibility of the Grouting Contractor to ensure that all their equipment and on-site

personnel comply with minimum approach distances at all times.

C. All work shall be performed in accordance with the latest edition of FirstEnergy Utilities / FirstEnergy Transmission Contractor Safety Requirements.

D. The grouting Contractor is responsible for locating all buried utilities and other structures which may lie in or adjacent to the grouting area. The Grouting Contractor shall be responsible for the repair, at his or her expense, of all existing utilities or structures damaged during grouting. Utility clearance by the Grouting Contractor may also include geophysical methods (Ground Penetrating Radar, electromagnetic scanning, etc.) used to help identify/clear private utilities and structures that may be present in the work areas. Soft-dig techniques may also be used by the Grouting Contractor to provide additional utility clearance at their discretion.

E. Layout of the grout injection locations is the responsibility of the Grouting Contractor. The surveyed layout shall be accurate to within 6-inches. Actual grout injection locations may be modified in the field based on utility clearance and existing site features.

F. Grout pipes for the majority of the locations shall be installed from the ground surface to at least 5 feet into rock or a minimum of 15 feet below grade, whichever is greater. See the Primary Grout Injection Location Plan for highlighted areas where grout pipes shall be installed from the ground surface to at least 10 feet into rock or a minimum of 15 feet below grade, whichever is greater. The total depths of drill holes may be adjusted based on the subsurface conditions encountered and recommendations from the Grouting Designer.

G. Depending on conditions during grouting, pressure grouting shall generally be performed in 1-foot stages from the bottom up to a level of 5 feet below the ground surface.

Each stage should meet the termination criteria presented below before raising the grout pipe one foot and beginning the subsequent stage. Grout injection rates shall not exceed 5 cfm. The termination criteria may be adjusted based on conditions encountered and the recommendation of the Grouting Designer.

Stage Termination Criteria

- **Volume Cutoff**: 27 cubic feet injected at 120 psi or less
- **Pressure Volume**: 5 cubic feet injected between 120 to 500 psi
- **Limiting Pressure**: Grout flow ceases at an injection pressure greater than 500 psi
- **Observed Grout**: Grout exits at the injection hole around the casing
- **Ground Heave**: Any measured ground heave

H. Each injection site may be terminated if one of the following occurs:

Injection Site Termination

- All stages are successfully completed, and the depth of the last injection stage meets the depth requirement outlined in 3.1.G.
- **Ground Heave**: Total measured heave at ground surface shall be limited to 0.5 inch.
- **Structural Movement**: Any measured movement of existing structures.
- **Observed Grout**: Grout daylights through the subsurface somewhere other than at the injection location.

I. All grouting operations shall be performed in the presence of a representative of the Grouting Designer. Specific procedures shall be determined by conditions encountered and may be modified at any time by the Grouting Designer.

J. The Grouting Contractor and Grout Designer shall maintain logs of drilled depths and grout

injections in each stage including pressures, grout takes, and termination criteria for each location grouted.

3.2 QUALITY CONTROL

A. General: The Grouting Contractor shall establish and maintain quality control for all operations to assure compliance with contract requirements and maintain records of his quality control for all operations. The Grouting Contractor shall assure that satisfactory grouting equipment is provided and kept in good mechanical condition, that he complies with all requirements of the specifications, and that he provides protection to all existing structures, and proper clean-up of work areas.

END OF SECTION

Appendix E

Substation Dewatering Analysis Memo

19955 Highland Vista Dr Ste 170
Ashburn, VA 20147
P (703) 726-8030
Terracon.com

December 12, 2023

First Energy Corp.
10802 Bower Ave.
Williamsport, MD 21795

Attn: Mr. Justin Walter
P: (301) 660-1418
E: jwalter@firstenergycorp.com

Re: Sage Substation Foundation Dewatering Analysis
5601 Manor Woods Road
Frederick County, MD
Terracon Project No. JD235372
Purchase Order No. PO48096737

Dear Mr. Walter:

Terracon Consultants, Inc. (Terracon) has completed dewatering analysis in general accordance with our Proposal, dated November 22, 2023. This analysis report summarizes the basis of design, assumptions, references and analysis supporting the volume of estimated groundwater flow into open bored drilled shafts during foundation construction.

We appreciate the opportunity to provide engineering services to First Energy Corp. Should you have any questions or require additional information, please do not hesitate to contact us.

Sincerely,
Terracon Consultants, Inc.

Gregg V. Piazza, P.E.
Senior Associate

Linna Duan, P.E.
Senior Engineer

Reviewed by Darrell Wilder - APR

19955 Highland Vista Dr Ste 170
Ashburn, VA 20147
P (703) 726-8030
Terracon.com

December 11, 2023

Re: Sage Substation Foundation Dewatering Analysis
5601 Manor Woods Road
Frederick County, MD
Terracon Project No. JD235372

Design Summary and Notes:

Objective: Analyze and estimate groundwater seepage flow rate and water volume into open bored drilled shafts for substation foundations for Maryland Department of the Environment permitting.

Available information used in our design:

- Sage Substation Geotechnical Engineering Report (GER) by Terracon, dated May 2, 2023. U.S.
- Site and Foundation Plans by Burns & McDonnel.
- Karst Mitigation Grouting Design Summary, Sage Substation Frederick, MD by Kleinfelder, dated May 12, 2023

Assumptions:

- The site will be graded to foundation subgrade elevation prior to commencing foundation construction.
- Karst grouting mitigation will be performed prior to installing drilled shafts.
- Drilled shafts will be open bored excavations through soil, rock and grouted rock strata.
- Soil and rock permeabilities are assumed, based on published values and references.
- Grout permeability is based on information provided by Kleinfelder.
- Selected soil permeabilities are based on in-situ soil conditions as described in the GER and discounts any improvement or densification from grouting; this is conservative.
- Grout is assumed to fill air and water filled voids in the rock strata, but not soil filled voids; this is conservative.
- Soil filled voids in rock are assumed to be permeable sand and gravel; this is conservative.
- Drilled shafts that are not socketed into rock and generally less than 30 ft deep are assumed to be completed within 24 hours.
- Drilled shafts that are rock socketed and up to 50 ft deep may take up to 72 hours to complete.

Design References and SEEP/W Input Parameters:

See Appendices B, C and D.

Basis of Design:

Terracon overlayed the boring location and foundation plans onto the site plan in order to correlate drilled shafts to subsurface conditions. Drilled shaft foundations were then compared to the nearest borings using subsurface profiles and boring logs in the GER. Based on our review, we narrowed down

the number of foundations for analysis, based on what we judged to be the most conservative cases. These cases included:

1. Drilled shaft foundations Type A at Boring P-24.
2. Drilled shaft foundations Type A at Boring P-29.
3. Drilled shaft foundations Type B at Boring B-06.

Type A drilled shafts are 7’ dia. X 50’ long w/ minimum 8’ rock socket.
Type B drilled shafts are 6’ dia. X 48’ long w/ minimum 6’ rock socket.

Seepage analysis was performed using the 2D finite element software SEEP/W, which models groundwater flow in porous media. We modeled a single element drilled shaft as an open bored excavation at each of the three cases described above. Based on soil stratigraphy, permeability and groundwater elevation, the seepage flow rate into each shaft was determined and volume of water computed based on the diameter and depth of the drilled shaft. Calculation flow rate results are provided in both cubic feet/second (cfs) and gallons per minute (gpm) and shown in cubic feet and gallons over time on the summary tables and graphs in Appendix A. We plotted the total volume of seepage water into each shaft over time from 0 to 72 hours, assuming drilled shafts will be filled with tremie concrete within that timeframe.

Results:

Based on our analysis, Case 1 at Boring P-24 produced the highest flow rate (0.002 cfs/0.91 gpm). and total volume of water over time. Case 3 at Boring B-06 was similar producing a flow rate of 0.0018 cfs/0.79 gpm. Case 2 produced a flow rate of 0.0004 cfs/0.19 gpm. The results of all three cases are shown in Appendix A.

Limitations:

Subsurface conditions at the site are highly variable. Terracon’s analysis was meant to estimate water volumes for the most conservative conditions. Our analysis does not account for potential infiltration water into open bored shafts or for the design of shaft dewatering during construction.

Attachments:

1. Appendices A, B, C, D.

APPENDICES

Appendix A – Summary Tables and Graphs: Flow rate and total water volume over time into selected drilled shaft foundations.

Appendix B – Cases 1,2 & 3 analysis sections and soil parameters.

Appendix C – Seep/W drilled shaft seepage analysis input parameters.

Appendix D – Analysis reference drawings.

Appendix A
Summary Tables and Graphs

PROJECT: Sage Substation Foundation Dewatering Analysis
JOB NO.:JD235372
DATE: 12/11/2023

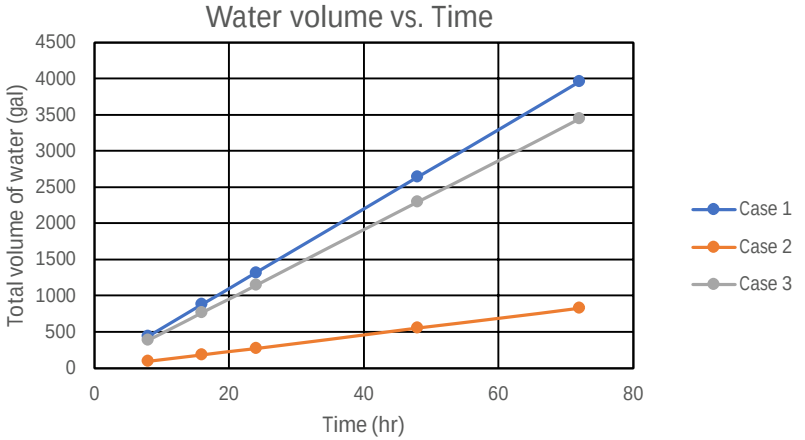
COMP BY: LD
CHECKED BY: GP

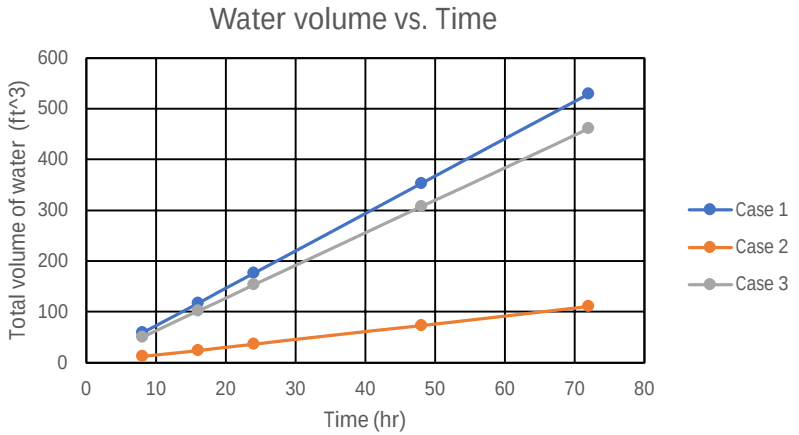
Summary Tables and Graphs: flow rate and total water volume over time into selected drilled shaft foundations

Case 1	Flow rate into shaft				Total volume of water flow over time (hr)				
P-24 (Shaft A)	Flow rate (ft^2/s/ft)	Length (ft)	flow rate (ft^3/s)	flow rate (gpm)	8	16	24	48	72
Side of the shaft	9.25E-05	21.99	2.03E-03	0.91	438.31	876.62	1314.94	2629.87	3944.81
Bottom of the Shaft	1.66E-06	5.50	9.12E-06	4.09E-03	1.96	3.93	5.89	11.79	17.68
Total volume (gal)	-	-	-	-	440	881	1321	2642	3962
Total volume (ft^3)	-	-	-	-	59	118	177	353	530

Case 2	Flow rate into shaft				Total volume of water flow over time				
P-29 (Shaft A)	Flow rate (ft^2/s/ft)	Length (ft)	flow rate (ft^3/s)	flow rate (gpm)	8	16	24	48	72
Side of the shaft	1.90E-05	21.99	4.17E-04	0.19	89.82	179.64	269.46	538.92	808.37
Bottom of the Shaft	1.80E-06	5.50	9.88E-06	4.43E-03	2.13	4.26	6.39	12.77	19.16
Total volume (gal)	-	-	-	-	92	184	276	552	828
Total volume (ft^3)	-	-	-	-	12	25	37	74	111

Case 3	Flow rate into shaft				Total volume of water flow over time (hr)				
B-6 (Shaft B)	Flow rate (ft^2/s/ft)	Length (ft)	flow rate (ft^3/s)	flow rate (gpm)	8	16	24	48	72
Side of the shaft	9.38E-05	18.85	1.77E-03	0.79	381.02	762.05	1143.07	2286.14	3429.21
Bottom of the Shaft	1.76E-06	4.71	8.30E-06	3.72E-03	1.79	3.57	5.36	10.72	16.09
Total volume (gal)	-	-	-	-	383	766	1148	2297	3445
Total volume (ft^3)	-	-	-	-	51	102	154	307	461





Appendix B

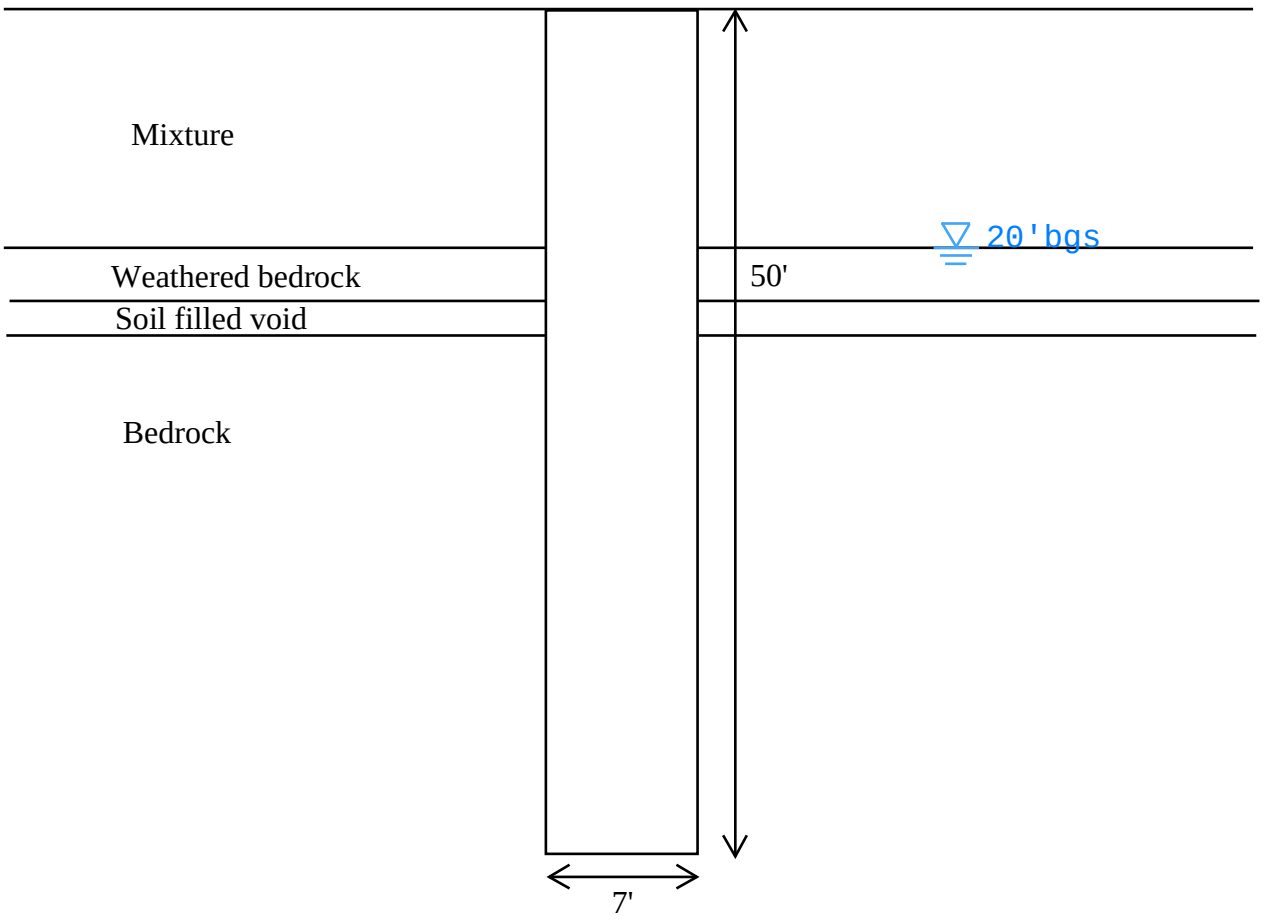
Cases 1,2 & 3 analysis sections and soil parameters

PROJECT: Sage Substation Foundation Dewatering Analysis
JOB NO.:JD235372
DATE: 12/11/2023

COMP BY: LD
CHECKED BY: GP

NOTES:
1. See GER for subsurface profiles and boring logs.
2. See Appendix C for SEEP/W input parameters and references.

