APPENDIX F
CASE 10-T-0139
STORMWATER POLLUTION PREVENTION PLAN
(SWPPP)

Stormwater Pollution Prevention Plan (SWPPP)

Prepared for Construction Activities At:

Champlain Hudson Power Express

Astoria Annex Upgrades

SWPPP Prepared For:

Transmission Developers, Inc.

1301 Avenue of the Americas, 26th Floor

New York, NY 10019-6022

SWPPP Prepared By:

Sargent & Lundy

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SWPPP Preparation Date:

October 2024

Estimated Project Start and End Dates:

Dec 2024 – Feb 2026

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SECTION 1: CONTACT INFORMATION/ RESPONSIBILITIES

1.1 Construction Stormwater Team

Construction Stormwater Team		
Name, company/organization, position, and contact information	Responsibilities	I Have Read and Understand the Applicable Requirements of Title 15, Chapter 19.1 NYC Rules and Regulations
Transmission Developers, Inc.		☐ Yes Date:
Primary Contractor Name		☐ Yes Date:
Sub-Contractor Name		☐ Yes Date:
Emergency 24-hour Name		☐ Yes Date:

1.2 Design Stormwater Team

Design Stormwater Team		
Name, company/organization, position, and contact information	Responsibilities	I Have Read and Understand the Applicable Requirements of Title 15, Chapter 19.1 NYC Rules and Regulations
Transmission Developers, Inc.	Owner/Developer	☐ Yes Date:
Eugene Porzio Sargent & Lundy Manager 609-451-3375 gene.porzio@sargentlundy.com	SWPPP Preparer	☐ Yes Date:
EDR Environmental Design & Research, Landscape Architecture, Engineering & Environmental Services, D.P.S..	Primary Consultant	☐ Yes Date:

SECTION 2: SITE EVALUATION, ASSESSMENT, AND PLANNING

2.1 Project Site Information

Project Name and Address
Project/ Site Name: Champlain Hudson Power Express - Astoria DC Annex Station Upgrades

Project Location: Located on the East River adjacent to Con Edison's Astoria Facilities

City: Astoria

State: New York

Zip Code: 11105

Borough: Queens

Block(s) and Lot(s): Block 850 Lot 1

DEC Region: 2

Business Days and hours for the project: Monday – Friday / 7:00am to 5:00pm

Project Latitude/ Longitude (from GIS)

Center of site:

Latitude: 40.783753 ° N
(Decimal degrees)

Longitude: -73.903522 ° W
(Decimal degrees)

Latitude/longitude data source:

☐ MAP ☐ GPS ☒ OTHER (Please specify): Google Map

Horizontal Reference Datum:

☐ NAD 27 ☒ NAD 83 ☐ WGS 85

Type of Construction Site *(check all that apply)*:

☐ Single-Family Residential ☐ Multi-Family Residential ☐ Commercial ☐ Industrial
☐ Institutional ☐ Highway or Road ☒ Utility ☒ Other:

Size of Construction Site

Size of Property	191.830 Acres +/- (Block 850, Lot 1)
Total Area Expected to be Disturbed by Construction Activities	<20,000 SF
Maximum soil disturbance at any time	<20, 000 SF

2.2 Nature of the Construction Activity

General Description of Project

CHPE LLC and Hydro-Québec (HQ) are developing the U.S. Champlain Hudson Power Express (CHPE) project to supply renewable energy from Quebec to New York City (NYC). The project consists of two (2) ±400 kV high voltage direct current (HVDC) cables from a new converter station adjacent to Hertel substation in Quebec to another new converter station adjacent to Astoria Annex substation in New York. The 345 KV HVAC output of the Astoria Converter Station will be connected to NYPA's Astoria Annex GIS substation which will need to be expanded from a four-breaker ring bus to a six-breaker ring bus. A new 345 KV HVAC circuit from the Astoria Annex to Con Edison's Rainey Substation will also be constructed.