Case 1 Shaft A (7'dia x 50')
Reference Boring P-24



Layer	Soil	Thickness (ft)	Kx (ft/s)	Ky/Kx ratio	Vol. water content	Compressibility (/psf)
1	Mixture	20	1.30E-05	0.25	0.3	7.02E-07
2	Weathered bedrock	3	5.30E-07	0.1	0.3	2.06E-09
3	Soil filled void	1	3.24E-04	0.25	0.3	7.02E-07
4	Bedrock	-	3.57E-07	0.1	0.15	1.03E-09

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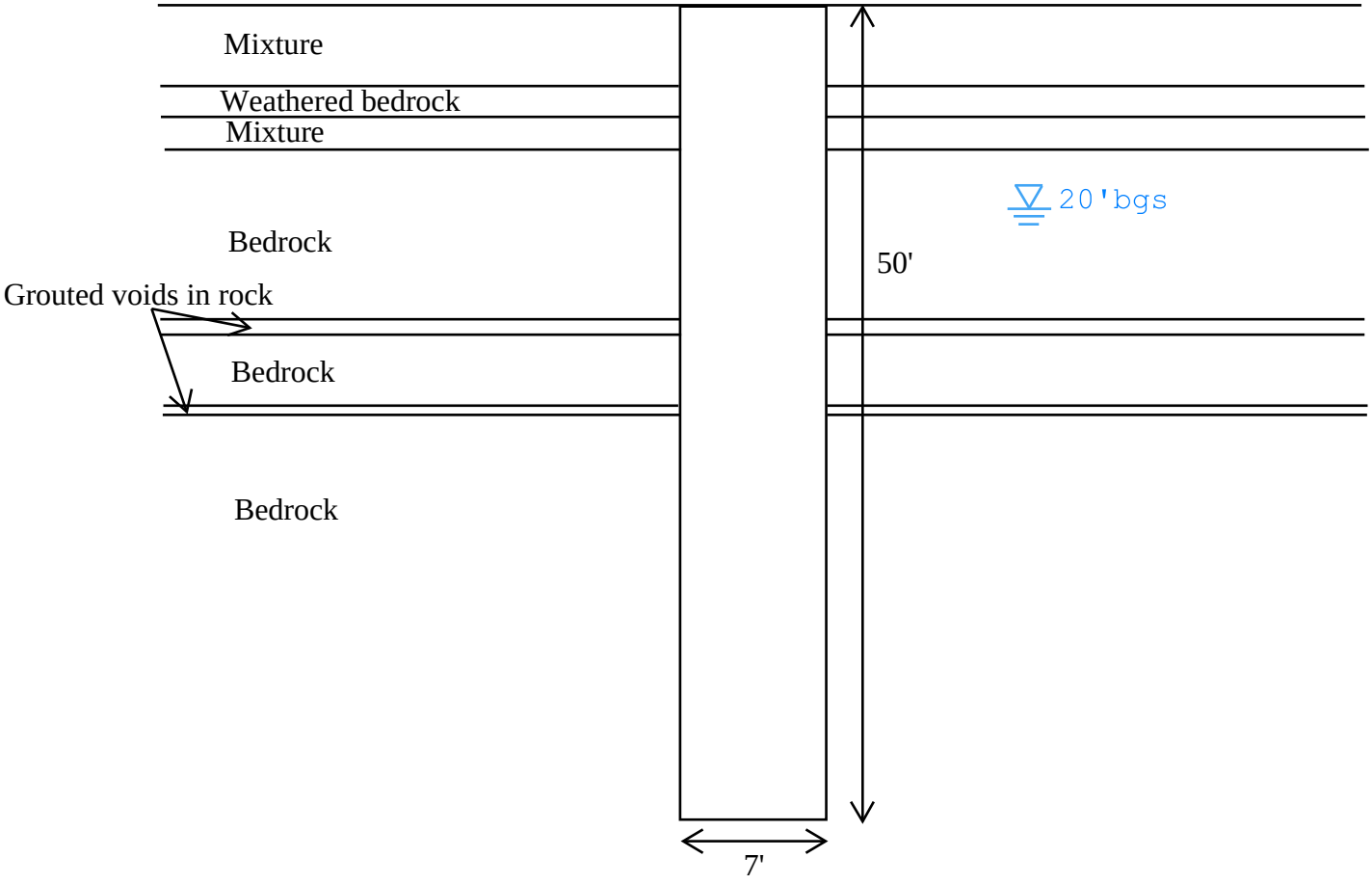
DATE: 12/11/2023

COMP BY: LD
CHECKED BY: GP

Case 2 Shaft A (7'dia x 50')
Reference Boring P-29



Layer	Soil	Thickness (ft)	Kx (ft/s)	Ky/Kx ratio	Vol. water content	Compressibility (/psf)
1	Mixture	7	1.30E-05	0.25	0.3	7.02E-07
2	Weathered bedrock	1	5.30E-07	0.1	0.3	2.06E-09
3	Mixture	1	1.30E-05	0.25	0.3	7.02E-07
4	Bedrock	24	3.57E-07	0.1	0.15	1.03E-09
seam	Grout	1	3.28E-12	0.1	0.05	1.03E-09
4	Bedrock	6	3.57E-07	0.1	0.15	1.03E-09
seam	Grout	0.2	3.28E-12	0.1	0.05	1.03E-09
4	Bedrock	-	3.57E-07	0.1	0.15	1.03E-09

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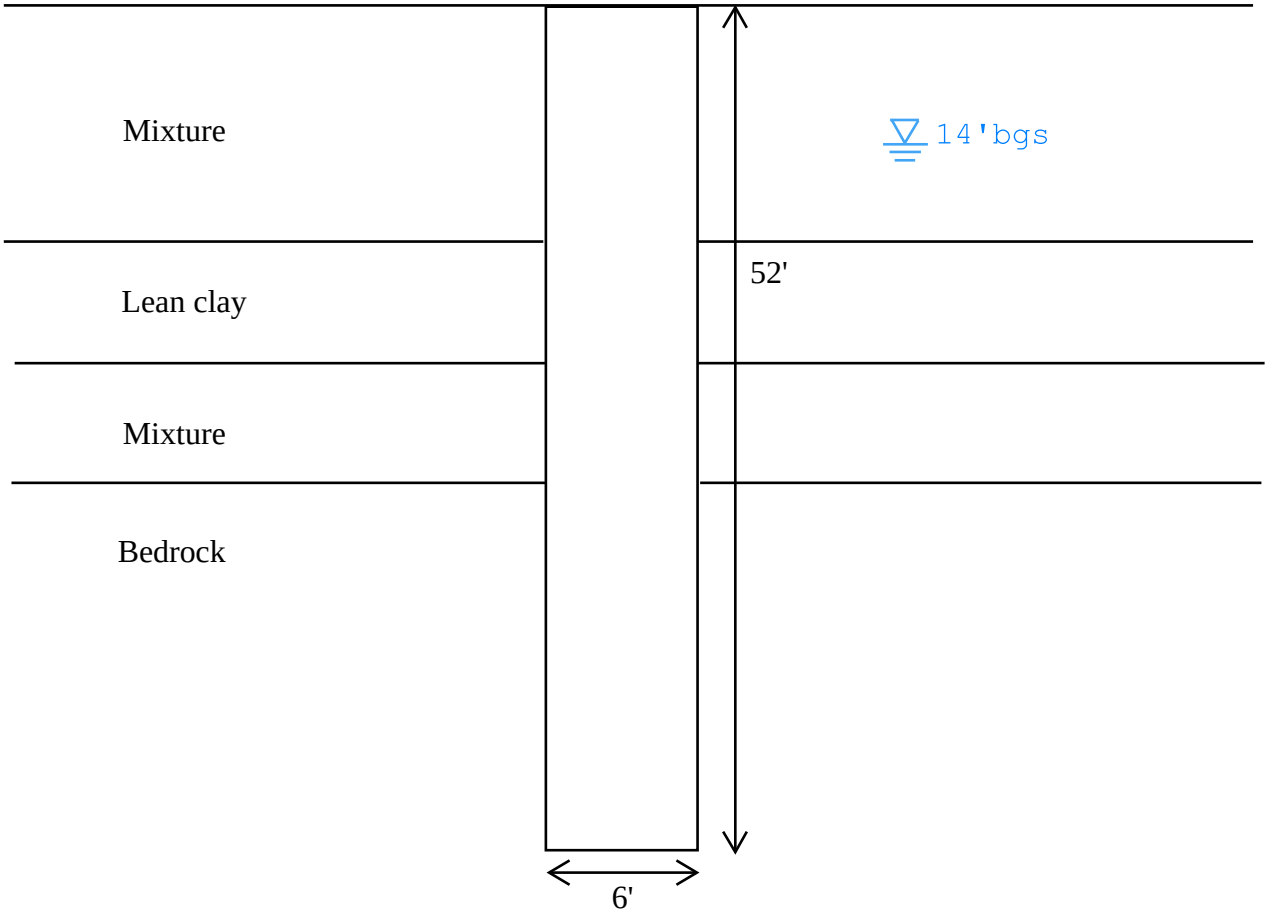
DATE: 12/11/2023

COMP BY: LD
CHECKED BY: GP

Case 3 Shaft B (6'dia x 52')
Reference Boring B-06



Layer	Soil	Thickness (ft)	Kx (ft/s)	Ky/Kx ratio	Vol. water content	Compressibility (/psf)
1	Mixture	24.5	1.30E-05	0.25	0.3	7.02E-07
2	Lean clay	10	3.24E-07	0.25	0.5	8.78E-06
3	Mixture	11	1.30E-05	0.25	0.3	7.02E-07
4	Bedrock	-	3.57E-07	0.1	0.15	1.03E-09

Appendix C

Seep/W drilled shaft seepage analysis input parameters

PROJECT: Sage Substation
JOB NO. JD235372
DATE: 12/11/2023

COMP BY: LD
CHECKED BY: GP

SEEP/W DRILLED SHAFT SEEPAGE ANALYSIS INPUT PARAMETERS
(SEEP/W Model available upon request)

Soil Design Parameters

Mixture soil permeability: $k := 1.12\ \frac{ft}{day} = (1.3 \cdot 10^{-5})\ \frac{ft}{s}$ Ky/Kx Ratio = 0.25

(Based on sieve analysis results for B-10, fine contents are 12.5%, 63.5%, 76.2%, and 16.7%, with an average of 42%, with a majority granular of gravel)

Lean clay permeability: $k := 0.028\ \frac{ft}{day} = (3.24 \cdot 10^{-7})\ \frac{ft}{s}$ Ky/Kx Ratio = 0.25

Shaly limestone Permeability: assume porosity $n := 15\%$ for shaly limestone (USGS report)

Use class 2 $k := \frac{2.04\ 10^{6} \cdot (n)^{6.38}}{0.36648 \cdot 1000} \cdot \frac{ft}{day} = (3.57 \cdot 10^{-7})\ \frac{ft}{s}$

(https://www.beg.utexas.edu/lmod/_IOL-CM07/cm07-step02a.htm)

PWR permeability: assume porosity $n := 30\%$ for medium crystalline Trenton Limestone (USGS report)

Use class 3 $k := \frac{2.884\ 10^{3} \cdot (n)^{4.275}}{0.36648 \cdot 1000} \cdot \frac{ft}{day} = (5.3 \cdot 10^{-7})\ \frac{ft}{s}$ Ky/Kx Ratio = 0.1

Soil filled void permeability: $k := 28\ \frac{ft}{day} = (3.24 \cdot 10^{-4})\ \frac{ft}{s}$ Ky/Kx Ratio = 0.25

Grout: $k := 10^{-10}\ \frac{cm}{s} = (3.28 \cdot 10^{-12})\ \frac{ft}{s}$ Ky/Kx Ratio = 0.1

References:

1. Soil permeability: Table E-1 - Hydraulic Conductivity Values by Kleinfelder, adapted from Terzaghi and Peck (1967), Freeze and Cherry (1979) and Cedergren (1967).
2. Limestone and PWR permeability: Bureau of Economic Geology: Estimating Permeability in Carbonates Using the Rock-Fabric Method (F. Jerry Lucia)
3. Grout permeability: Kleinfelder email to Burns and McDonnell, dated December 6, 2023.
4. Soil porosity: NAVFAC (Design Manual) DM 7.1 Soil Mechanics, Table 6.
5. Limestone and PWR porosity: USGS
6. Soil and Rock Constraint and Elastic Modulus Values: EPRI Manual on Estimating Soil Properties for Foundation Design.

PROJECT: Sage Substation
JOB NO. JD235372
DATE: 12/11/2023

COMP BY: LD
CHECKED BY: GP

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Table E-1. Hydraulic Conductivity Values

Material Type	Soil Description	Kh (Kx in SEEP/W)		Kv/Kh (Ky/Kx Seep/w)	Resulting Kv (Ky in SEEP/W)	
		cm/s	ft/day		cm/s	ft/day
Low to Medium Plasticity CLAY	Clay core	10^{-6}	0.0028	1	10^{-6}	0.0028
	Clay fill	10^{-5}	0.028	1	10^{-5}	0.028
	Weathered clay blanket 3 ft thick	10^{-5}	0.028	0.25 - 100	10^{-3}	2.8
	Weathered clay blanket 4 to 10 ft thick	10^{-5}	0.028	0.25 - 10	10^{-4}	0.28
	Weathered clay blanket >10 ft thick	10^{-5}	0.028	0.25	$2.5x10^{-6}$	0.007
	Unweathered clay at depth	10^{-6}	0.028	0.1	10^{-6}	0.0028
SILT	Silt fill (mechanically placed)	10^{-4}	0.28	1	10^{-4}	0.28
	Silt fill (hydraulically placed)	$8x10^{-4}$	2.24	1	$8x10^{-4}$	2.24
	86 to 100% fines	$2x10^{-4}$	0.56	1	$2x10^{-4}$	0.56
	Silt with sand, 71 to 85% fines	$2x10^{-4}$	0.56	1	$2x10^{-4}$	0.56
	Sandy silt, 50 to 70% fines	$2x10^{-4}$	0.56	1	$2x10^{-4}$	0.56
SAND and SILTY SAND	Sand fill (mechanically placed)	--	--	1	--	--
	Sand fill (hydraulically placed)	--	--	0.125	--	--
	0 to 2% silt	10^{-2}	28	0.25	$2.5x10^{-3}$	7
	3 to 7% silt	$5x10^{-3}$	14	0.25	$1.25x10^{-3}$	3.5
	8 to 12% silt	10^{-3}	2.8	0.25	$2.5x10^{-4}$	0.7
	13 to 27% silt	10^{-3}	2.8	0.25	$2.5x10^{-4}$	0.7
	28 to 49% silt	$4x10^{-4}$	1.12	0.25	10^{-4}	0.28
SAND and CLAYEY SAND	Sand fill (mechanically placed)	--	--	1	--	
	Sand fill (hydraulically placed)	--	--	0.125	--	
	0 to 2% clay	$5x10^{-3}$	14	0.25	$1.25x10^{-3}$	3.5
	3 to 7% clay	10^{-3}	2.8	0.25	$2.5x10^{-4}$	0.7
	8 to 12% clay	10^{-3}	2.8	0.25	$2.5x10^{-4}$	0.7
	13 to 27% clay	$4x10^{-4}$	1.12	0.25	10^{-4}	0.28
	28 to 49% clay	--	--	0.25	--	--
GRAVEL	0 to 2% fines	$2.5x10^{-2}$	70	0.1	$2.5x10^{-3}$	7
	3 to 7% fines	$2.5x10^{-2}$	70	0.1	$2.5x10^{-3}$	7
	8 to 12% fines	$1.2x10^{-2}$	35	0.1	$1.2x10^{-3}$	3.5
	13 to 17% fines	$6x10^{-3}$	18	0.1	$6x10^{-4}$	1.8
	18 to 27% fines	10^{-3}	2.8	0.25	$2.5x10^{-4}$	0.7
	28 to 49% fines	$4x10^{-4}$	1.12	0.25	10^{-4}	0.28

(Kleinfelder Hydraulic Conductivity Values adapted from Terzaghi and Peck(1967), Freeze and Cherry (1979), and Cedergren (1967))

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CHECKED BY: GP

Soil Constraint Modulus:

Mixture soil Elastic Modulus: $E := 500 \cdot atm = 7347.97\ psi$ $\quad \nu := 0.3$

Constraint Modulus: $M := \frac{E \cdot (1 - \nu)}{(1 + \nu)(1 - 2 \cdot \nu)} = 9891.5\ psi$ $\quad \frac{1}{M} = (7.02 \cdot 10^{-7})\ \frac{1}{psf}$

Lean clay Elastic Modulus: $E := 40 \cdot atm = 587.84\ psi$ $\quad \nu := 0.3$

Constraint Modulus: $M := \frac{E \cdot (1 - \nu)}{(1 + \nu)(1 - 2 \cdot \nu)} = 791.32\ psi$ $\quad \frac{1}{M} = (8.78 \cdot 10^{-6})\ \frac{1}{psf}$

Bedrock Elastic Modulus: $E := 5000\ ksi$ $\quad \nu := 0.3$

Constraint Modulus: $M := \frac{E \cdot (1 - \nu)}{(1 + \nu)(1 - 2 \cdot \nu)} = (6.73 \cdot 10^{6})\ psi$ $\quad \frac{1}{M} = (1.03 \cdot 10^{-9})\ \frac{1}{psf}$

PWR Elastic Modulus: $E := 2500\ ksi$ $\quad \nu := 0.3$

Constraint Modulus: $M := \frac{E \cdot (1 - \nu)}{(1 + \nu)(1 - 2 \cdot \nu)} = (3.37 \cdot 10^{6})\ psi$ $\quad \frac{1}{M} = (2.06 \cdot 10^{-9})\ \frac{1}{psf}$

Table 5-2

TYPICAL RANGES OF UNDRAINED MODULUS FOR CLAY

Consistency	Normalized Undrained Modulus, E_u/p_a
soft	15 to 40
medium	40 to 80
stiff	80 to 200

Table 5-5

TYPICAL RANGES OF DRAINED MODULUS FOR SAND

Consistency	Normalized Elastic Modulus, E_d/p_a	
	Typical	Driven Piles[a]
loose	100 to 200	275 to 550
medium	200 to 500	550 to 700
dense	500 to 1000	700 to 1100

a - Source: Poulos (17), p. 207.

Table 5-1

TYPICAL RANGES OF DRAINED POISSON'S RATIO

Soil	Drained Poisson's Ratio, ν_d
Clay	0.2 to 0.4
Dense sand	0.3 to 0.4
Loose sand	0.1 to 0.3 .

(EPRI Manual on Estimating Soil Properties for Foundation Design)

PROJECT: Sage Substation
JOB NO. JD235372
DATE: 12/11/2023

COMP BY: LD
CHECKED BY: GP

Table 2-4. Typical range of values for Poisson's ratio μ

Type of soil	μ
Clay, saturated	0.4–0.5
Clay, unsaturated	0.1–0.3
Sandy clay	0.2–0.3
Silt	0.3–0.35
Sand (dense)	0.2–0.4
Coarse (void ratio = 0.4–0.7)	0.15
Fine-grained (void ratio = 0.4–0.7)	0.25
Rock	0.1–0.4 (depends somewhat on type of rock)
Loess	0.1–0.3
Ice	0.36
Concrete	0.15

(Bowles Soil Mechanics in Foundation Engineering)

Soil Porosity:

Lean clay: $n_s := 0.5$ Clay from NAVFAC DM7.1 Table 6, average porosity = 50%

Mixture soil: $n_s := 0.3$ Assume medium silty sand from NAVFAC DM7.1 Table 6, average porosity = 30%

Grout: $n_s := 0.05$

PROJECT: Sage Substation
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CHECKED BY: GP

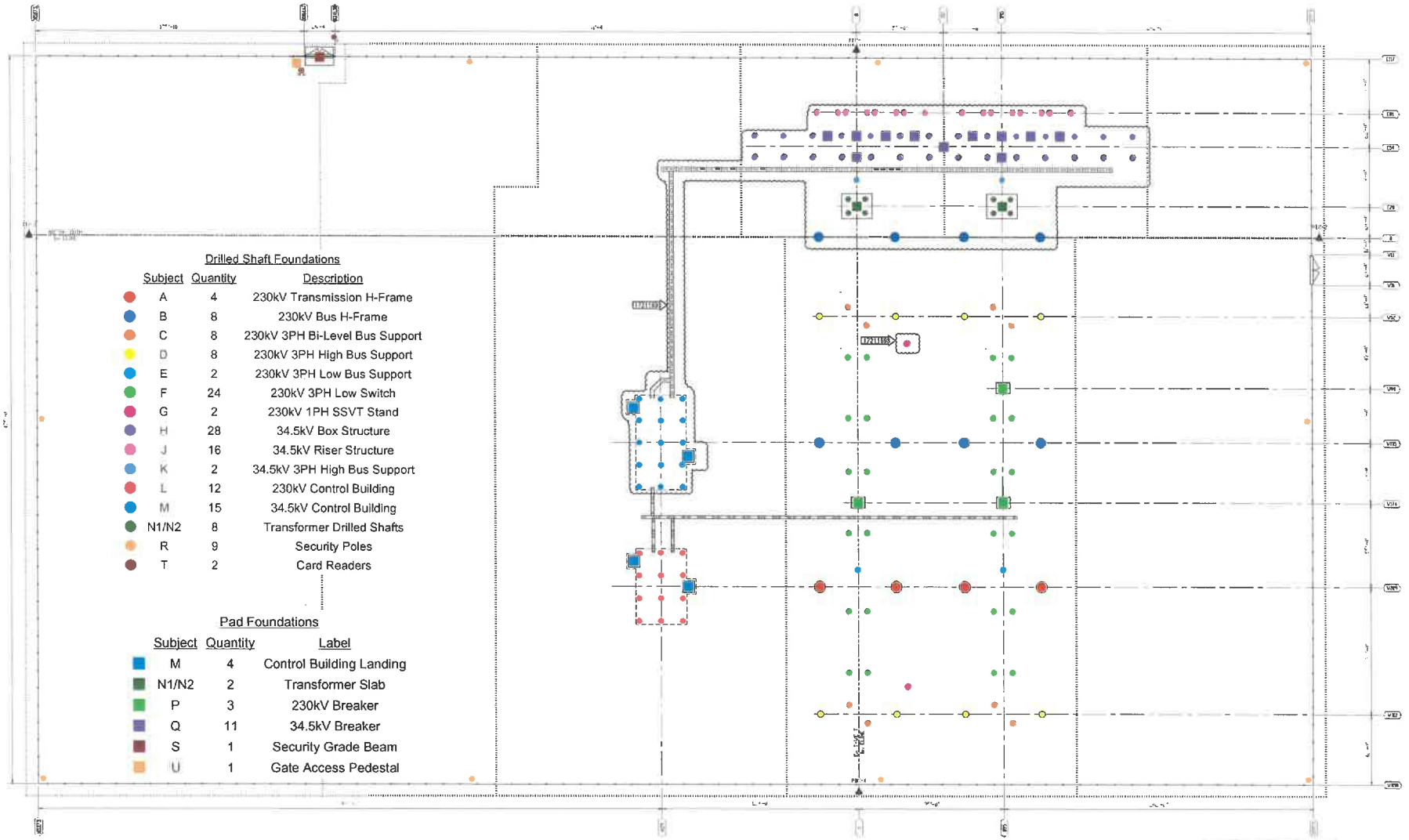
TABLE 6
Typical Values of Soil Index Properties

	Particle Size and Gradation				Voids[1]					Unit Weight[2] (lb./cu.ft.)						
	Approximate Size Range (mm)		Approx. D_{10} (mm)	Approx. Range Uniform Coefficient C_u	Void Ratio			Porosity (%)		Dry Weight			Wet Weight		Submerged Weight	
	D_{max}	D_{min}			e_{max} loose	e_{cr}	e_{min} dense	n_{max} loose	n_{min} dense	Min loose	100% Mod. AASHO	Max dense	Min loose	Max dense	Min loose	Max dense
GRANULAR MATERIALS																
Uniform Materials																
a. Equal spheres (theoretical values)	-	-	-	1.0	0.92	-	0.35	47.6	26	-	-	-	-	-	-	-
b. Standard Ottawa SAND	0.84	0.59	0.67	1.1	0.80	0.75	0.50	44	33	92	-	110	93	131	57	69
c. Clean, uniform SAND (fine or medium)	-	-	-	1.2 to 2.0	1.0	0.80	0.40	50	29	83	115	118	84	136	52	73
d. Uniform, inorganic SILT	0.05	0.005	0.012	1.2 to 2.0	1.1	-	0.40	52	29	80	-	118	81	136	51	73
Well-graded Materials																
a. Silty SAND	2.0	0.005	0.02	5 to 10	0.90	-	0.30	47	23	87	122	127	88	142	54	79
b. Clean, fine to coarse SAND	2.0	0.05	0.09	4 to 6	0.95	0.70	0.20	49	17	85	132	138	86	148	53	86
c. Micaceous SAND	-	-	-	-	1.2	-	0.40	55	29	76	-	120	77	138	48	76
d. Silty SAND & GRAVEL	100	0.005	0.02	15 to 300	0.85	-	0.14	46	12	89	-	146[3]	90	155[3]	56	92
MIXED SOILS																
Sandy or Silty CLAY	2.0	0.001	0.003	10 to 30	1.8	-	0.25	64	20	60	130	135	100	147	38	85
Skip-graded Silty CLAY with stones or rk fgmts	250	0.001	-	-	1.0	-	0.20	50	17	84	-	140	115	151	53	89
Well-graded GRAVEL, SAND, SILT & CLAY mixture	250	0.001	0.002	25 to 1000	0.70	-	0.13	41	11	100	140	148[4]	125	156[4]	62	94
CLAY SOILS																
CLAY (30%-50% clay sizes)	0.05	0.5μ	0.001	-	2.4	-	0.50	71	33	50	105	112	94	133	31	71
Colloidal CLAY (-0.002 mm: 50%)	0.01	10Å	-	-	12	-	0.60	92	37	13	90	106	71	128	8	66
ORGANIC SOILS																
Organic SILT	-	-	-	-	3.0	-	0.55	75	35	40	-	110	87	131	25	69
Organic CLAY (30% - 50% clay sizes)	-	-	-	-	4.4	-	0.70	81	41	30		100	81	125	18	62

(NAVFAC DM7.1)

Appendix D

Analysis reference drawings



Drilled Shaft Foundations

Subject	Quantity	Description
A	4	230kV Transmission H-Frame
B	8	230kV Bus H-Frame
C	8	230kV 3PH Bi-Level Bus Support
D	8	230kV 3PH High Bus Support
E	2	230kV 3PH Low Bus Support
F	24	230kV 3PH Low Switch
G	2	230kV 1PH SSVT Stand
H	28	34.5kV Box Structure
J	16	34.5kV Riser Structure
K	2	34.5kV 3PH High Bus Support
L	12	230kV Control Building
M	15	34.5kV Control Building
N1/N2	8	Transformer Drilled Shafts
R	9	Security Poles
T	2	Card Readers

Pad Foundations

Subject	Quantity	Label
M	4	Control Building Landing
N1/N2	2	Transformer Slab
P	3	230kV Breaker
Q	11	34.5kV Breaker
S	1	Security Grade Beam
U	1	Gate Access Pedestal

NOTES:

1. SEE FOUNDATION PLAN [illegible] FOR ANCHOR ROD NOTE.
2. SEE FENCE PLAN [illegible] FOR REMOVAL AND FENCE GATE DETAILS.

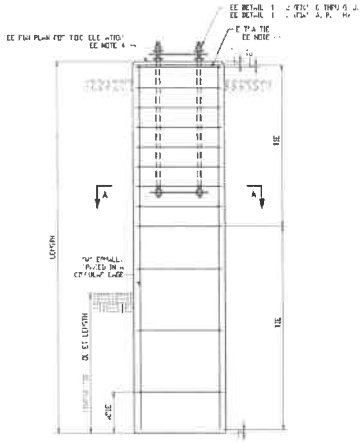
KEY PLAN

FirstEnergy

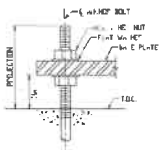
DRILLED PIER FOUNDATION SCHEDULE (ITEMS M-19 THRU M-22)

FDN ITEM NO.	DESCRIPTION	QTY PER NETWORK #17148633	QTY PER NETWORK #17211698	FOUNDATION DIMENSIONS DIA	LENGTH	MINIMUM ROCK SOCKET LENGTH	FOUNDATION REINFORCEMENT "W" QTY	"W" LENGTH	TIES * "X" QTY	TIES * "Y" QTY	TIES * TOTAL TIES*	TIES * OUTSIDE DIA	TIES * LENGTH	ANCHOR BOLT DETAILS BOLT CIRCLE/ SPACING "A"	ANCHOR BOLT DETAILS DIA "B"	ANCHOR BOLT DETAILS LENGTH "C"	ANCHOR BOLT DETAILS PROJ.	SUMMARY PER FOUNDATION CONCRETE (CU. YDS)	SUMMARY PER FOUNDATION REINF STEEL (LBS)	TOTAL PER NETWORK #17148633 CONCRETE (CU. YDS)	TOTAL PER NETWORK #17148633 REINF STEEL (LBS)	TOTAL PER NETWORK #17211698 CONCRETE (CU. YDS)	TOTAL PER NETWORK #17211698 REINF STEEL (LBS)
A	[illegible] FOUNDATION	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
B	[illegible] FOUNDATION	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
C	[illegible] DIAGONAL BRACE EL [illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
D	[illegible] HIGH [illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
E	[illegible] LOW [illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
F	[illegible] LOW WITH T-WAD FOUNDATION	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
G	[illegible] T-WAD FOUNDATION	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
H	[illegible] FOUNDATION	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
J	[illegible] [illegible] FOUNDATION	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
K	[illegible] HIGH [illegible] [illegible] FOUNDATION	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
L	CONTROL ENCLOSURE FOUNDATION	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	SEE NOTE 5				[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
M	CONTROL ENCLOSURE FOUNDATION	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	SEE NOTE 5				[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

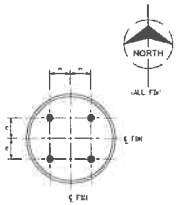
SEE NOTE [illegible]



ELEVATION
TYPICAL DRILLED PIER FOUNDATION
NOT TO SCALE

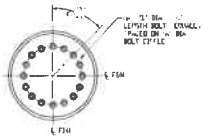


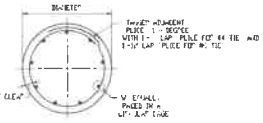
DETAIL 1
TYPICAL LEVELING BASE DETAIL
NOT TO SCALE

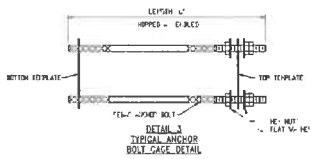




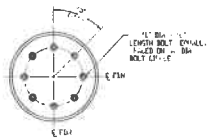
DETAIL 2
TYPICAL ANCHOR
BOLT CAGE DETAIL
NOT TO SCALE







DETAIL 3
TYPICAL ANCHOR
BOLT CAGE DETAIL
NOT TO SCALE



NOTES:

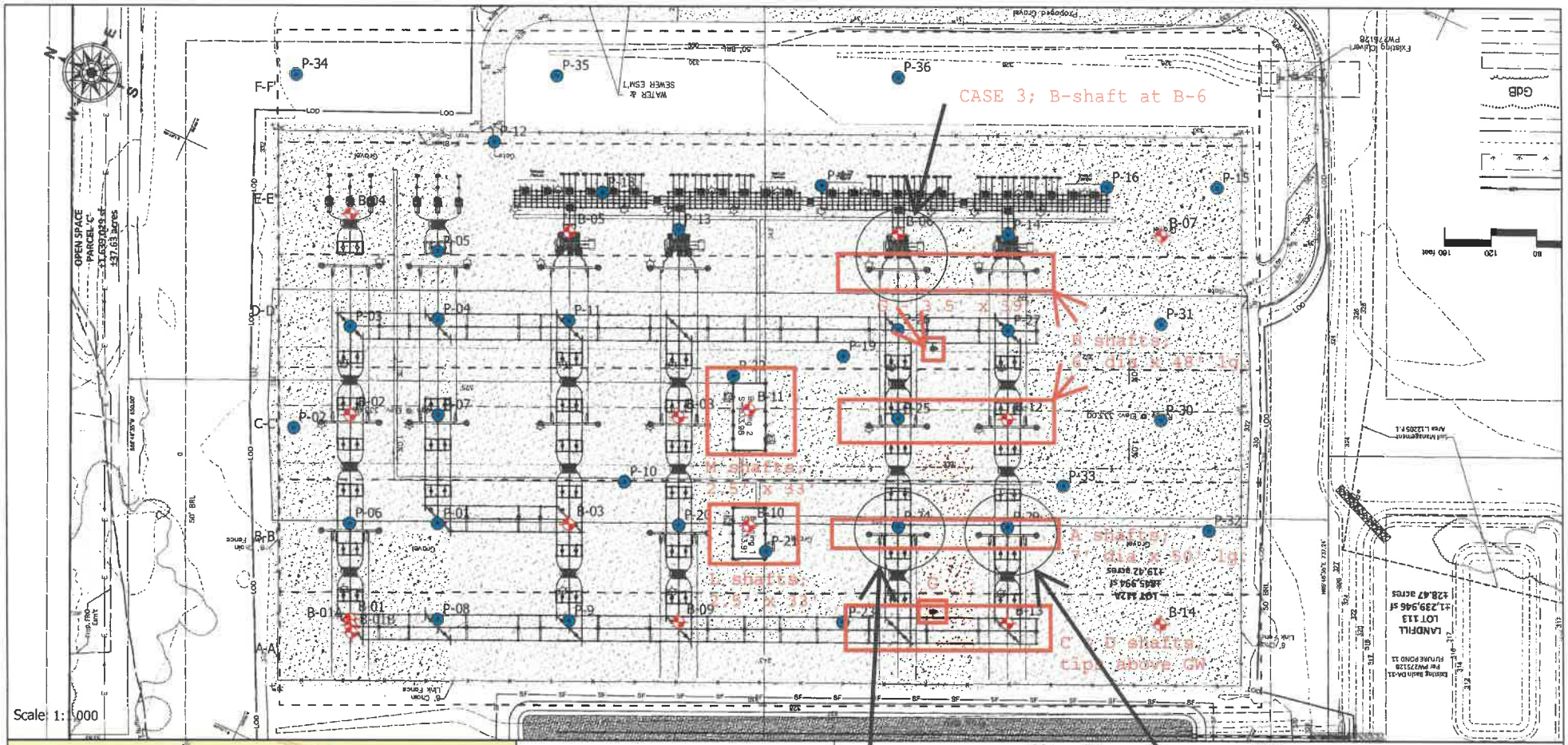
1. ANCHOR BOLT AND TEMPLATE FOR ALL DRILLED SHAFT FOUNDATIONS SHALL BE PROVIDED BY STEEL SUPPLIER.
2. CHAMFER ALL EXPOSED EDGES 1".
3. REINFORCING STEEL SHALL BE NEW INTERMEDIATE GRADE BILLET STEEL DEFORMED BAR CONFORMING TO ASTM A615 GRADE 60, UNLESS NOTED OTHERWISE ON THE CONTRACT PLANS.
4. SEE DWGS PE-L-[illegible], PE-L-[illegible], PE-L-[illegible], AND PE-L-[illegible] FOR FOUNDATION LOCATION AND POLE ELEVATIONS.
5. SEE DWGS PE-L-[illegible] AND PE-L-[illegible] FOR CONTROL ENCLOSURE FOUNDATION PLAN ARRANGEMENT DETAILS AND ANCHOR BOLT LOCATION.
6. THE TOTAL TIE FOR EACH PIER INCLUDES THE [illegible] TIES, AND ONE [illegible] ADDITIONAL TIE PLACED AT THE TOP.
7. FOUNDATIONS SHALL BE INSTALLED ACCORDING TO THE GENERAL, SPECIFICATIONS, MATERIAL AND CONSTRUCTION SPECIFICATIONS FOR TRANSMISSION LINE AND SUBSTATION STRUCTURE FOUNDATIONS, AND THE DRAWINGS. IF A FOUNDATION INSTALLATION IS NOT EXPECTED THAT IS NOT COVERED IN THESE SPECIFICATIONS OR THE DRAWINGS, THE CONTRACTOR SHALL CONTACT THE ENGINEER OF RECORD FOR REQUIREMENTS BEFORE PROCEEDING. AND SHALL COMPLY WITH ALL APPLICABLE LAWS, ORDINANCES, RULES AND REGULATIONS OF THE AUTHORITIES HAVING JURISDICTION OVER THE WORK. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND LICENSES NECESSARY FOR THE PERFORMANCE OF THE WORK. NOTHING IN THESE SPECIFICATIONS SHALL BE CONSTRUED AS REQUIRING OR PERMITTING ANY PERSON TO CONDUCT ANY ACTIVITY IN VIOLATION OF ANY APPLICABLE LAW, ORDINANCE OR REGULATION.
8. FOUNDATION DESIGN IS BASED ON THE INFORMATION PROVIDED IN THE REPORT TITLED "SOIL INVESTIGATION, GEOTECHNICAL ENGINEERING REPORT" PREPARED BY TECHNICON, DATED FEBRUARY [illegible].
9. IF EXCAVATION METHODS OTHER THAN DRILLING AND BOTTOM OF THE HOLE PRIOR TO PLACING CONCRETE THAT WOULD PREVENT INTIMATE CONTACT OF THE CONCRETE WITH FIRM, UNDISTURBED SOIL OR ROCK.
10. DRILLED SHAFT MAY BE DESIGNED TO INCORPORATE TIE-TIE TWISTED AND END BEARING.
11. ALL CASINGS SHALL BE CONSIDERED TEMPORARY, PERMANENT CASINGS ARE NOT PERMITTED.
12. CONCRETE SHALL HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 4,000 PSI.
13. CONCRETE SLUMP SHALL CONFORM TO ASTM C143, TABLE 2.4.
14. PROBE HOLE MAY BE REQUIRED TO DEPTH OF 10 BELOW THE BASE OF DRILLED SHAFT OR EXTENDED INTO ROCK.
15. WHERE INDICATED, OR IF SHALL BE OBSERVED INTO LIKE ZONE OF MATERIAL BEYOND VISIBLE CAVE, SOME SMALL COMMERCIALLY FEASIBLE ELEVATION AT WHICH PIT IS CONSIDERED SOUND THE FULL DEPTH OF THE EXCAVATION AND GENERALLY, IF MONITORING A WET HOLE, IF AND WHERE APPLICABLE, OF IF WET HOLE CONDITIONS EXIST, CONCRETE SHALL BE PLACED BY TREMIE METHOD, THROUGH CONCRETE PUMP OR CHUTE, OR BY OTHER METHODS APPROVED BY THE ENGINEER OF RECORD. CONCRETE SHALL NOT BE CONSIDERED "PLACED" WHEN THE TREMIE HOSE OR CHUTE IS WITHDRAWN FROM THE CONCRETE MASS. THE TREMIE HOSE SHALL BE KEPT SUFFICIENTLY DEEP IN THE FRESH CONCRETE MASS TO OVERCOME THE EXTERNAL HYDROSTATIC PRESSURE OF THE WATER OR SLURRY AND PREVENT WATER FROM ENTERING THE HOSE. THE TREMIE SHALL BE WITHDRAWN AT A SLOW RATE, AND SHALL BE CLEANED AND FILLED AS NEEDED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DEFECTIVE CONCRETE PLACED IN DEFICIENT SHAFTS AND SHALL REMEDIATE THE DEFECTIVE CONCRETE IN DEFICIENT SHAFTS AT NO ADDITIONAL COST TO THE OWNER.
16. CLEAN THE BOTTOM OF EXCAVATION OF LOOSE MATERIAL AND DEBRIS TO THE SPECIFIED FULL DEPTH AND DIAMETER BEFORE CONCRETE AND REINFORCEMENT ARE PLACED. THE CONTRACTOR SHALL REMOVE ALL LOOSE MATERIAL AND POOL WATER FROM THE BOTTOM OF THE SHAFT. THE ALLOWABLE THICKNESS OF SEDIMENT ON THE SHAFT BOTTOM SHALL BE LIMITED TO ONE-HALF INCH WITH NO BULGING. THICKNESS OF SEDIMENT SHALL BE DEMONSTRATED BY SOUNDING.
17. WHERE PERMITTED, AND WITHOUT COMPROMISING THE STABILITY OF THE EXCAVATION, CONCRETE PLACEMENT MAY BE CONSIDERED BEFORE PLACING REINFORCING STEEL. CONCRETE SHALL BE PLACED TO ELEVATION AT LEAST 10 ABOVE THE BOTTOM OF THE REINFORCING STEEL. AS THE CONCRETE IS PLACED, THE REINFORCING STEEL SHALL BE LOWERED TO ITS FINAL ELEVATION. CONCRETE SHALL BE PLACED IN A CONTINUOUS OPERATION UNTIL THE CONCRETE REACHES AN ELEVATION AT LEAST 5 FEET ABOVE THE BOTTOM OF THE REINFORCING STEEL. AFTER THE REINFORCING STEEL IS PLACED, CONCRETE SHALL BE PLACED WITHIN 4 HOURS. IF CONCRETE PLACEMENT IS INTERRUPTED FOR MORE THAN 4 HOURS, THE CONCRETE SHALL BE REMOVED FROM THE SHAFT AND REPLACED WITH NEW CONCRETE.
18. WHERE DEWATERING IS IMPRACTICAL OR WHERE CONCRETE PLACEMENT IS PERFORMED IN WATER, IF CONCRETE IS NOT PLACED WITHIN 4 HOURS OF COMPLETION AND PLACEMENT OF CONCRETE UNDER WATER OR THROUGH SLURRY SHALL NOT BE PERMITTED. ALL REMOVED AND REPLACED AS UNACCEPTABLE. EXTENDED BEARING MATERIAL AND "SLURRY" PERMITTED.
19. WHERE DEWATERING IS IMPRACTICAL OR WHERE CONCRETE PLACEMENT IS PERFORMED IN WATER, IF CONCRETE IS NOT PLACED WITHIN 4 HOURS OF COMPLETION AND PLACEMENT OF CONCRETE UNDER WATER OR THROUGH SLURRY SHALL NOT BE PERMITTED. ALL REMOVED AND REPLACED AS UNACCEPTABLE. EXTENDED BEARING MATERIAL AND "SLURRY" PERMITTED.
20. THE USE OF SLURRY WILL NOT BE PERMITTED DURING CONSTRUCTION OF THAT PORTION OF DRILLED SHAFT WHICH BEARS UPON OR ACTS AS EXPOSED INTO ROCK.
21. NO PROJECTIONS AT THE TOP OF THE DRILLED SHAFT SHALL NOT BE PERMITTED.
22. IF REQUIRED BY THE ENGINEER, CONTRACTOR SHALL MAKE A CORE BOREHOLE TO VERIFY INTEGRITY. THIS SHALL BE COMPLETED BY DRILLED SHAFT. THE BOREHOLE SHALL CONSIST OF A 10 HOLE CENTRALLY LOCATED WITHIN THE BOTTOM 1/3 OF THE DRILLED SHAFT. IF REQUIRED BY THE ENGINEER, THE CONTRACTOR SHALL PERFORM ADDITIONAL BOREHOLES AT LOCATIONS DETERMINED BY THE ENGINEER WITHIN 24 HOURS OF THE INITIAL BOREHOLE. THE BOREHOLE SHALL BE FILLED WITH GROUT IMMEDIATELY AFTER TESTING.