HVAC Connection to Astoria Annex ("Project")
A segment of overhead HVAC transmission lines is planned between the Astoria Converter Station and the existing Astoria Annex GIS Substation. The transmission line will be a single circuit 345kV HVAC transmission line (T-line) connecting the Astoria converter station to the Astoria Annex GIS building. Each phase of the transmission line will be comprised of two 795 kcmil OH conductors. The T-line will be less than one half mile in length and located on the Con Edison Astoria Generating Complex in Queens, New York. This overhead transmission line will serve as the link between the CHPE Astoria Converter station project and the NYPA Transmission system. Drawing CHPE-CS-CV-002 in Appendix M shows the anticipated routing of the HVAC connection between the Astoria Converter station and the Astoria Annex substation owned by NYPA.

Astoria Annex Substation Modifications ("Project")
The existing Astoria Annex substation is a 345 KV Gas Insulated Switchgear (GIS) four-breaker ring bus owned by NYPA but under the operational control of Con Edison. The GIS switchgear will be expanded to a six-breaker ring bus configuration to accommodate the T-line connection locations from the Astoria Convertor Station and the Astoria to Rainey Cable connection. Two (2) additional Control Buildings are being added in conjunction with the GIS expansion. Drawing CHPE-CS-CV-002 in Appendix M shows the proposed expansion of the Astoria Annex Substation.

Site restoration of disturbed areas such as pavements and lawn areas are addressed on the plan sheets, detail sheets and erosion and sediment control plans. Limits of proposed disturbances and restoration areas are identified on the plans and reference site specific details regarding the required restoration. Once the construction activity is completed, all disturbed grounds will be stabilized with gravel.

The proposed project will disturb less than 20,000 SF and will result in an increase of impervious area of less than 5,000 SF, so an increase of peak flow and pollutant load is not anticipated. As such, peak flow mitigation and water quality treatment are not required by the State Pollutant Discharge Elimination System (SPDES) General Permit for Construction Activities (GP-0-20-001) nor the New York City Stormwater Manual.

A SWPPP for erosion and sediment control measures is required. The scope of work for this project will be managed such that less than 20,000 SF of soil will be disturbed and subject to erosion at any given time during the construction duration. This SWPPP encompasses all work involving erosion and sediment control. The construction will be managed to ensure the

maximum soil disturbance is less than 20,000 SF. As such a waiver for disturbance will not be required.

This SWPPP has been prepared in accordance with the criteria presented in the SPDES General Permit GP-0-20-001 (January 2020), the New York State Stormwater Management Design Manual (January 2015), the New York State Standards and Specifications for Erosion and Sediment Control (Nov 2016), and the New York City Stormwater Manual (February 2024). Work for the project is scheduled to take place from Dec 2024 through Feb 2026.

The total land disturbance acreage is calculated based on proposed site work. Detailed disturbance and limit of work limits are depicted on the Erosion and Sediment Control plan sheets.

Site Limitations/Assessment

The site is within FEMA floodplain zones AE and X as shown on FEMA FIRM Panel 3604970009F dated 9/5/2007 (refer to Appendix N).

Groundwater depths were measured in open boreholes at depths of about 1.4 feet to 8.3 feet below grade, corresponding to about El +5.7 feet to +11.1 feet. The average measured groundwater depths were obtained approximately one to three days after completion of drilling, to allow for drilling mud to dissipate. The measured groundwater depths are summarized in the table below. It should be noted that changes in groundwater elevation will occur due to variations in seasonal influences, tidal river levels, precipitation amounts, local pumping, surface runoff, utility leakage, and other factors different from those existing at the time the observations were made. Refer to Appendix I Geotechnical Report for soil borings and additional information.