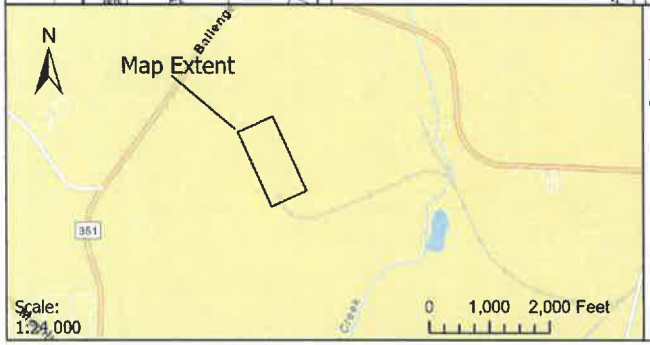
[illegible]	FirstEnergy	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]

[illegible] 345 KV, 161 KV AND 69 KV SINGLE, DOUBLE AND TRIPLE CIRCUIT TOWER AND CONCRETE PIER FOUNDATION
DRAWING BY: [illegible]

FOUNDATION DETAIL
DRILLED SHAFT FOUNDATION

PE-1252-15-13





Legend

- Borehole Location
- Percussive Probe Location
- GeoModel Subsurface Profile Boundaries

Spatial Reference
Name: NAD 1983 2011 StatePlane Maryland FIPS 1900 Ft US
PCS: NAD 1983 2011 StatePlane Maryland FIPS 1900 Ft US
GCS: GCS NAD 1983 2011
Datum: NAD 1983 2011
Projection: Lambert Conformal Conic

Project No:	JD225296
Date:	Nov 2023
Drawn By:	MLS
Reviewed By:	RSZ

Terracon
19955 Highland Vista Drive, Suite 170
Ashburn, VA 20147
PH. (703) 726-8030 terracon.com

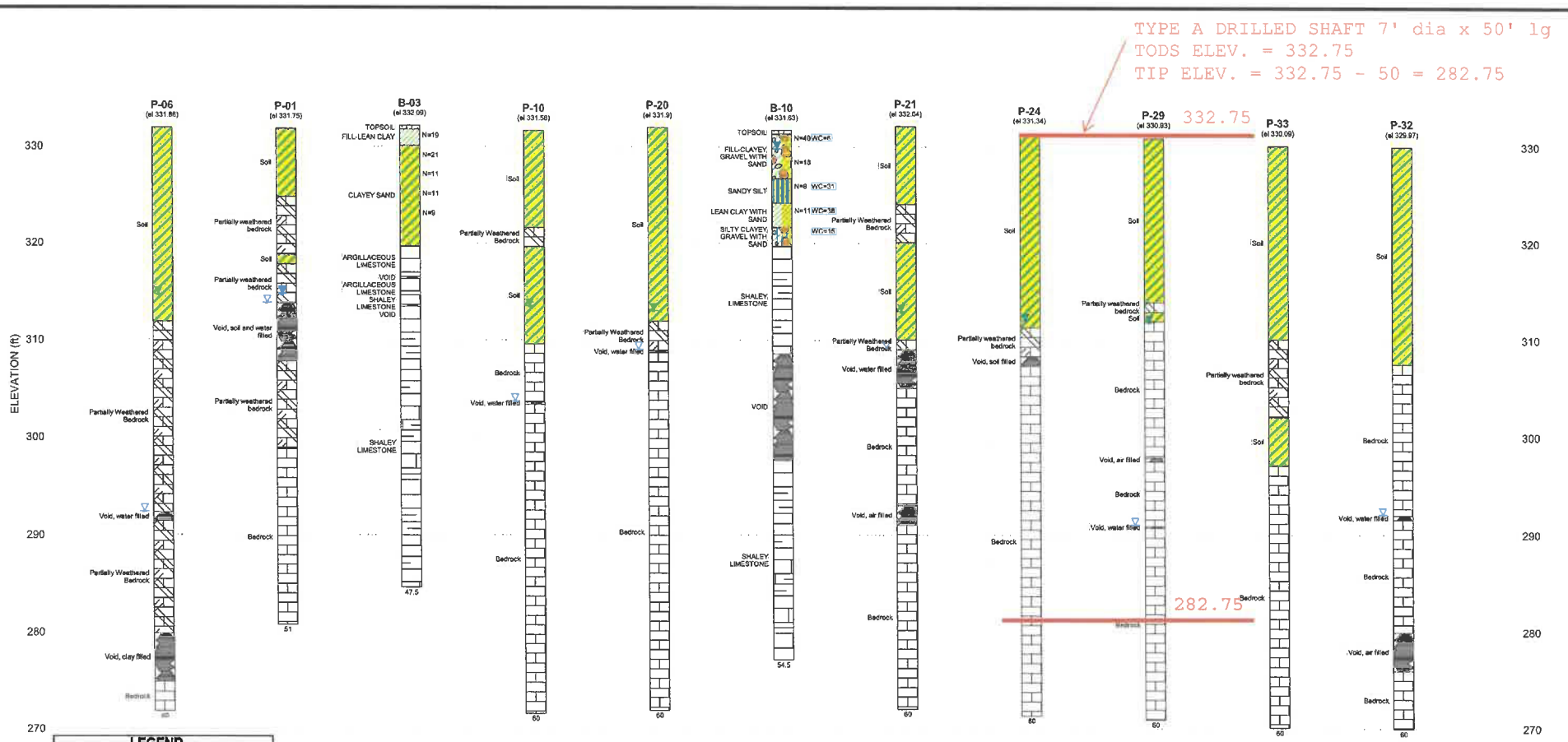
Map3Subsurface Exploration Plan

Sage Substation
Frederick County Maryland

Exhibit

3

Other Imagery Sources: MNCPPC, WashCo MD, VGIN, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA



See Exhibit 3 for cross-section plan.
See General Notes in Appendix C for symbols and soil classifications.
Soils profile provided for illustration purposes only.
Soils between borings may differ.
BT - Boring Termination (Ft)
For probe locations the legend does not apply. Only soil, weathered rock, void and bedrock are shown graphically.

Project Manager:	Project No.: JD225296
Drawn by: MLS	Scale: N.T.S.
Approved by: DK	File Name: GeoModel_2
Date: 2/21/2023	

Terracon
19955 Highland Vista Dr Ste 170
Ashburn, VA
PH. 703-726-8030 FAX.

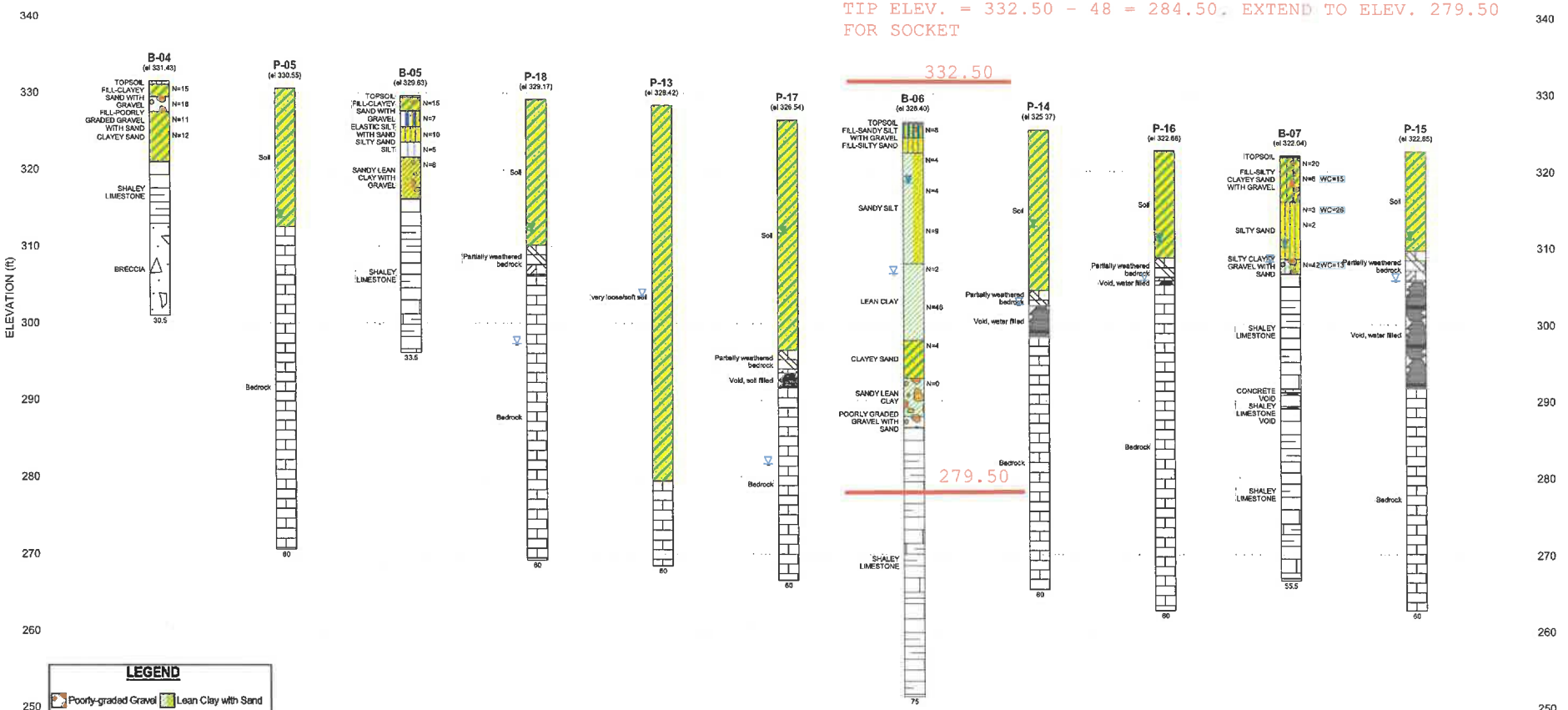
SUBSURFACE PROFILE

B-B'
SAGE SUBSTATION
5601 MANOR WOODS ROAD
FREDERICK, MD

FIGURE 2

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. FLORIDA_DOT_FENCE_DIAGRAM_SAGE SUBSTATION (2).GPJ_TERRACON_DATATEMPLATE.GDT 2/21/23

TYPE B DRILLED SHAFT - 6' dia. x 48' lg (min 6' socket)
TODS ELEV. = 332.50
TIP ELEV. = 332.50 - 48 = 284.50. EXTEND TO ELEV. 279.50 FOR SOCKET



LEGEND

- Poorly-graded Gravel
- Fat Clay
- Breccia
- Sandy Lean Clay
- Void
- Sandy Silt
- Clayey Sand
- Clayey Sand with Gravel
- Lean Clay with Sand
- Clayey Gravel
- Topsoil
- Gravelly Lean Clay with Sand
- Silty Sand
- Lean Clay
- Argillaceous or Shaly Limestone
- Elastic Silt with Sand

Water Level Reading at time of drilling.
Water Level Reading after drilling.

NOTES:
See Exhibit 3 for cross-section plan.
See General Notes in Appendix C for symbols and soil classifications.
Soils profile provided for illustration purposes only.
Soils between borings may differ.
For presentation purposes, some locations are offset to allow display of both borings and CPTs.
BT - Boring Termination-(Ft)
Probe Locations, only soil, weathered rock and bedrock are shown.

Project Manager:	Project No.: JD225296
Drawn by: MLS	Scale: N.T.S.
Approved by: DK	File Name: GeoModel_5
Date: 2/21/2023	

Terracon
19955 Highland Vista Dr Ste 170
Ashburn, VA
PH. 703-726-8030 FAX

SUBSURFACE PROFILE

E-E'
SAGE SUBSTATION
5601 MANOR WOODS ROAD
FREDERICK, MD

FIGURE 5

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. FLORIDA_DOT_FENCE_DIAGRAM_SAGE SUBSTATION (2).GPJ_TERRACON_DATATEMPLATE.GDT 2/21/23

Sage Substation
5601 Manor Woods Road | Frederick, MD
Terracon Project No. JD225296

Terracon
19955 Highland Vista Dr Ste 170
Ashburn, VA

Boring Log No. P-24

Location: See Exploration Plan

Latitude: 39.331023° Longitude: -77.478425°
Northing: 606500.887 Easting: 1177001.447

Depth (Ft.) Elevation.: 331.34 (Ft.)

Graphic Log | Depth (Ft.) | Water Level Observations | Sample Type

Depth (Ft.)	Elevation (Ft.)	Description
0.0	331.34	**Soil**
20.0	311.34	**Partially weathered bedrock**
23.0	308.34	
24.0	307.34	**Void, soil filled**
		Bedrock
60.0	271.34	***Boring Terminated at 60 Feet***

10 20 30 40 50 60

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
Not encountered during drilling
After 24 hours

Notes

Advancement Method
3" Percussive Hammer

Abandonment Method
Boring backfilled with cement-bentonite grout after 24-hour groundwater observations.

Drill Rig
MD5090

Hammer Type
Percussive Air Hammer

Driller
B. Howard

Boring Started
09-19-2022

Boring Completed
09-19-2022

Sage Substation
5601 Manor Woods Road | Frederick, MD
Terracon Project No. JD225296

Terracon
19955 Highland Vista Dr Ste 170
Ashburn, VA

Boring Log No. P-29

Location: See Exploration Plan

Latitude: 39.330787° Longitude: -77.478286°
Northing: 606414.749 Easting: 1177040.303

Depth (Ft.) Elevation.: 330.93 (Ft.)

Graphic Log	Depth (Ft.)	Elevation (Ft.)	Water Level Observations	Sample Type
	0.0	330.93		
	Soil			
	17.0	313.93		
	18.0 **Partially weathered bedrock**	312.93		
	19.0 **Soil**	311.93		
	Bedrock			
	33.0	297.93		
	33.4 **Void, air filled**	297.53		
	Bedrock			
	40.0	290.93		
	40.2 **Void, water filled**	290.73		
	Bedrock			
	60.0	270.93		
	Boring Terminated at 60 Feet			

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
While drilling
After 24 hours

Notes

Advancement Method
3" Percussive Hammer

Abandonment Method
Boring backfilled with cement-bentonite grout after 24-hour groundwater observations.

Drill Rig
MD5090

Hammer Type
Percussive Air Hammer

Driller
B. Howard

Boring Started
09-19-2022

Boring Completed
09-19-2022

Sage Substation
5601 Manor Woods Road | Frederick, MD
Terracon Project No. JD225296

Terracon
19955 Highland Vista Dr Ste 170
Ashburn, VA

Boring Log No. B-06

Location: See Exploration Plan

Latitude: 39.331314° Longitude: -77.477610°
Northing: 606605.443 Easting: 1177232.345

Depth (Ft.) Elevation.: 326.40 (Ft.)