Measured Groundwater Depth and Elevation				
Boring Number	**Approximate Ground Surface Elevation (ft)**	**Groundwater Reading Date and Time**	**Approximate Depth to Groundwater (ft)**	**Approximate Groundwater Elevation (ft)**
B-01	9.84	4/19/2024 10:00 AM	1.4	8.4
B-02	9.00	5/16/2024 6:00 PM	1.9	7.1
B-03	14.00	5/16/2024 7:15 AM	6.8	7.2
B-04	14.21	5/8/2024 7:00 AM	6.8	7.4
B-05	14.34	*N/M*	*N/M*	*N/M*
B-06	14.50	5/14/2024 8:00 AM	7.0	7.5
B-07	14.00	4/16/2024 12:30 PM	6.8	7.2
B-08	14.00	4/15/2024 7:15 AM	8.3	5.7
B-09	14.00	4/16/2024 12:00 PM	2.9	11.1
N/M = Not Measured				

The soil disturbance for the proposed work is limited to the total limit of disturbance (LOD) square footage listed in Table 1 below. Based on a review of the USDA Soil Survey for the project area, the original soils on the project site are listed in Table 1 below.

Table 1 - Soils

Soil Unit Symbol	Soil Unit Name, % Slope Range	HSG	Square Footage in LOD	Percent of LOD
Queens County				
UmA	Urban land, tidal marsh substratum, 0 to 3 percent slopes	C*	12,781	65.6%
ULAl	Urban land-Laguardia complex, 0 to 3 percent slopes, low impervious surface	C*	80	0.4%
UtA	Urban land, till substratum, 0 to 3 percent slopes	C*	6,609	34.0%
Totals for Area of Interest			**19,470**	**100.0%**

*This soil unit has no HSG. Because the majority of the site belongs to group C, it will also be applied to this soil unit.

2.3 Surface Waters

Based on the existing topography on the project site, runoff is generally conveyed overland towards existing ditches, culverts, catch basins, and rivers onsite and offsite. The East River is listed as an impaired waterbody.

The water quality of surface waters in New York State is classified by the New York State Department of Environmental Conservation as A, B, C, or D, with special classifications for water supply sources (AA). A "T" used with the classification indicates the stream supports, or may support, a trout population. Water quality standards are also provided. The standards apply the same classification system but, in some cases, are more stringent in an effort to eventually improve the water quality. The higher standard is most often used to reflect the existence or the potential for breeding trout (designation of (T) as discussed above). All surface waters with a Classification and/or a Standard of C (T) or better are regulated by the State. A summary of the stream classifications is shown in Table 2. Locations of the receiving waters are shown on figures and maps in Appendix I.

Table 2 – Summary of Receiving Waters and Stream Classifications

For each point of discharge, provide a point of discharge ID (a unique 3-digit ID, e.g., 001, 002), the name of the first water of the State that receives stormwater from the MS4 outfall. If the receiving water is on Table 2.4 of the NYC SWDM, identify the pollutant of concern and the practices used to meet no net increase (NNI) requirement by the practice number indicated in Section 5.1 of this template.					
Point of Discharge ID	Name of receiving water:	Is the receiving water impaired (on the CWA 303(d) list)?	If yes, list the pollutants that are causing the impairment:	Identify possible pollutant source on site based on location and intended use:	SMP/BMP used to meet NNI
001	East River	☒ Yes ☐ No	Garbage & Refuse	Portable toilets, construction debris and dewatering activities	During Construction portable toilets will be located away from storm drains and open water. Construction debris will be containerized. Dewatering activities will utilize silt bags and frac tanks.

2.4 Other SPDES discharges:

Site Plan Map Location	Discharge Type	Pollutants or Pollutant Constituents	NYSDEC SPDES Permit Number
Staging area to be provided within the construction area. Concrete trucks shall be allowed to wash out within project areas provided that it is within this staging area so that concrete/slurry material washed from the trucks can be collected, contained, and disposed at a later time. No concrete/slurry shall be discharged from the property at any time of construction. If such washing is anticipated, the contractor shall submit a plan detailing the control of concrete/slurry to the engineer for approval.	Concrete Truck Washout	Sediment	
Foreign waste materials shall be collected and stored in a secured area until removal and disposal by a licensed solid waste management company. All trash and construction debris from the project area shall be disposed of in a portable container unit. No foreign waste materials shall be buried within the project area. All personnel shall be instructed regarding the correct procedure for waste disposal. Notices stating these practices shall be posted in the project trailer and the individual who manages day-to-day project operations will be responsible for seeing that these procedures are followed.	Waste disposal	Fuels, paints	

Construction Support Activities

Contact information for construction support activity (to be filled in by contractor that pulls the permit):

Name:
Tel:
Email:
Address:

2.5 Allowable Non-Stormwater Discharges

List of Authorized Non-Stormwater Discharges Present at the Site

Type of Authorized Non-Stormwater Discharge	Likely to be Present at Your Site?
Landscape irrigation	☐ Yes ☒ No
Waters used to wash vehicles and equipment (cleansers are not used)[1]	☒ Yes ☐ No
Water used to control dust	☒ Yes ☐ No
Potable water including uncontaminated water line flushing's	☐ Yes ☒ No
External building wash down (soaps/solvents are not used, and external surfaces do not contain hazardous substances)	☐ Yes ☒ No
Pavement wash waters (spills or leaks have not occurred)	☐ Yes ☒ No
Uncontaminated air conditioning or compressor condensate*	☐ Yes ☒ No
Uncontaminated, non-turbid discharges of ground water or spring water*	☐ Yes ☒ No
Foundation or footing drains*	☐ Yes ☒ No
Discharges from construction de-watering operations*[2],[3]	☒ Yes ☐ No

***Require permits from DEP's Bureau of Water and Sewer Operations, DEP's Bureau of Waste Water Treatment, Department of Buildings and/or NYSDEC.**

[1]Details in Section 3.1 and Section 3.3
[2]Discharge will be limited to the site
[3]Sediment laden water shall be collected in a filter bag

SECTION 3: EROSION AND SEDIMENT CONTROLS

3.1 Practices

3.1.1 General ESC Practices

Soil erosion and sediment control plans have been developed in accordance with the Department's technical standards in compliance with the "New York Standards and Specifications for Erosion and Sediment Control". The soil erosion and sediment control plans will mitigate soil erosion and discharge of sediment offsite relating to activities from construction by using various sediment control methods such as seeding, silt fence and or composite filter sock, inlet protection, and stockpile covers. All temporary erosion and sediment controls are to be inspected and maintained in accordance with New York State Standards and Specifications for Erosion and Sediment Control (Blue Book), in compliance with this SWPPP, and as ordered by the NYCDPR.

Specific Erosion and Sediment Controls

Silt Fence	
Reference Detail	C-308
Reference Standard Design Specifications	NYS BLUE BOOK Page 5.54
How does this practice meet the standards and requirements?	This practice will be used as a temporary barrier of geotextile fabric installed on the contours across a slope used to intercept sediment laden runoff from small drainage areas of disturbed soil by temporarily ponding the sediment laden runoff allowing settling to occur.

Sediment Dewatering Bag (Geotextile Filter Bag)	
Reference Detail	C-308
Reference Standard Design Specifications	NYS BLUE BOOK Page 5.16
How does this practice meet the standards and requirements?	This practice will be used to temporary trap and retain sediment laden water prior to its disposal offsite in a state approved solid waste disposal facility.

Dust Control	
Reference Detail	N/A
Reference Standard Design Specifications	NYS BLUE BOOK Page 2.25
How does this practice meet the standards and requirements?	Land-disturbing activities that generate excessive dust shall be controlled by sprinkling water to prevent off-site damage, health hazards, and traffic safety problems.

Land Grading	
Reference Detail	Refer to C-101 to C-105 for Grading Plan
Reference Standard Design Specifications	NYS BLUE BOOK Page 4.24
How does this practice meet the standards and requirements?	Permanent reshaping of the existing land surface by grading in accordance with an engineering topographic plan and specification to provide for erosion control and vegetative establishment on disturbed, reshaped areas.