Model Layer	Graphic Log	Depth (Ft.)	Water Level Observations	Sample Type	Recovery (%)	Field Test Results	RQD (%)	HP (tsf)	Atterberg Limits LL-PL-PI
1		0.2 **TOPSOIL**, = 2 inches (326.2)							
		FILL - SANDY SILT WITH GRAVEL, fine to medium sand, brown, moist, medium stiff			30	4-4-4-7 N=8		1.5 (HP)	
		2.0 (324.4)							
		FILL - SILTY SAND, fine to medium, gray brown, moist, very dense			100	12-23-50/5"			
		4.0 (322.4)							
2		**SANDY SILT (ML)**, fine to coarse sand, light red brown, moist, soft to stiff			100	1-2-2-3 N=4		1.0 (HP)	
		5			80			3.0 (HP)	
			▽		100	2-2-2-3 N=4		0.75 (HP)	
		10							
					100	2-3-6 N=9		1.25 (HP)	
		15							
		18.5 (307.9)							
		LEAN CLAY (CL), brown, moist, very soft to hard	▽		47	3-1-1 N=2		0.0 (HP)	
		20							

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
▽ 20 ft. while drilling
▽ 8 ft. upon completion
Dry on 2022-10-17
Caved: 22 ft.

Notes

Advancement Method
3.25" ID HSA

Abandonment Method
Boring backfilled with cement-bentonite grout upon completion.

Drill Rig
D 70

Hammer Type
Automatic Hammer

Driller
Josh Lewis

Boring Started
10-03-2022

Boring Completed
10-04-2022

Sage Substation
5601 Manor Woods Road | Frederick, MD
Terracon Project No. JD225296

Terracon
19955 Highland Vista Dr Ste 170
Ashburn, VA

Boring Log No. B-06

Location: See Exploration Plan

Latitude: 39.331314° Longitude: -77.477610°
Northing: 606605.443 Easting: 1177232.345

Depth (Ft.) Elevation.: 326.40 (Ft.)

Model Layer	Graphic Log		Depth (Ft.)	Water Level Observations	Sample Type	Recovery (%)	Field Test Results	RQD (%)	HP (tsf)	Atterberg Limits LL-PL-PI
2		**LEAN CLAY (CL)**, brown, moist, very soft to hard *(continued)*								
		28.5 297.9								
						87	3-42-6 N=48		0.5 (HP)	
3		**CLAYEY SAND (SC)**, fine to medium, dark brown, moist, loose	25							
		33.5 292.9				47	3-1-3 N=4		0.5 (HP)	
2		**SANDY LEAN CLAY (CL)**, fine to medium sand, brown, moist, very soft	30							
		38.5 287.9				47	1-0-0 N=0		0.25 (HP)	
4		**POORLY GRADED GRAVEL WITH SAND (GP)**, fine to coarse, gray, moist, dense, Weathered Rock	35			100	50/4"			
		40.0 286.45	40							

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
20 ft. while drilling
8 ft. upon completion
Dry on 2022-10-17
Caved: 22 ft.

Notes

Advancement Method
3.25" ID HSA

Abandonment Method
Boring backfilled with cement-bentonite grout upon completion.

Drill Rig
D 70

Hammer Type
Automatic Hammer

Driller
Josh Lewis

Boring Started
10-03-2022

Boring Completed
10-04-2022

Sage Substation
5601 Manor Woods Road | Frederick, MD
Terracon Project No. JD225296

Terracon
19955 Highland Vista Dr Ste 170
Ashburn, VA

Boring Log No. B-06

Location: See Exploration Plan

Latitude: 39.331314° Longitude: -77.477610°
Northing: 606605.443 Easting: 1177232.345

Depth (Ft.) Elevation.: 326.40 (Ft.)

Model Layer	Graphic Log	Depth (Ft.)	Water Level Observations	Sample Type	Recovery (%)	Field Test Results	RQD (%)	HP (tsf)	Atterberg Limits LL-PL-PI
		40.0 Auger and Spoon Refusal. 286.4			0	50/0"			
5		**SHALEY LIMESTONE**, gray brown, intensely fractured, laminated bedding, highly weathered, weak rock, very poor to fair quality dark blue gray, moderately weathered, medium strong, below 41.3 ft.			78		9		
		highly fractured, below 43.1 ft.							
		highly weathered, weak rock, below 43.9 ft.							
		45 light gray, highly fractured, moderately weathered, medium strong, below 45 ft.							
		6 inch calcite vein from 46 to 46.6 ft.			72		0		
		intensely fractured, highly weathered, weak rock, below 48.6 ft.							
		50 light greenish gray, moderately weathered, medium strong, below 50 ft.							
		dark blue gray, slightly weathered, below 52 ft.			88		10		
		55							
					100		35		
		60							

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
20 ft. while drilling
8 ft. upon completion
Dry on 2022-10-17
Caved: 22 ft.

Notes

Advancement Method
3.25" ID HSA

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Drill Rig
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Automatic Hammer

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Josh Lewis

Boring Started
10-03-2022

Boring Completed
10-04-2022

Sage Substation
5601 Manor Woods Road | Frederick, MD
Terracon Project No. JD225296

Terracon
19955 Highland Vista Dr Ste 170
Ashburn, VA

Boring Log No. B-06

Model Layer	Graphic Log	Location: See Exploration Plan Latitude: 39.331314° Longitude: -77.477610° Northing: 606605.443 Easting: 1177232.345 Depth (Ft.) Elevation.: 326.40 (Ft.)	Depth (Ft.)	Water Level Observations	Sample Type	Recovery (%)	Field Test Results	RQD (%)	HP (tsf)	Atterberg Limits LL-PL-PI
5		**SHALEY LIMESTONE**, gray brown, intensely fractured, laminated bedding, highly weathered, weak rock, very poor to fair quality *(continued)* highly fractured, thin bedding, trace calcite veins below 60 ft.								
		intensely fractured, below 62 ft.				100		29		
		highly fractured, medium strong to strong rock, below 65 ft. Unconfined Compressive Strength = 3,614 to 11,620 psi	65							
		intensely fractured, below 67 ft.				100		57		
		light olive gray and red, highly fractured, below 70 ft.	70							
		dark blue gray, below 72.4 ft.				100		28		
		75.0 251.4	75							
		Boring Terminated at 75 Feet								

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes

Water Level Observations
20 ft. while drilling
8 ft. upon completion
Dry on 2022-10-17
Caved: 22 ft.

Advancement Method
3.25" ID HSA

Abandonment Method
Boring backfilled with cement-bentonite grout upon completion.

Drill Rig
D 70

Hammer Type
Automatic Hammer

Driller
Josh Lewis

Boring Started
10-03-2022

Boring Completed
10-04-2022

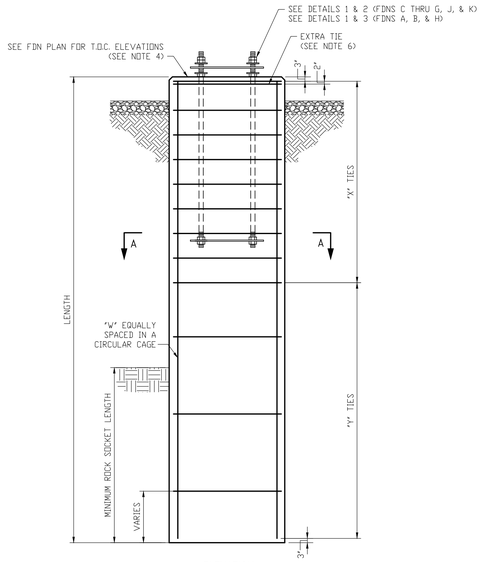
DRILLED PIER FOUNDATION SCHEDULE (ITEMS M-19 THRU M-22)

FDN ITEM NO.	DESCRIPTION	QTY PER NETWORK #17148633	QTY PER NETWORK #17211698	FOUNDATION DIMENSIONS			FOUNDATION REINFORCEMENT							ANCHOR BOLT DETAILS				SUMMARY PER FOUNDATION		TOTAL PER NETWORK #17148633		TOTAL PER NETWORK #17211698	
							"W"		TIES *														
				DIA	LENGTH	MINIMUM ROCK SOCKET LENGTH	QTY	LENGTH	"X" QTY	"Y" QTY	TOTAL TIES*	OUTSIDE DIA	LENGTH	BOLT CIRCLE/ SPACING "A"	DIA "B"	LENGTH "C"	PROJ.	CONCRETE (CU. YDS)	REINF STEEL (LBS)	CONCRETE (CU. YDS)	REINF STEEL (LBS)	CONCRETE (CU. YDS)	REINF STEEL (LBS)
A	230kV TRANSMISSION H-FRAME FOUNDATION	4	-	7'-0"	50'-0"	8'-0"	36-#11	49'-6"	23-#6 @ 6"	38-#6 @ 12"	62	6'-6"	22'-5"	60 1/2"	2 1/4"	10'-6"	12"	71.3	11555	285.2	46220	-	-
B	230kV STRAIN BUS H-FRAME FOUNDATION	4	4	6'-0"	48'-0"	6'-0"	25-#10	47'-6"	17-#6 @ 6"	39-#6 @ 12"	57	5'-6"	19'-3"	50"	2 1/4"	7'-6"	12"	50.3	6758	201.2	27032	201.2	27032
C	230kV 3PH DIAGONAL BI-LEVEL BUS SUPPORT FOUNDATION	8	-	3'-6"	15'-0"	-	18-#7	14'-6"	10-#4 @ 6"	10-#4 @ 12"	21	3'-0"	10'-9"	8"	1 1/2"	4'-0"	6 1/2"	5.3	684	42.4	5472	-	-
D	230kV 3PH HIGH BUS SUPPORT FOUNDATION	8	-	4'-0"	17'-0"	-	18-#8	16'-6"	11-#4 @ 6"	11-#4 @ 12"	23	3'-6"	12'-3"	10"	1 3/4"	4'-6"	7 1/2"	7.9	981	63.2	7848	-	-
E	230kV 3PH LOW BUS SUPPORT FOUNDATION	2	-	3'-6"	14'-0"	-	18-#7	13'-6"	10-#4 @ 6"	9-#4 @ 12"	20	3'-0"	10'-9"	9"	1 3/4"	4'-6"	7 1/2"	5.0	640	10.0	1280	-	-
F	230kV 3PH LOW SWITCH STAND FOUNDATION	24	-	3'-6"	14'-0"	-	18-#7	13'-6"	10-#4 @ 6"	9-#4 @ 12"	20	3'-0"	10'-9"	8"	1 1/2"	4'-0"	6 1/2"	5.0	640	120.0	15360	-	-
G	230kV 1PH SSVT STAND FOUNDATION	1	1	3'-6"	39'-0"	-	18-#7	38'-6"	10-#4 @ 6"	34-#4 @ 12"	45	3'-0"	10'-9"	8"	1 1/2"	4'-0"	6 1/2"	13.9	1740	13.2	1652	13.9	1740
H	34.5kV BOX STRUCTURE FOUNDATION	-	28	3'-6"	23'-0"	-	18-#7	22'-6"	10-#4 @ 6"	18-#4 @ 12"	29	3'-0"	10'-9"	8"	1 1/2"	4'-6"	10"	8.2	1325	-	-	229.6	37100
J	34.5kV 3PH RISER STRUCTURE FOUNDATION	-	16	3'-0"	16'-0"	-	13-#7	15'-6"	10-#4 @ 6"	11-#4 @ 12"	22	2'-6"	9'-2"	7"	1 1/4"	4'-0"	8"	4.2	547	-	-	67.2	8752
K	34.5kV 3PH HIGH BUS SUPPORT STRUCTURE FOUNDATION	-	2	3'-6"	15'-0"	-	18-#7	14'-6"	10-#4 @ 6"	10-#4 @ 12"	21	3'-0"	10'-9"	8"	1 1/4"	4'-0"	8"	5.3	684	-	-	10.6	1368
L	230kV CONTROL ENCLOSURE FOUNDATION	12	-	2'-6"	33'-0"	5'-0"	9-#7	32'-6"	7-#4 @ 6"	29-#4 @ 12"	37	2'-0"	7'-7"	SEE NOTE 5				6.0	785	72.0	9420	-	-
M	34.5kV CONTROL ENCLOSURE FOUNDATION	-	15	2'-6"	33'-0"	5'-0"	9-#7	32'-6"	7-#4 @ 6"	29-#4 @ 12"	37	2'-0"	7'-7"	SEE NOTE 5				6.0	785	-	-	90.0	11775

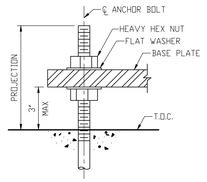
* SEE NOTE 6

17211698

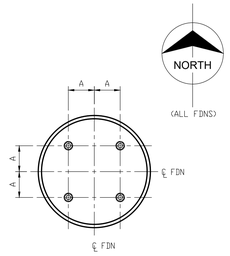
17211698



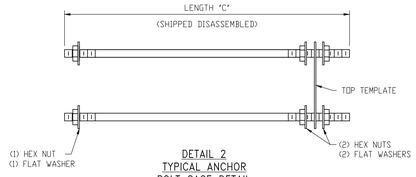
ELEVATION
TYPICAL DRILLED PIER FOUNDATION
NOT TO SCALE



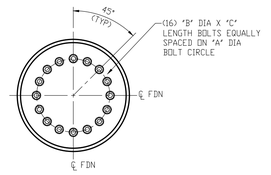
DETAIL 1
TYPICAL LEVELING BASE DETAIL
NOT TO SCALE



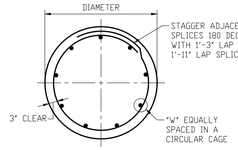
ANCHOR BOLT PLAN
ALL FOUNDATIONS
EXCEPT A & B
NOT TO SCALE



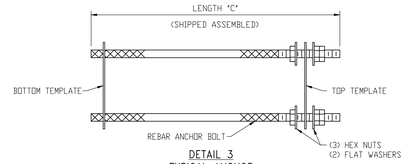
DETAIL 2
TYPICAL ANCHOR
BOLT CAGE DETAIL
NOT TO SCALE



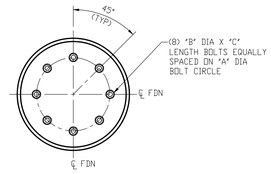
ANCHOR BOLT PLAN
FOUNDATION A
NOT TO SCALE



SECTION A-A
NOT TO SCALE



DETAIL 3
TYPICAL ANCHOR
BOLT CAGE DETAIL
NOT TO SCALE



ANCHOR BOLT PLAN
FOUNDATION B
NOT TO SCALE

NOTES:

1. ANCHOR BOLTS AND TEMPLATES FOR ALL DRILLED SHAFT FOUNDATIONS SHALL BE PROVIDED BY STEEL SUPPLIER.
2. CHAMFER ALL EXPOSED EDGES 1".
3. REINFORCING STEEL SHALL BE NEW INTERMEDIATE GRADE BILLET STEEL DEFORMED BARS CONFORMING TO ASTM A615 GRADE 60, LATEST REV. SUPPLIED BY BELOW GRADE CONTRACTOR.
4. SEE DWG. PE-1252-15-05, PE-1252-15-06, PE-1252-15-10, AND PE-1252-15-11 FOR FOUNDATION LAYOUT AND T.O.C ELEVATIONS.
5. SEE DWG PE-1252-15-17 AND PE-1252-15-18 FOR CONTROL ENCLOSURE FOUNDATION PLAN. ANCHORING DETAILS AND ANCHORING LOCATIONS.
6. THE TOTAL TIES FOR EACH PIER INCLUDES THE 'X' TIES, 'Y' TIES, AND ONE (1) ADDITIONAL TIE SPACED AT 2".
7. FOUNDATIONS SHALL BE INSTALLED ACCORDING TO FIRSTENERGY SPECIFICATIONS FE-TLS-004 "MATERIAL AND CONSTRUCTION SPECIFICATIONS FOR TRANSMISSION LINE AND SUBSTATION STRUCTURE FOUNDATIONS" AND THIS DRAWING. IF A FOUNDATION CONSTRUCTION ISSUE IS ENCOUNTERED THAT IS NOT COVERED IN FE-TLS-004 OR THIS DRAWING, WORK SHALL CONFORM TO REQUIREMENTS OF THE CONTRACT DOCUMENTS AND ACI-336.1-01 PUBLISHED BY THE AMERICAN CONCRETE INSTITUTE, FARMINGTON HILLS, MICHIGAN.
8. OWNER MAY EMPLOY ONE OR MORE OF THEIR REPRESENTATIVES TO PROVIDE OBSERVATION AND TESTING SERVICES. CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR FULL COMPLIANCE WITH THE CONTRACT DOCUMENTS. REPAIRS OR REPLACEMENT SHALL BE AT THE SOLE EXPENSE OF THE CONTRACTOR, INCLUDING THE COSTS TO REDESIGN, AS REQUIRED.
9. PROVIDE SUBMITTALS TO FIRSTENERGY AS IDENTIFIED IN ACI-336.1-01, PART 1.8, PRIOR TO CONSTRUCTION AND DURING CONSTRUCTION AS APPLICABLE.
10. FOUNDATION DESIGN IS BASED ON THE INFORMATION PRESENTED IN THE REPORT TITLED "SAGE SUBSTATION, GEOTECHNICAL ENGINEERING REPORT" PREPARED BY TERRACON, DATED FEBRUARY 21,2023.
11. USE EXCAVATION METHODS THAT LEAVE THE SIDES AND BOTTOM OF THE HOLE FREE OF LOOSE MATERIAL THAT WOULD PREVENT INTIMATE CONTACT OF THE CONCRETE WITH FIRM, UNDISTURBED SOIL OR ROCK.
12. DRILLED SHAFTS HAVE BEEN DESIGNED TO INCORPORATE SIDE-RESISTANCE AND END BEARING.
13. ALL CASING SHALL BE CONSIDERED TEMPORARY. PERMANENT CASING IS NOT PERMITTED.
14. CONCRETE SHALL HAVE A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 4,000 PSI.
15. CONCRETE SLUMP SHALL CONFORM TO ACI 336.1-01, TABLE 2.4.3.
16. PROBE HOLES ARE REQUIRED TO DEPTH OF 2D BELOW THE BASE OF SHAFTS SOCKETED INTO ROCK.
17. WHERE INDICATED, SOCKETS SHALL BE ADVANCED INTO LIMESTONE OR BRECCIA BEDROCK WITHOUT VISIBLE VOIDS, GENERALLY COMMENCING FROM THE ELEVATION AT WHICH FIRST ENCOUNTERED AROUND THE FULL PERIMETER OF THE SOCKET EXCAVATION, AND GENERALLY EXHIBITING A HARD, MASSIVE, AND SOLID APPEARANCE. SOCKET DOES NOT EXHIBIT OR CONTAIN CLAY SEAMS, VOIDS, SOLUTION CAVITIES, COBBLES, BOULDERS, OR BROKEN, RUBBLY, OR WEATHERED ROCK CONDITIONS. COBBLES AND BOULDERS, AS DEFINED BY ASTM D2487, OR PORTIONS OF IRREGULAR ROCK CONTACT ALONG THE SHAFT SIDE WALL SHALL NOT BE CONSIDERED FOR PURPOSES OF DEVELOPING A MINIMUM EMBEDMENT FOR SOCKET. SOCKET MAY OR MAY NOT BE CONSIDERED CUMULATIVE ALONG THE SIDE WALL SHAFT, DEPENDING UPON THE SIZE, EXTENT, LOCATION AND FREQUENCY OF CRACKS, CREVICES, AND CLAY SEAMS THAT CAN BE CLEANED AND FILLED BY DENTAL WORK. OWNER OR THEIR REPRESENTATIVE WILL EVALUATE EXTENT OF IRREGULARITIES IN DEFINING ADEQUATE SOCKET.
18. CLEAN SIDES OF SOCKET OF ANY LOOSE MATERIAL AND ROCK PASTE TO PROVIDE FULL BOND BETWEEN CONCRETE AND UNDISTURBED SOCKET MATERIAL.
19. CLEANOUT AND REMOVE ALL LOOSE MATERIAL AND SPOIL FROM THE BOTTOM OF THE SHAFT. THE AVERAGE THICKNESS OF SEDIMENTS ON THE SHAFT BOTTOM SHALL BE LIMITED TO ONE-HALF INCH, WITH MAXIMUM THICKNESS OF ONE INCH.
20. WHERE PRACTICAL, AND WITHOUT COMPROMISING THE STABILITY OF THE EXCAVATION, DEWATER EXCAVATION BEFORE PLACING CONCRETE. HOLD THE WATER LEVEL IN THE BOTTOM OF THE EXCAVATION PRIOR TO CONCRETING AT NOMINAL DEPTH NOT TO EXCEED 2 INCHES. EXCAVATIONS WHICH TERMINATE IN COHESIONLESS SOILS BELOW THE WATER LEVEL SHALL NOT BE DEWATERED.
21. COMPLETE CONCRETING WITHIN THE SAME WORKING DAY IN WHICH DRILLED SHAFT IS EXCAVATED. IF CONCRETE IS NOT PLACED WITHIN 4 HOURS OF COMPLETION AND ACCEPTANCE OF EXCAVATION, THE BOTTOM OF THE EXCAVATION MAY REQUIRE ADDITIONAL CLEANOUT, AS REQUIRED BY OWNER, TO REMOVE ANY SOFTENED BEARING MATERIAL, AND RE-INSPECTED.
22. WHERE DEWATERING IS IMPRACTICAL OR WHERE SLURRY IS USED, CONCRETE SHALL BE PUMPED FROM THE BASE OF EXCAVATION. GRAVITY TREMIE REPLACEMENT OF CONCRETE UNDER WATER OR THROUGH SLURRY SHALL NOT BE PERMITTED.
23. THE USE OF SLURRY WILL NOT BE PERMITTED DURING CONSTRUCTION OF THAT PORTION OF DRILLED SHAFTS WHICH BEAR UPON OR ARE SOCKETED INTO ROCK.
24. MUSHROOMING AT THE TOP OF THE DRILLED SHAFT SHALL NOT BE PERMITTED.
25. IF REQUIRED BY FIRSTENERGY, CONTRACTOR SHALL HIRE A CONSULTANT TO PERFORM INTEGRITY TESTING ON COMPLETED DRILLED SHAFTS. TESTING SHALL CONSIST OF CROSSHOLE SONIC LOGGING (CSL) IN ACCORDANCE WITH ASTM D6760, OR THERMAL INTEGRITY PROFILING (TIP) IN ACCORDANCE WITH ASTM D7949.