Inlet Protection	
Reference Detail	C-308
Reference Standard Design Specifications	NYS BLUE BOOK Page 5.57
How does this practice meet the standards and requirements?	A temporary sediment sack with low permeability, installed around inlets in the form of a fence, berm or excavation around an opening, detaining water and thereby reducing the sediment content of sediment laden water by settling thus preventing heavily sediment laden water from entering a storm drain system.

Stockpile Management	
Reference Detail	C-309
Reference Standard Design Specifications	Project Contract Documents (Project drawings and specifications)
How does this practice meet the standards and requirements?	Soil stockpiles and exposed soil shall be stabilized by seed, mulch, or other appropriate measures, when activities temporarily cease during construction for 7 days or more in accordance with NYSDEC requirements

Soil Restoration	
Reference Detail	N/A
Reference Standard Design Specifications	NYS BLUE BOOK Page 4.52
How does this practice meet the standards and requirements?	The decompaction of areas of development site or construction project where soils have been disturbed to recover the original properties and porosity of the soil; thus, providing a sustainable growth medium for vegetation, reduction of runoff and filtering of pollutants from stormwater runoff.

Concrete Truck Washout	
Reference Detail	C-308
Reference Standard Design Specifications	NYS BLUE BOOK Page 2.24
How does this practice meet the standards and requirements?	A temporary excavated or above ground lined constructed pit where concrete truck mixers and equipment can be washed after their loads have been discharged, to prevent highly alkaline runoff from entering storm drainage systems or leaching into soil. Location of the practice will be determined by the contractor but has to be a minimum of 100 feet from the drainage swales, and storm drain inlets.

Stabilized Construction Access	
Reference Detail	C-308
Reference Standard Design Specifications	NYS BLUE BOOK Page 2.30
How does this practice meet the standards and requirements?	A stabilized pad of aggregate underlain with geotextile located at any point where traffic will be entering or leaving a construction site to or from a public right-of-way, street, alley, sidewalk, or parking area. The purpose of stabilized construction access is to reduce or eliminate the tracking of sediment onto public rights-of-way or streets.

Spill Protection	
Reference Detail	N/A
Reference Standard Design Specifications	NYS BLUE BOOK Page 2.29
How does this practice meet the standards and requirements?	Safety Data Sheets (SDS) for all materials to be stored on site. All workers on-site will be required to be trained on safe handling and spill prevention procedures for all materials used during construction. All spills shall be cleaned up immediately upon discovery. Spent absorbent materials and rags shall be hauled off-site immediately after the spill is cleaned for disposal at a local landfill. Spill kits shall be provided on site.

3.1.2 Nonstandard ESC Practices

N/A

3.2 Construction (Phasing and) Sequence of Operations

Pre-Construction ESC Activities

This SWPPP presents erosion and sediment controls, both temporary and permanent, to assist the operator in compliance with the project's SPDES General Permit for construction activity. To the degree practicable, all temporary erosion and sediment control mitigation measures shall be installed immediately before associated project areas are disturbed in anticipation of all soil disturbing activities to follow. Based upon NYSDEC and NYCDEP regulations, the owner or operator of a construction activity shall not disturb greater than five (5) acres of soil at any one time without prior written authorization from the Department. Refer to Appendix P for the Construction Phasing Map.

Construction activities shall be scheduled by the Contractor with the intent to minimize the amount of disturbed soil exposed at any one time by area and length of time. In general, once work has been started on a particular structure, this work shall be completed to the extent possible, before work on another structure is started. The Contractor must submit a schedule of construction activities for approval by the Engineer prior to any disturbance to the site.

The project will be carried out as outlined as follow, while maintaining the amount of disturbed soil in compliance with the NYSDEC and NYCDEP limit.

Pre-Construction ESC Activities

1. Establish work area and contractor staging areas
2. Install stabilized construction entrance and temporary erosion and sediment control measures
3. Identify all-natural resources and mark and protect them as necessary including trees, existing points of water discharge off-site, etc.
4. Install controls to protect all onsite water resources from receiving sedimentation.
5. Install perimeter sediment control such as silt fences, as shown on the Soil Erosion and Sediment Control Plans.
6. Install temporary construction fencing as shown on the Soil Erosion and Sediment Control Plans.
7. Onsite earth disturbance should be limited to work necessary to install erosion and sedimentation controls.