Preliminary
12/13/2023 2:32:32 PM

I CHRISTOPHER B. WILSON HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 30419 , EXPIRATION DATE: 09-10-2025 .

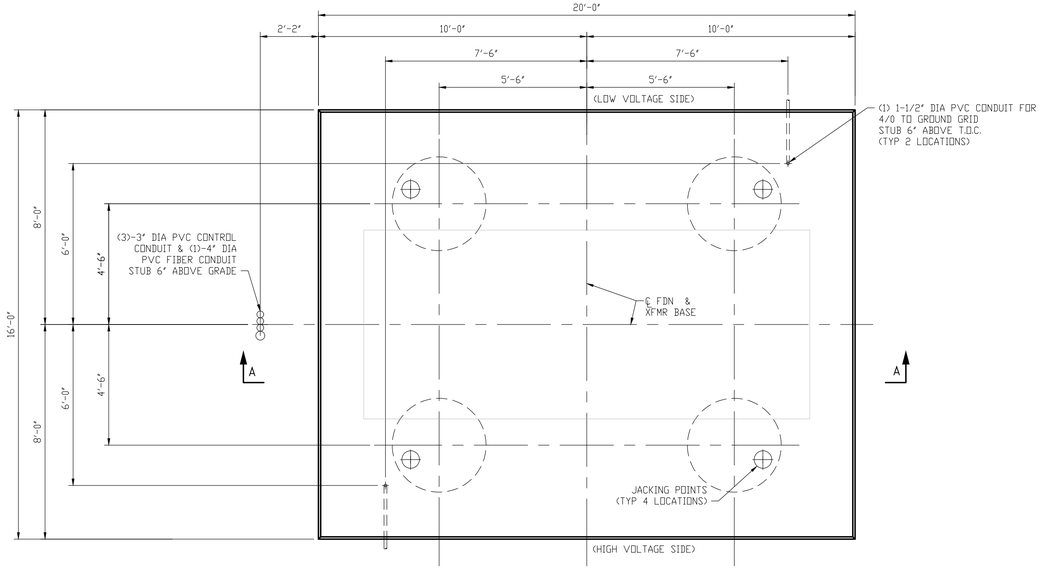
DR: MHM	FirstEnergy Energy Delivery Technical Services	DIST. CODE:	OPERATING COMPANY: POTOMAC EDISON (PE)
APP: CBW			REGION: MD-WE
DATE: 05/26/23		SCALE: NONE	AREA: FREDERICK
ISSUE: FTW BID		SIZE: 42x30	FACILITY: SAGE

17148633 230KV STRUCTURES AND CONTROL ENCLOSURE FOUNDATIONS;
17211698 230KV SSVT AND H-FRAMES, 34.5KV STRUCTURES AND CONTROL ENCLOSURE FOUNDATIONS.
DRAWING BY: BURNS & McDONNELL

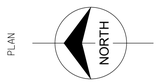
TITLE
FOUNDATION DETAILS
DRILLED SHAFT FOUNDATIONS

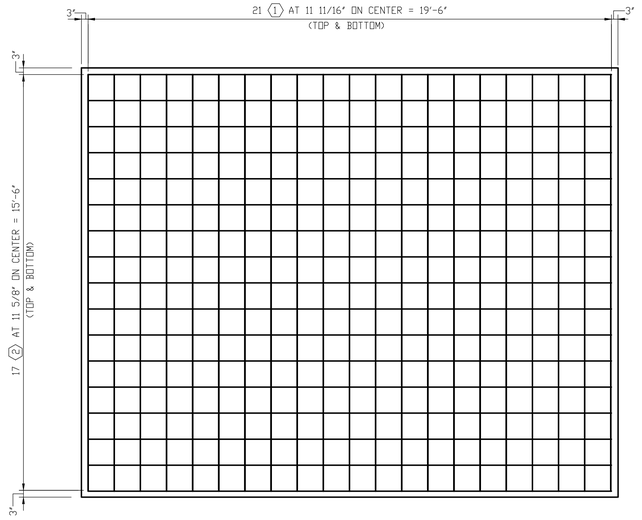
SAP NETWORK NO.	DOC. ID	REV
AS NOTED	PE-1252-15-13	--

Revision Block

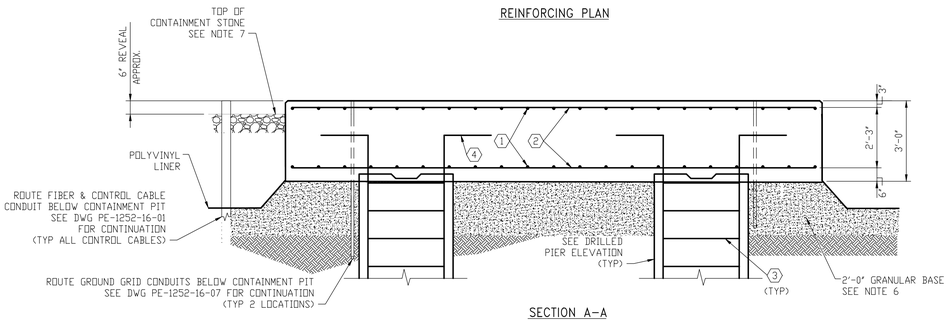


PLAN VIEW



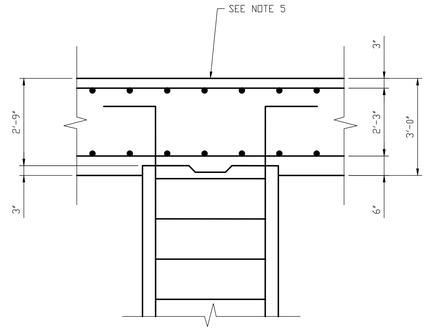


REINFORCING PLAN

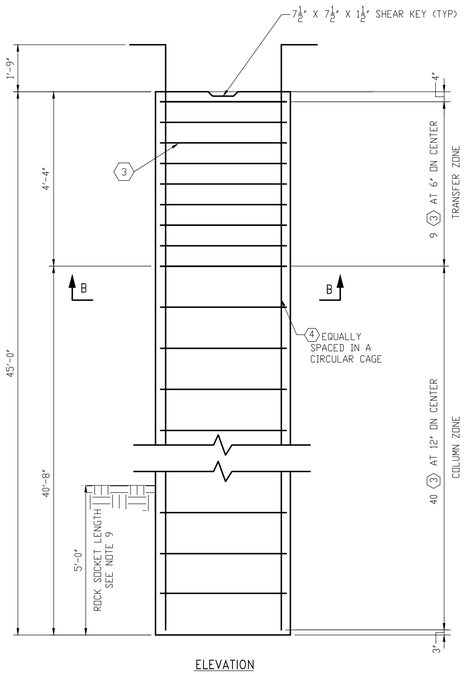


SECTION A-A

230/34.5kV TRANSFORMER FOUNDATION



ELEVATION
TYPICAL PIER CAP
NOT TO SCALE



ELEVATION
DRILLED PIER FOUNDATION
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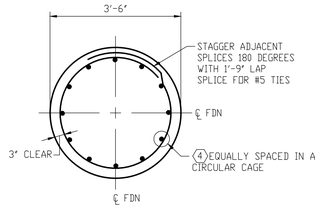

SECTION B-B
NOT TO SCALE

NETWORK #17211698			REINFORCING BAR LIST					
BM ITEM NO.	TOTAL WT.	NO. REQ'D	PIECE	NO. PER FDN.	SIZE	LENGTH	TOTAL WT. PER PC.	DETAIL
M-21	2213#	42	1	42	#9	15'-6"	52.7#	STRAIGHT
	2254#	34	2	34	#9	19'-6"	66.3#	STRAIGHT
M-21	2266#	196	3	196	#5	11'-1"	11.5#	1'-9" LAPSPLICE, 3'-0"
M-21	7874#	48	4	48	#9	48'-3"	164.1#	46'-6", 1'-9"
M-22	CONCRETE - 4000psi @ 28 DAYS MINIMUM Total Required 98.4 Cu Yds		CONCRETE QUANTITY					
			98.4 CU. YDS. PER FDN.					
			DESIGN CRITERIA					
			VERTICAL LOAD (WT. OF EQUIP) = 290,476# CONCRETE = 4000 PSI AT 28 DAYS MINIMUM REBAR = GRADE 60 DEFORMED STEEL					

NOTES:

1. CHAMFER ALL EXPOSED EDGES 1".
2. REINFORCING STEEL SHALL BE NEW INTERMEDIATE GRADE BILLET STEEL DEFORMED BARS CONFORMING TO ASTM A615 GRADE 60, LATEST REV. FURNISHED BY BELOW GRADE CONTRACTOR.
3. REINFORCING STEEL MAY BE REARRANGED TO MAINTAIN CORRECT CONDUIT PENETRATION LOCATIONS. MAXIMUM SPACING OF REINFORCING STEEL SHALL BE 13".
4. WHEN THE AIR TEMPERATURE IS BELOW 50°F HIGH-EARLY STRENGTH CEMENT SHALL BE USED AND CONCRETE STRUCTURE SHALL BE KEPT AT 50°F FOR FOUR DAYS AFTER POURING.
5. SEE DWG PE-1252-15-10 FOR FOUNDATION LAYOUT.
6. THE MATERIAL USED FOR GRANULAR BASE SHALL CONFORM WITH AND BE COMPACTED PER FIRSTENERGY SPECIFICATIONS.
7. SEE DWG PE-1252-28-02 FOR OIL CONTAINMENT PLAN AND DETAILS.
8. CENTER TRANSFORMER SKID/BASE ON FOUNDATION AS SHOWN.
9. DRILLED PIER SHALL EXTEND TO THE REQUIRED ROCK SOCKET LENGTH AS INDICATED. SEE DWG. PE-1252-15-13 FOR ADDITIONAL NOTES AND REQUIREMENTS.

Preliminary

12/13/2023 2:32:19 PM

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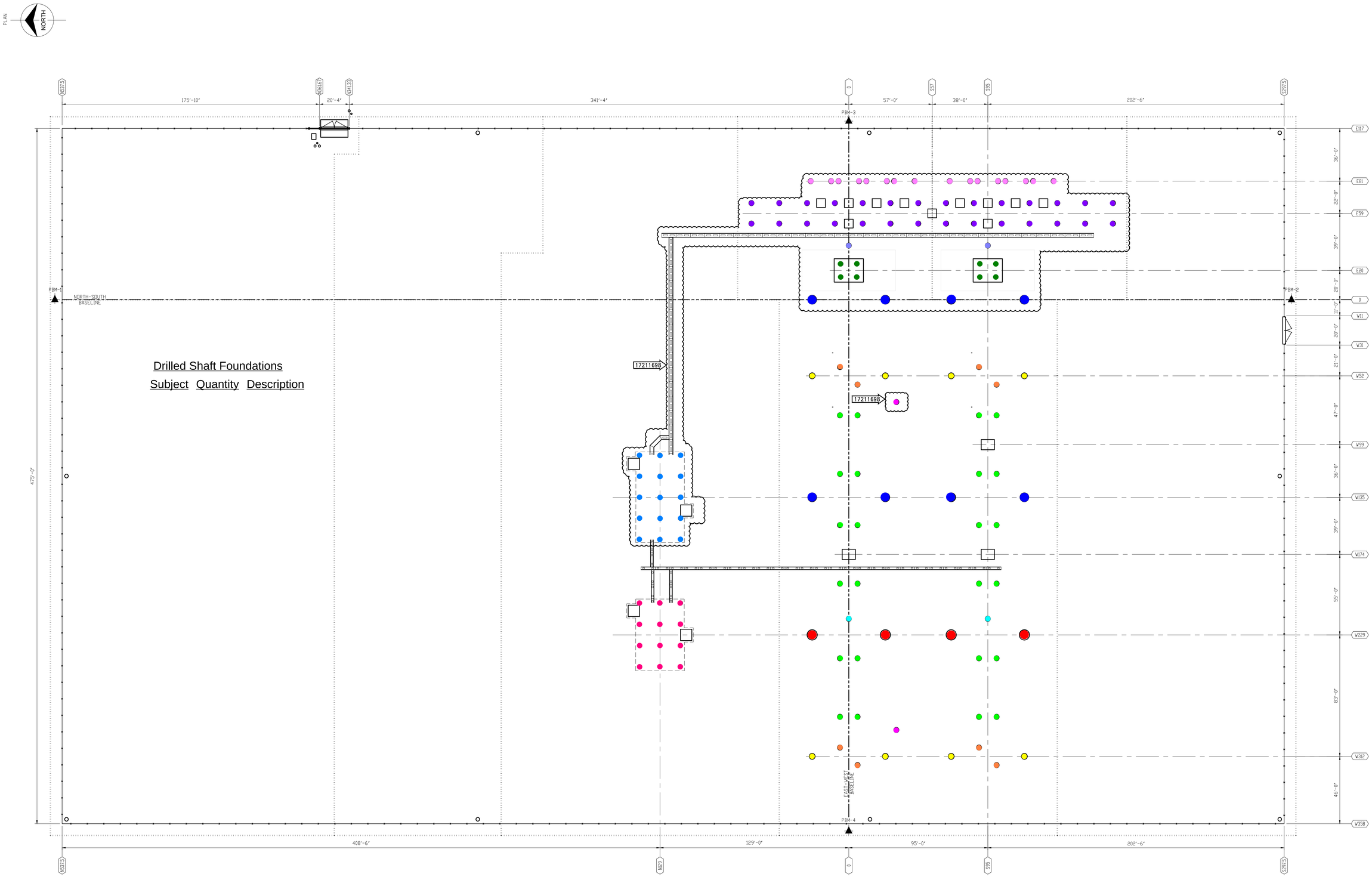
N1 (1) REQUIRED FOR NETWORK #17211698

BY: MHM APP: CDW DATE: 05/26/23 ISSUE: FOR BID	FirstEnergy Energy Delivery Technical Services	DIST. CODE: SCALE: NONE SIZE: 36x24	OPERATING COMPANY: POTOMAC EDISON (PE)	REGION: MD-WE AREA: FREDERICK
DRAWING BY BURNS & McDONNELL.			FACILITY: SAGE	
			TITLE: FOUNDATION DETAILS 230/34.5KV TRANSFORMER FOUNDATION N1	
			SAP NETWORK NO.: 17211698	DOC ID: PE-1252-15-14 REV.: –

Revision Note

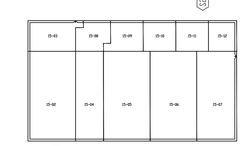


Drilled Shaft Foundations

Subject Quantity Description

NOTES:

1. SEE FOUNDATION PLANS PE-1252-15-02 THRU PE-1252-15-12 FOR ADDITIONAL NOTES.
2. SEE FENCE PLAN DWG PE-1252-04-01 FOR BENCHMARK LOCATIONS AND FENCE CORNER COORDINATES.



KEY PLAN

Preliminary

12/13/2023 2:31:56 PM

I CHRISTOPHER D. WILSON HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO 51419 , EXPIRATION DATE: 08-10-2025 .

BY: MHM	FirstEnergy Energy Delivery Technical Services	DIST. CODE:	OPERATING COMPANY: POTOMAC EDISON (PE)
APP: CDW		SCALE: 1"=25'-0"	REGION: MD-WE
DATE: 05/26/23		SIZE: 42x30	AREA: FREDERICK
ISSUE: FOR BID			FACILITY: SAGE

17148633: 230KV STRUCTURES AND CONTROL ENCLOSURE FOUNDATIONS
17211698: 34.5KV STRUCTURES AND CONTROL ENCLOSURE FOUNDATIONS
DRAWING BY: BURNS & McDONNELLL

TITLE: FOUNDATION PLAN 230KV-34.5KV YARD

SAP NO: AS NOTED | DOC. ID: PE-1252-15-01 | REV: -

Revisions/Note

Design Criteria
* Information in spreadsheet is based on information provided by Terracon in "Sage Substation Foundation Dewatering Analysis" dated 12/11/2023. *** Shallow Shafts** - Includes all shafts with embedment less than or equal to 30ft. Assumes that shafts are not socketed into rock and completed within 24 hours. Volume of water per shaft calculated as 1/3 of the deep shaft water volume (24hr/72hr)*(4000gallons/shaft)=1333.3 gallons *** Deep Shafts** - Includes all shafts with embedment greater than 30ft. Assumes that shafts are socketed up to 50ft and take up to 72 hours to complete. * Volume of water is based on "Case 1" which models FDN Mk. A near boring P-29. * Volumes provided are for "Phase 1" construction only. ***** All slab foundations are neglected from dewatering calculations.