Construction Sequence

1. Install all temporary ESC activities including, silt fence, inlet protection, stabilized construction entrance and geotextile filter bags.

2. Perform excavation and trenching and install all foundations and utilities. Stabilize area once installed. (<20,000 SF area of disturbance).
3. Strip topsoil from remainder of site (where proposed improvements or grading is shown only). Topsoil stockpiles(s) remaining for more than seven days shall be stabilized with vegetative cover, mulch, tarps or other approved practice. Erosion from topsoil piles left for less than seven days shall be controlled with silt fence or other approved methods. Any Topsoil stockpile within 25' of a roadway or drainage ditch shall be covered with tarps or other approved methods. All disturbed ground left inactive for seven or more days is to be stabilized by seed, sod, mulch, or other approved methods.
4. Begin foundation and utility construction. (<20,000 SF of disturbance)
5. Surplus topsoil (if any) shall be removed from the site by the contractor. Final grade the site.
6. Upon site stabilization, remove temporary erosion control practices. Clean structures of any sediment and/or construction debris.

Construction Sequence			
Activity (In order of construction)	Erosion and sediment control practice	When will practice be installed	Maintenance, replacement and removal of ESCs
Establish work area	Stabilized Construction Entrance	Before	Inspected daily. All sediment spilled, dropped, or washed onto public rights-of-way must be removed immediately.
Excavation and trenching and install all foundations and utilities within project limits	Silt Fence	Before	Inspected weekly replaced when damaged or no longer effective. The Maximum period of use is limited by the ultraviolet stability of the fabric (approximately one year).
	Storm Drain Inlet Protection	Before	Inspected weekly and after major rain event. Replaced when damaged or no longer effective
	Sediment Trap	Before	Sediment traps must be cleaned out as sediment accumulates within the trap. It is recommended to clean out the trap when it has lost one-half of the wet storage volume.
Landgrading	Anchored Stabilization Matting	During activity	Blanketed areas shall be inspected weekly and after each runoff event until perennial vegetation is established to a minimum uniform 80% coverage throughout the blanketed area. Damaged or displaced blankets shall be restored or replaced within 2 calendar days.
Final Stabilization	Soil Restoration	After Activity	Final stabilization occurs when all soil disturbing activities at the site have been completed and the site is completely stabilized by the final gravel surface. Upon soil stabilizing, operators on construction activities can formally submit an NOT.

3.3 Pollution Prevention and Good Housekeeping Practices

3.3.1 General Requirements

- A copy of the SPDES General Permit (GP-0-20-001), the signed Notice of Intent (NOI), NOI acknowledgement letter, SWPPP, and inspection reports shall be maintained onsite until the site has achieved final stabilization.
- During construction it may be necessary to remove surface or subsurface water from work areas. Where dewatering is necessary, the discharges of water from the excavated areas will be collected, containerized, and then disposed of offsite in a state approved waste disposal facility. Dewatering structures will be removed as soon as possible following the completion of dewatering activities. Refer to Section 3.3.2 for more detail. Additional erosion and sedimentation controls may be installed as determined by the Environmental Inspector.
- Sediment filter bags will be inspected regularly. Soil excavated from the site shall be stockpiled separately within a straw bale/ silt fence barrier to prevent siltation into surrounding areas.
- Any contaminated waters removed from a work site may not be discharged without a SPDES permit or must be discharged at a wastewater treatment plant following chemical analysis. Refer to Section 3.3.2 for more detail.
- Built up sediment shall be removed from any silt fence when it has reached one-third the height of the fence.
- Sediment fencing shall be inspected for depth of sediment, and tears, to see if fabric is securely attached to the fence posts, and to see that the fence posts are firmly in the ground.
- The construction entrance shall be cleaned of sediment and redressed when voids in the crushed stone become filled and vehicular tracking of sediment is occurring.
- Dust shall be controlled on access points and other disturbed areas subject to surface dust movement and blowing.
- Inspection must verify that all practices are adequately operational, maintained properly and that sediment is removed from all control structures.
- Inspection must look for evidence of soil erosion on the site, potential of pollutants entering drainage systems, problems at the discharge points, and signs of soil and mud transport from the site to the public road.