Shallow Drilled Shafts

FDN Mk.	Description	QTY	Length (ft)	Case Used	Volume of Water Per Shaft (gal)	Total Volume of Water (gal)
C	230kV 3PH Bi-Level Bus Support	8	15	1	1333.3	10666.7
D	230kV 3PH High Bus Support	8	17	1	1333.3	10666.7
E	230kV 3PH Low Bus Support	2	14	1	1333.3	2666.7
F	230kV 3PH Low Switch	24	14	1	1333.3	32000.0
H	34.5kV Box Structure	28	23	1	1333.3	37333.3
J	34.5kV Riser Structure	16	16	1	1333.3	21333.3
K	34.5kV 3PH High Bus Support	2	15	1	1333.3	2666.7
					Total:	117,333.3

Deep Drilled Shafts

FDN Mk.	Description	QTY	Length (ft)	Case Used	Volume of water per shaft (gal)	Total Volume of Water (gal)
A	230kV Transmission H-Frame	4	50	1	4000	16000.0
B	230kV Bus H-Frame	8	48	1	4000	32000.0
G	230kV 1PH SSVT Stand	2	39	1	4000	8000.0
L	230kV Control Building	12	33	1	4000	48000.0
M	34.5kV Control Building	15	33	1	4000	60000.0
N1	Transformer Drilled Shafts	4	45	1	4000	16000.0
N2	Transformer Drilled Shafts	4	45	1	4000	16000.0
					Total	196,000.00

Total Dewatering Volume From Foundation Activities (gal):	313,333

Appendix F

HASP for Substation Work

PRINT RESET

FE JOB SPECIFIC SAFETY PLAN

FirstEnergy

WORK PLANNING FOR PERSONNEL, ENVIRONMENTAL AND EQUIPMENT SAFETY

(NOTE: CONTRACTOR SUBMITS ELECTRONICALLY TO FIRSTENERGY REPRESENTATIVE FOR REVIEW)

CONTRACTOR COMPANY NAME:	PROJECT NAME:	FE FACILITY NAME/JOB SITE:	
FirstEnergy	Sage Substation - Phase 1	Sage Substation	
PROJECT MANAGER(S):	CONTACT PHONE NUMBER(S):	DATE SUBMITTED:	ESTIMATED START DATE:
Justin Walter	(301) 660-1418		

This plan is to cover personnel safety, environmental safety, and equipment safety. Sections I-III are intended to aid you in the gathering of information and the planning of your work. Information gathered in these sections will be utilized in their entirety during completion of Section IV, your Hazard Mitigation Plan. This plan will then be used to generate pre-job briefs that will be reviewed with all involved employees prior to each task. All information is to be shared with all employees at the job site and direction provided that no task is to proceed unless it is in accordance with their pre-job brief. The use of 2-Minute drill is mandatory and must be discussed during pre-job briefs. Photographs should be utilized whenever their inclusion provides additional clarity. Additional pages should be created as necessary.

I. PREREQUISITES TO JOB SPECIFIC SAFETY PLAN

- ☑ SAFETY PREQUALIFIED THROUGH AVETTA (WHERE APPLICABLE PER FEU-SAF-0002)
  - ☑ IF NOT IN AVETTA, DIRECTOR APPROVAL RECEIVED, AND VARIANCE GRANTED THROUGH FE CONTRACTOR SAFETY?
- ☑ SUBSTANCE ABUSE PROGRAM THAT INCLUDES NEW HIRE, REASONABLE SUSPICION, AND RANDOM TESTING
- ☑ EMERGENCY ACTION/RESCUE PLAN FOR SPECIFIC WORK ATTACHED
- ☑ COMMITMENT TO PAUSE WORK FOR ANY HAZARD/EXPOSURE/CRITICAL CONTROL NOT IDENTIFIED IN THIS PLAN
- ☑ HOST CONTRACTOR FORM REQUIRED

II. JOB PLANNING

A. DETAILED JOB SCOPE:

Construct new 230-34.5kV substation with two 125KVA transformers. Project includes new gravel access road, concrete foundations, steel strucutures, various power distribution and transmission equipment, two new pre-fabricated control buildings, and perimeter security fence.
This is a site wide Health and Safety plan. Contractors will be required to submit Health and Safety plans specific to their scope of work and discipline as part of their awarded contract.

B. PERMITS, CERTIFICATIONS, OR SPECIAL QUALIFICATIONS (I.E. OSHA COMPETENT PERSON) – CONNECT THIS INFORMATION INTO SECTION IV:

☐ RIGGING	☐ SCAFFOLDING	☐ ELECTRICAL/ARC FLASH	☐ SPECIALTY TOOLS/EQUIPMENT
☐ ASBESTOS	☑ EXCAVATION/TRENCHING	☑ CRANE OPERATOR	☐ QUALIFIED SIGNALMAN
☐ HOT WORK	☐ CONFINED SPACE	☑ FALL PROTECTION	☐ FLOOR OPENING
☐ FORKLIFT OPERATOR	☑ CLEARANCE (LO/TO)	☑ ENVIRONMENTAL (SPECIFY)	☑ SUBSTATION ACCESS
☑ ONE CALL (811)	☐ QUALIFIED NON-ELECTRICAL WORKER (QNEW)		

OTHER:

C. TOOLS AND EQUIPMENT TO BE UTILIZED:

LIST ALL ELECTRIC OR PNEUMATIC POWER TOOLS THAT WILL BE USED DURING THIS JOB

☑ DRILL (WITH CLUTCH)	☐ BAND SAW	☐ CHIPPING HAMMER	☐ PORTA POWER
☑ DRILL (WITHOUT CLUTCH)	☑ CIRCULAR SAW	☑ ANGLE GRINDER	☐ MILLING MACHINE
☐ IMPACT WRENCH	☐ SHEARING TOOL	☐ TAPPING MACHINE	

OTHER:

LIST ALL OTHER TOOLS OR EQUIPMENT THAT WILL BE USED DURING THIS JOB

☐ CUTTING TORCH	☑ FACE SHIELD	☑ WELDING MACHINE	☑ FALL PROTECTION (SPECIFY)
☑ SAFETY GOGGLES	☐ CLEVISES/SHACKLES	☑ WELD HELMET	GUARDRAIL
☑ SPECIALTY GLOVES	☐ EXPLOSIVES	☑ SLINGS	RESTRAINT
	☑ LONG SLEEVE FR CLOTHING	☐ RESPIRATOR (SPECIFY):	PFAS
☐ HI PRESS. HOSES (>500 PSI)	(SUBSTATIONS)		OTHER

OTHER:

II. JOB PLANNING (CONTINUED)

C. TOOLS AND EQUIPMENT TO BE UTILIZED (CONTINUED):

LIST ALL INDUSTRIAL EQUIPMENT THAT WILL BE USED DURING THIS JOB

☑ FORKLIFT	☑ CRANE	☐ VACUUM TRUCK	☑ AERIAL LIFT
☐ PUMP(S)	☑ EXCAVATOR	☑ DOZER	☑ BACKHOE
☐ HIGH PRESSURE WASH	☑ SKID STEER		

OTHER:

D. LIST ALL TOOL AND EQUIPMENT INSPECTIONS THAT WILL BE CONDUCTED

TOOL OR EQUIPMENT (EX. CRANE, FALL PROTECTION, RIGGING, ETC.)	INSPECTION (EX. VISUAL, PER CHECKLIST, CERTIFIED, ETC.)	FREQUENCY (EX. DAILY, PRE-USE, ETC.)

E. INDUSTRIAL HYGIENE REQUIREMENTS

LIST ALL POTENTIAL EXPOSURES THAT COULD REACH ACTION LIMIT (TYPICALLY HALF OF THE PEL)

☐ ASBESTOS	☐ LEAD	☐ HEXAVALENT CHROMIUM	☐ INORGANIC ARESENIC
☐ SILICA	☐ SULFUR DIOXIDE	☐ NITRIC OXIDES	☐ CARBON MONOXIDE
☐ PCB'S	☐ MERCURY	☐ DUST	☐ RADIATION
☐ HISTOPLASMOSIS (BIRD FECES)	☐ HANTAVIRUS (RODENT FECES)		

OTHER:
None are anticipated since this is a greenfield site. The EMP delineates prevention and mitigation measures for hazardous substances encountered on site.

OTHER HYGIENE NEEDS:

☑ RESTROOMS/PORTABLE	☐ SHOWER FACILITIES	☐ DECONTAMINATION AREA

LOCATION OF NEAREST EYEWASH STATION:	LOCATION OF NEAREST FIRE EXTINGUISHER:

F. SUBCONTRACTOR SAFETY MANAGEMENT:

(LIST INFORMATION FOR **EVERY** SUBCONTRACTOR THAT WILL BE UTILIZED DURING THIS WORK/PROJECT)

COMPANY NAME:	TRADE/SPECIALTY:
COMPANY CONTACT:	CELL PHONE NO:

SAFETY CRITERIA VERIFICATION:	LAST YEAR	2 YEARS AGO	3 YEARS AGO	3 YEAR AVG.	CRITERIA
TOTAL RECORDABLE INCIDENT RATE (TRIR):					<3.0
NUMBER OF FATALITIES:					0
NO. OF CITATIONS (SERIOUS OR WILLFUL):					0
EXPERIENCE MODIFICATION RATE:					1.0

NAICS CODE:	INDUSTRY TRIR:	
EXPECTED CREW SIZE:	ESTIMATED START DATE:	NO. OF SHIFTS:

COMPANY NAME:	TRADE/SPECIALTY:
COMPANY CONTACT:	CELL PHONE NO:

SAFETY CRITERIA VERIFICATION:	LAST YEAR	2 YEARS AGO	3 YEARS AGO	3 YEAR AVG.	CRITERIA
TOTAL RECORDABLE INCIDENT RATE (TRIR):					<3.0
NUMBER OF FATALITIES:					0
NO. OF CITATIONS (SERIOUS OR WILLFUL):					0
EXPERIENCE MODIFICATION RATE:					1.0

NAICS CODE:	INDUSTRY TRIR:	
EXPECTED CREW SIZE:	ESTIMATED START DATE:	NO. OF SHIFTS:

II. JOB PLANNING (CONTINUED)

F. SUBCONTRACTOR SAFETY MANAGEMENT (CONTINUED):

(LIST INFORMATION FOR **EVERY** SUBCONTRACTOR THAT WILL BE UTILITZED DURING THIS WORK/PROJECT)

COMPANY NAME:			TRADE/SPECIALTY:		
COMPANY CONTACT:			CELL PHONE NO:		
SAFETY CRITERIA VERIFICATION:	LAST YEAR	2 YEARS AGO	3 YEARS AGO	3 YEAR AVG.	CRITERIA
TOTAL RECORDABLE INCIDENT RATE (TRIR):					<3.0
NUMBER OF FATALITIES:					0
NO. OF CITATIONS (SERIOUS OR WILLFUL):					0
EXPERIENCE MODIFICATION RATE:					1.0
NAICS CODE:			INDUSTRY TRIR:		
EXPECTED CREW SIZE:	ESTIMATED START DATE:		NO. OF SHIFTS:		

COMPANY NAME:			TRADE/SPECIALTY:		
COMPANY CONTACT:			CELL PHONE NO:		
SAFETY CRITERIA VERIFICATION:	LAST YEAR	2 YEARS AGO	3 YEARS AGO	3 YEAR AVG.	CRITERIA
TOTAL RECORDABLE INCIDENT RATE (TRIR):					<3.0
NUMBER OF FATALITIES:					0
NO. OF CITATIONS (SERIOUS OR WILLFUL):					0
EXPERIENCE MODIFICATION RATE:					1.0
NAICS CODE:			INDUSTRY TRIR:		
EXPECTED CREW SIZE:	ESTIMATED START DATE:		NO. OF SHIFTS:		

WHAT ENERGY SOURCES WILL NEED TO BE ISOLATED (LO/TO) FOR THIS JOB? (EX. ELECTRICAL, PRESSURE, TEMPERATURE, POTENTIAL ENERGY, ETC):

Initially, no outage will be required since the 205 Line is currently de-energized. Once the 205 Line is energized, FE's Manual of Operations will be followed for tagging and switching of the system.

ARE THERE ANY CRITICAL STEPS IN THIS JOB? (EX. CRITICAL LIFT, REENERGIZING EQUIPMENT, VERIFYING EQUIPMENT ISOLATIONS, ETC.):

Initial energization of transmission line, energizing any equipment inside the station, and lifting/setting of large equipment (transformers, control buildings).

DESCRIBE PLANS TO PROTECT STORM DRAINS AND WATERWAYS NEAR EITHER WORK OR STAGING AREAS. (EX. CONTAINMENT, ISOLATION, GRADING, ETC.):

Erosion and Sediment Controls delineated in the Site Improvement Plan will be followed throughout the project.

LIST FACILITY EQUIPMENT NEAR WORK OR STAGING AREAS AND DESCRIBE PLANS TO ENSURE THAT ACTIVITIES WILL NOT IMPACT PLANT OPERATIONS:

N/A

WHAT LEVEL OF OVERSIGHT WILL BE PROVIDED DURING THIS JOB? (EX. FOREMAN, SUPERINTENDENT, FE, NONE, ETC.):

FE Construction Site Coordinator will be on site while work is underway, Project Manager will be on site periodically and will be supporting the CSC when not on site.

DESCRIBE ANY INTERFACE REQUIRED WITH FE OR OTHER CONTRACTORS (EX. OVERSIGHT, CLEARANCE, QUALITY CHECK, ETC.):

WHAT CRITERIA WILL BE USED TO IDENTIFY WHEN THIS JOB WILL BE ABORTED? (EX. RIGGING CHANGES, NEW TOOL REQUIRED, UNIDENTIFIED HAZARD, ETC.):

III. TASK PLANNING (EX. SET UP CRANE, TRANSFER MATERIAL TO LOCATION, REMOVE SCRAP MATERIAL, ETC.)

A. LIST THE INDIVIDUAL TASKS REQUIRED TO COMPLETE THE IDENTIFIED SCOPE OF WORK

1. Karst Remediation Grouting	11.
2. Installation of Erosion and Sediment Controls	12.
3. Construction of Access Road	13.
4. Excavation and Placement of Concrete Foundations	14.
5. Delivery and Placement of Control Buildings	15.
6. Construction of Steel Structures	16.
7. Placement/Wiring of Electrical Equipment	17.
8. Testing/Commissioning of Electrical Equipment	18.
9. Energization of the Substation	19.
10.	20.

IV. HAZARD MITIGATION PLAN

IDENTIFY THE WORK STEPS ASSOCIATED WITH EACH TASK IDENTIFIED IN SECTION III. FOR EACH WORK STEP, IDENTIFY THE ASSOCIATED HAZARDS AND THE MEANS THAT WILL BE USED TO CONTROL OR ELIMINATE THE HAZARDS. INSERT PHOTOS WHEREVER APPROPRIATE. ALSO INCLUDE INFORMATION ASSOCIATED IN SECTION II. IF MORE THAN FIVE STEPS ARE REQUIRED, ATTACH ADDITIONAL INFORMATION AS NEEDED.

TASK 1:	**ASSOCIATED CLEARANCE(S)** (INCLUDE ONCE A CLEARANCE NUMBER HAS BEEN GENERATED:

WORK STEP #1

	LIST THE WORK STEPS FOR EACH TASK	IDENTIFY THE HAZARDS	ELIMINATE OR CONTROL THE HAZARD

WORK STEP #2

	LIST THE WORK STEPS FOR EACH TASK	IDENTIFY THE HAZARDS	ELIMINATE OR CONTROL THE HAZARD

WORK STEP #3

	LIST THE WORK STEPS FOR EACH TASK	IDENTIFY THE HAZARDS	ELIMINATE OR CONTROL THE HAZARD

WORK STEP #4

	LIST THE WORK STEPS FOR EACH TASK	IDENTIFY THE HAZARDS	ELIMINATE OR CONTROL THE HAZARD

WORK STEP #5

	LIST THE WORK STEPS FOR EACH TASK	IDENTIFY THE HAZARDS	ELIMINATE OR CONTROL THE HAZARD

IV. HAZARD MITIGATION PLAN (CONTINUED)

TASK 2:	**ASSOCIATED CLEARANCE(S)** (INCLUDE ONCE A CLEARANCE NUMBER HAS BEEN GENERATED:

WORK STEP #1			
	LIST THE WORK STEPS FOR EACH TASK	**IDENTIFY THE HAZARDS**	**ELIMINATE OR CONTROL THE HAZARD**
WORK STEP #2			
	LIST THE WORK STEPS FOR EACH TASK	**IDENTIFY THE HAZARDS**	**ELIMINATE OR CONTROL THE HAZARD**
WORK STEP #3			
	LIST THE WORK STEPS FOR EACH TASK	**IDENTIFY THE HAZARDS**	**ELIMINATE OR CONTROL THE HAZARD**
WORK STEP #4			
	LIST THE WORK STEPS FOR EACH TASK	**IDENTIFY THE HAZARDS**	**ELIMINATE OR CONTROL THE HAZARD**
WORK STEP #5			
	LIST THE WORK STEPS FOR EACH TASK	**IDENTIFY THE HAZARDS**	**ELIMINATE OR CONTROL THE HAZARD**

TASK 3:	**ASSOCIATED CLEARANCE(S)** (INCLUDE ONCE A CLEARANCE NUMBER HAS BEEN GENERATED:

WORK STEP #1			
	LIST THE WORK STEPS FOR EACH TASK	**IDENTIFY THE HAZARDS**	**ELIMINATE OR CONTROL THE HAZARD**
WORK STEP #2			
	LIST THE WORK STEPS FOR EACH TASK	**IDENTIFY THE HAZARDS**	**ELIMINATE OR CONTROL THE HAZARD**
WORK STEP #3			
	LIST THE WORK STEPS FOR EACH TASK	**IDENTIFY THE HAZARDS**	**ELIMINATE OR CONTROL THE HAZARD**
WORK STEP #4			
	LIST THE WORK STEPS FOR EACH TASK	**IDENTIFY THE HAZARDS**	**ELIMINATE OR CONTROL THE HAZARD**
WORK STEP #5			
	LIST THE WORK STEPS FOR EACH TASK	**IDENTIFY THE HAZARDS**	**ELIMINATE OR CONTROL THE HAZARD**

IV. HAZARD MITIGATION PLAN (CONTINUED)

TASK 4:	**ASSOCIATED CLEARANCE(S)** (INCLUDE ONCE A CLEARANCE NUMBER HAS BEEN GENERATED:

WORK STEP #1			
	LIST THE WORK STEPS FOR EACH TASK	**IDENTIFY THE HAZARDS**	**ELIMINATE OR CONTROL THE HAZARD**
WORK STEP #2			
	LIST THE WORK STEPS FOR EACH TASK	**IDENTIFY THE HAZARDS**	**ELIMINATE OR CONTROL THE HAZARD**
WORK STEP #3			
	LIST THE WORK STEPS FOR EACH TASK	**IDENTIFY THE HAZARDS**	**ELIMINATE OR CONTROL THE HAZARD**
WORK STEP #4			
	LIST THE WORK STEPS FOR EACH TASK	**IDENTIFY THE HAZARDS**	**ELIMINATE OR CONTROL THE HAZARD**
WORK STEP #5			
	LIST THE WORK STEPS FOR EACH TASK	**IDENTIFY THE HAZARDS**	**ELIMINATE OR CONTROL THE HAZARD**

TASK 5:	**ASSOCIATED CLEARANCE(S)** (INCLUDE ONCE A CLEARANCE NUMBER HAS BEEN GENERATED:

WORK STEP #1			
	LIST THE WORK STEPS FOR EACH TASK	**IDENTIFY THE HAZARDS**	**ELIMINATE OR CONTROL THE HAZARD**
WORK STEP #2			
	LIST THE WORK STEPS FOR EACH TASK	**IDENTIFY THE HAZARDS**	**ELIMINATE OR CONTROL THE HAZARD**
WORK STEP #3			
	LIST THE WORK STEPS FOR EACH TASK	**IDENTIFY THE HAZARDS**	**ELIMINATE OR CONTROL THE HAZARD**
WORK STEP #4			
	LIST THE WORK STEPS FOR EACH TASK	**IDENTIFY THE HAZARDS**	**ELIMINATE OR CONTROL THE HAZARD**
WORK STEP #5			
	LIST THE WORK STEPS FOR EACH TASK	**IDENTIFY THE HAZARDS**	**ELIMINATE OR CONTROL THE HAZARD**

JOB SPECIFIC SAFETY PLAN ATTACHMENTS		
ATTACHMENT TYPE	**FILE NAME**	**LOCATION OF SAVED FILE**
EMERGENCY ACT/RESCUE PLAN		
SUBSTANCE ABUSE POLICY		
FALL PROTECTION PLAN		
SAFETY DATA SHEETS		

Appendix G

Water Management Procedure

Water and Sediment Management Process Flow Diagram
Quantum Maryland – First Energy Sage Substation - EMP-4

Water Generation

Water Pumped or Trucked to Separator Tank based on proximity, source (all EC), and quality (clear groundwater/stormwater vs grout contact water)

Sage Substation Tank System

- LMG displaced return water
- Grout system wash water
- Shallow foundation stormwater
- Deep foundation dewatering

Multiple Separator/Tank Systems (if selected)

Separator Tank 1
(Separates solids, contains sediment, may be neutralized)

Water

Field test water daily for pH

Neutralize as needed (See **Procedure N-1**)

Settle (typically overnight)

Decant clear water to Frac Tank #2, #3, etc. (flow through or settle during periods of low flow/overnight, no lower than 1 foot above sediment).

Sediment (Wet)

Solids may be allowed to build up in this tank for the duration of the work.

When solids are to be removed (at completion or contractor discretion), they must first be tested per sediment procedure.

(See **Procedure S-2**).

Frac Tank 2, etc
(Decanted water for testing/ holding)

Water

Log water volume daily

When full, label as such and no more water is added.

Verify no measurable sediment layer.

Field test pH.

Neutralize if needed per **Procedure N-1**.

Collect one water sample per **Procedure W-1**.

Review Data/Share results and recommendation with MDE.

Destination
(Dust Control or Off-Site Disposal)

Dust Control

Water for dust control must meet standards for all COCs listed in **Procedure W-1** (shorter list if W-1 list is reduced with MDE approval after second tank tested)

(See **Procedure W-1**)

When approved for dust control, pump water to water truck and apply per ESC plan. When tank is empty, log as empty and available for reuse

Disposal

Water for disposal requires testing for pH and fluoride and any additional parameters required by the disposal facility.

(See **Procedure W-1**).

Water can be tested for this short list if destined in advance for disposal, or water tested for dust control use which does not meet dust control standards and does meet disposal standards may be disposed

See **Process Flow Notes** sheet for **Procedures S-1, S-2, N-1, W-1** where referenced this sheet.

Quantum Maryland – First Energy Sage Substation
EMP-4 Process Flow Notes/Procedures

1. See **Process Flow Diagram** for overall process flow and references to these notes/Procedures.

2. General concepts (for context – this section General Concepts is not the procedure itself)
    a. All water generated within the scope of EMP-4 follows this same process.
    b. Multiple separator and tank systems may be used to manage differing source and location of water generation. Sources and locations are listed on the flow sheet Water Generation box.
    c. The process diagram shows solids removed in separator tank #1 (sediment removal).
    d. Neutralization is included as needed in separator tank #1.
    e. The process builds in some flexibility up to this point (when to remove solids, when to neutralize if needed, etc). The next step creates a tank full of water for testing/decision making.
    f. Water (without sediment) is decanted into frac tank #2, 3, etc. That is where water is segregated, tested and held for decision making. This is done in a tank with no measurable sediment so one sample is representative of the tank and conditions don't change with agitation, etc or upon emptying.
    g. All water is destined for either off-site disposal or on-site dust control (no on-site discharge). The parameter lists/standards described herein are different for each use.
    h. Each frac tank and its log will be labelled with the frac tank unique identifier (typically around 6 digits) as well as whether it is in the Separator Tank #1 position or the decanted Frac Tank #2, 3, 4 position)

3. Numbered **Procedures** as/where referenced on **Process Flow Diagram** are as follows:

    Procedure S-1 (not used)

    Procedure N-1 (neutralization in Separator Tank #1)
    a. Collect aqueous sample using a bailer dropped to approximate center (1/2 depth) of tank. Field check pH.
    b. Measure sediment thickness. If measurable thickness is present, collect sediment sample from base of tank using bottom-filling sampler such as Sludge Judge® II by Nasco Sampling or equal. Field check pH.
    c. If pH is out of range for intended water use/disposition (6-9 s.u. for on-site dust control or 4-10.5 s.u. for disposal [conservative within RCRA non-hazardous range of 2 to 12.5]), implement neutralization using following steps.
    d. Circulate water in tank by pumping from low outlet back to tank inlet.
    e. Collect aqueous sample using a bailer dropped to approximate center (1/2 depth) of tank. Field check pH. Field check total alkalinity (as $CaCO_3$) using Hach Alkalinity Test Kit, Model AL-AP, mg/L Product Number: 2444301 (or equal).
    f. Estimate required addition of citric acid. The balanced reaction of $CaCO_3$ and citric acid is: $3CaCO_3 + 2H_3C_6H_5O_7 \rightarrow Ca_3(C_6H_5O_7)_2 + 3H_2O + 3\ CO_2$ (2 moles citric acid per 3

moles CaCO3). Using molecular weights of CaCO3 (100g/mol) and citric acid (192 g/mol):

grams citric acid needed = alkalinity (mg CaCO3/liter) x 1g/1000 mg x 1 mol CaCO3/100g x 192 g citric acid/mol x 2 mol citric acid/3 mol CaCO3 x 0.264 l/gal) x tank volume (gallons) = 0.00033792 x CaCO3 alkalinity x tank volume (in gallons)

g. Citric acid is obtained as a solid (the estimated quantity needed is the number of grams above) or as a 50% solution (approximately density of 1.24 kg/l, so 620 grams/liter)
h. These are only estimates. Using appropriate safety precautions, acid should be added slowly while continuously circulating the tank and periodically checking pH. Pause when approaching target range.
i. Stop water circulation. Check pH again after letting tank rest for several hours.

Procedure S-2 (sediment removal from Separator Tank #1)

a. Sediment in Separator Tank #1 will be present under a water phase (either a small amount of water if clear water has been decanted to Frac Tank #2 or more water if not).
b. Sediment removed from this location will be destined for off-site disposal.
c. If a waste characterization has not yet been approved by a disposal facility, sample sediment for fluoride, PCBs, TCLP RCRA metals, pH and any additional parameters requested by the disposal facility. Share the results and the waste facility approval with MDE.
d. If a waste characterization has already been approved by a disposal facility (or once approved)
    i. a sample will be collected from the base of the tank and field checked for pH.
    ii. If outside acceptable range of 4-10.5 s.u. (conservative within RCRA non-hazardous range of 2 to 12.5), implement neutralization.
    iii. If within range, vac water into transport vehicle. Check pH in tanker prior to leaving the site.
    iv. Retain copy of disposal record.

Procedure W-1 (water sampling and decision-making in Frac Tank #2, 3, etc.)

a. Following the Flow Diagram, Frac Tank #2, 3, etc. will contain decanted water with no measurable sediment at the point where this **Procedure W-1** is referenced.
b. Based on the above, the representative sampling procedure (where this **Procedure W-1** is referenced in the "**Frac Tank #2**" box on the **Process Flow Diagram**) is to drop a bailer to at least the midpoint (1/2 depth) of the tank.
c. As referenced in the "D**estination**" box on the **Process Flow Diagram**, the analytical parameters depend on whether the water is proposed for use for dust control (subject to testing/approval) or is already destined for off-site disposal (such as when dust control water is not needed, or when fluoride or other concentrations in previous tanks of water suggest the water would not be approved for dust control if tested).
    i. Procedure for dust control (as referenced in the "**Destination/Dust Control**" box on the **Process Flow Diagram**:
        1) Label the tank and tank log as held subject to testing.

2) Verify no measurable sediment is present.
3) Collect a sample from the midpoint of the tank and field check for pH.
4) If outside acceptable range of 6-9 s.u., implement neutralization per **Procedure N-1,** wait minimum 1 hour and resample.
5) Analyze sample for pH, fluoride, free cyanide, VOCs, PAHs, PCBs, TPH-GRO/DRO, and priority pollutant metals (dissolved). After a minimum of two tanks of water have been sampled for these parameters, QL may request a reduction in the parameter list to remove parameters with no history of detection above a standard; the minimum list will include fluoride.
6) When results are returned (estimated 5 day lab turnaround), compare results to standards and share results and recommended disposition (acceptable for dust control or not) with MDE.
7) Water standards for dust control are as listed below (specific constituents of VOC, PAH, PCB, Metals groups listed below are based on site COCs. Any detected constituent of these groups not listed will be compared to MDE groundwater standards):

Media	COPC	Criteria	Basis
Water	pH	6-9 s.u.	
	Fluoride	4.0 mg/l	NPWDR
	Free cyanide	0.2 mg/L	NPWDR
	VOCs		
	PCE	5.0 ug/l	MDE GCS
	PAHs		
	Benz(a)anthracene	0.03 ug/l	MDE GCS
	Benzo(a)pyrene	0.2 ug/l	MDE GCS
	Benzo(b)fluoranthene	0.25 ug/l	MDE GCS
	Benzo(k)fluoranthene	2.5 ug/	MDE GCS
	Dibenz(a,h)anthracene	0.025 ug/l	MDE GCS
	Indeno(1,2,3-c,d)pyrene	0.25 ug/l	MDE GCS
	PCBs		
	Aroclor 1016	0.14 ug/l	MDE GCS
	Aroclor 1242	0.0078 ug/l	MDE GCS
	Aroclor 1248	0.0078 ug/l	MDE GCS
	TPH-GRO/DRO	47 ug/l	MDE GCS
	PP Metals		
	Arsenic	10 ug/l	MDE GCS
	Chromium (total)	100 ug/l	MDE GCS

NPWDR – US EPA National Primary Drinking Water Regulations

MDE GCS – Maryland Department of Environment Generic Cleanup Standards (October 2018, Interim Final Guidance Update No. 3)
If total chromium exceeds 100 ug/l, analyze hexavalent chromium.

8) If not approved for dust control, follow next procedure for disposal.
9) When approved by MDE for dust control, pump water to water truck and apply per ESC plan. When tank is empty, log as empty and available for reuse.

ii. Procedure for disposal (as referenced in the "**Destination/Disposal**" box on the **Process Flow Diagram**:

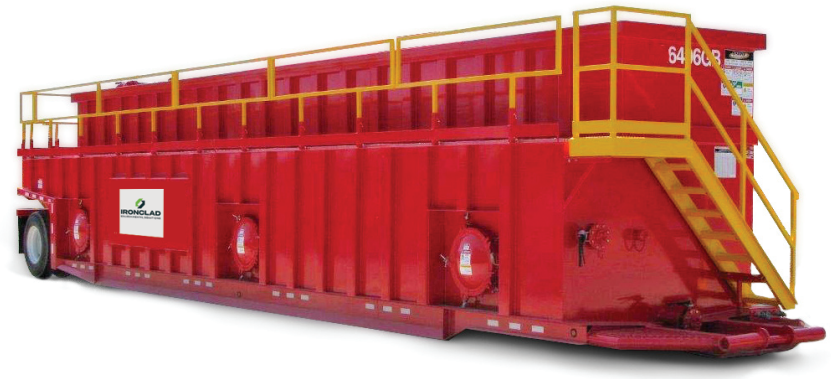
1) If a waste characterization has not yet been approved by a disposal facility, sample water for fluoride, PCBs, TCLP RCRA metals, pH and any additional parameters requested by the disposal facility. Share the results and the waste facility approval with MDE.
2) If a waste characterization has already been approved by a disposal facility (or once approved)
3) Collect a sample from the midpoint of the tank and field check for pH.
4) If outside acceptable range of 4-10.5 s.u. (conservative within RCRA non-hazardous range of 2 to 12.5), implement neutralization per **Procedure N-1**.
5) If within range, vac water into transport vehicle. A full tank will require multiple transport loads. Check pH in each tanker prior to leaving the site.
6) Retain copy of each disposal record.
7) When tank is empty, log as empty and available for reuse.
    a) If water was disposed due to exceeding a standard applicable to dust control water, log tank as empty and available for disposal use.
    b) At contractor option, tank may be rinsed and rinsewater pumped to filter box. The tank was already sediment-free to get to this point in the process. Review with MDE prior to logging tank as available for any use.

IRONCLAD
ENVIRONMENTAL SOLUTIONS

18,000 GALLON (430BBL)

Sabre Open-Top Tank

Designed to allow tank content access via an open top, the 18,000 Gallon Open Top Tank is outfi tted with a complete set of safety features, including a full length side walkway with permanent fixed handrails and a 48" wall between the operator and the product in the tank, a bare steel interior with optional weirs, and three side manways allowing easy access into the tank for cleaning.



*Photos are representational; actual products vary. Additional product plans and specifications may vary from those shown and are subject to in-stock availability.

Dimensions and Weights

Capacity: 18,060 gal (430 bbl)

Height: 13'

Width: 8'

Length: 45' 1"

Tare Weight: 26,820 lbs

Construction

Integrated full-length side-walkway
- No Guardrails to set up or take down
- No moving parts or pins to break
- No over-height issues
- Storage area is protected from walkway debris

Easy to clean design
- Smooth Wall Interior
- No corrugations
- No internal rods

3 easily accessible side hinged manways

2 front and 1 rear 4 inch valved fi ll/drain ports

Front and rear 3-inch fill line

Fixed rear axle for increased maneuverability

Nose rail cut-out for easy access when installing hose and fi ttings

Features

Safety Walkway eliminates need to walk on top of product

Grip strut stairs to help prevent slipping

Rails and stairs are painted safety yellow for high visibility

Safe Operation reminder decals attached

Attached strapping charts

Options

Bolt in Wiers



We proudly provide specialty-containment and waste-management solutions, with industry-leading service, safety, access and integrity.

Learn more at **Ironclad**Environmental.com

IRONCLAD
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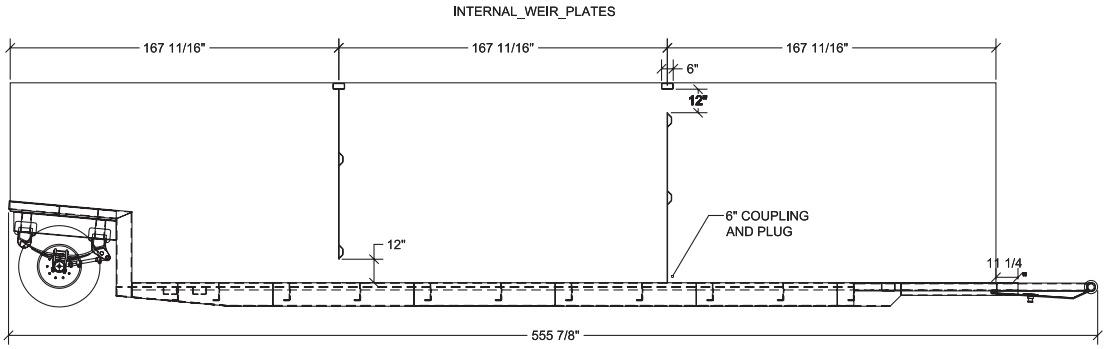
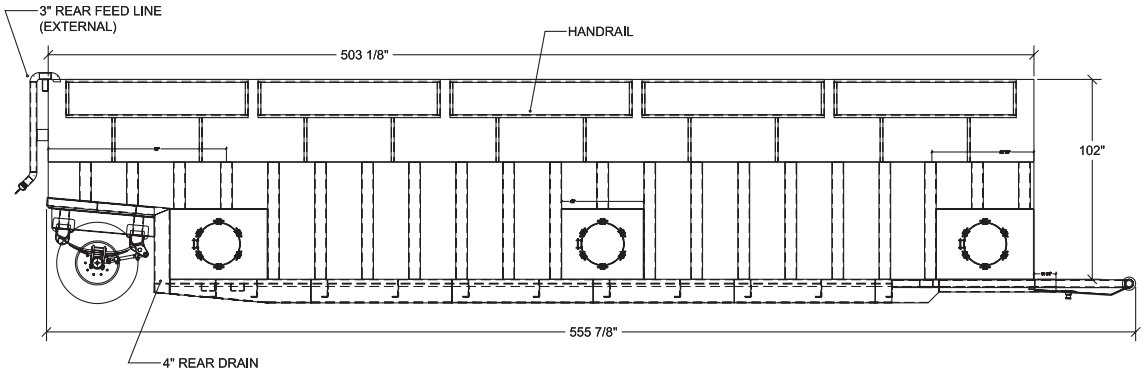
STEEL TANK

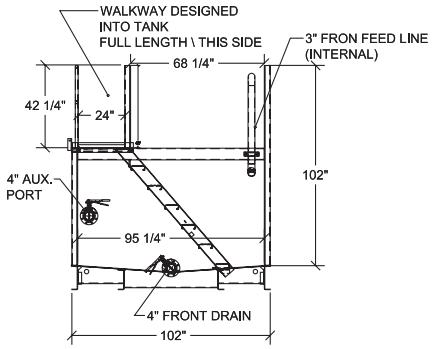
18,000 Gallon Sabre Open-Top Tank



Internal Weir View



Exterior Passenger Side View



Ladder Side View

*Some details not shown in all views. Overall dimensions are normal.

*Photos are representational; actual products vary. Additional product plans and specifications may vary from those shown and are subject to in-stock availability.

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