3.3.2 Dewatering Methods

3.3.2.1 Fluids Management Background

The Astoria Generating Station (AGS) is subject to a Consent Order entered into by Orion Power New York, L.P., Inc. (Orion Power) and the New York State Department of Environmental Conservation (NYSDEC), NYSDEC File No.C02-19990430-28, on September 11, 2000, and amended by Modification Agreements 1 through 5, dated July 16, 2001, May 20, 2003, September 28, 2004, May 31, 2005, and March 9, 2006, respectively. Under the NYSDEC-approved Environmental Remediation Plan, dated July 8, 2020, remedial activities are being performed at the AGS which would entail raising the existing grade of the Site. The complete sequence of activities associated with the construction of the Astoria Annex Upgrades Project is outlined in Section 4.0 of the EM&CP. Because the

construction will commence only upon the completion of the Consent Order, limited dewatering is anticipated because the excavation will only be limited to areas that will be below the water table (See Section 3.2 Construction [Phasing] and Sequence of Operations). There are no known municipal sewers or storm sewers located near or at the Site; therefore, there are no anticipated New York City permits for sewer /stormwater discharges.

3.3.2.2 Governing Standards Criteria and Guidance

The procedures set forth here are informed by following laws, ordinances, codes, rules, and regulations of the federal, state, and local authorities having jurisdiction over any of the work.

Any required pretreatment system shall meet New State Department of Environmental Conservation (NYSDEC) and United States Environmental Protection Agency (EPA) limitations for discharge into any surface water bodies, federal EPA, and State Department of Transportation regulations for shipping of regulated substances to off-Site disposal facilities, and meet all regulatory requirements imposed by the Treatment, Storage and Disposal Facility.

Regulations pertaining to the transport and disposal of regulated materials / fluid include, but are not limited to the most recent version of the following:

- Department of Transportation 49 CFR 172 through 179
- Department of Transportation 49 CFR 387 (46 FR 30974)
- Department of Transportation DOT-E 8876
- Environmental Protection Agency 40 CFR 136 (41 FR 52779)
- Environmental Protection Agency 40 CFR 262 and 761
- Resource Conservation and Recovery Act (RCRA)
- NYSDEC, Environmental Conservation Law Article 15, Title 15
- NYSDEC, 6 NYCRR Part 601 Water Withdrawal Program
- NYSDEC, 6 NYCRR Part 602 Long Island Well Program
- NYSDEC, 6 NYCCR Part 750 State Pollutant Discharge Elimination System (SPDES) Permits

Any transporter of contaminated or hazardous materials / fluids shall be licensed in the state in which the handling and transportation will take place in accordance with all applicable regulations.

- Comply with Occupational Health and Safety Administration Standards (OSHA) and regulations contained within Title 29 CFR Part 1910.120 - Hazardous Waste and Operations Emergency Response.
- Construction activities will comply with New York State, New York City, and federal (including OSHA and DOT) laws, codes, rules, and regulations.
- NYSDEC Technical and Operational Guidance Series (TOGS) 1.1.1 Aqueous Water Quality Standards (AWQS).

3.3.2.3 Known or Suspected Contamination Evaluation

The proposed Astoria Annex Upgrades construction will only commence upon the completion of the Consent Order and baseline groundwater data may not be available upon conveyance of the Site to the Certificate Holders. Although the construction will have limited excavation areas that may extend below the groundwater table, the groundwater will be evaluated prior to treatment and disposal. Baseline groundwater sampling will be sampled in a manner required by a receiving disposal facility, and in compliance with applicable laws and regulations.

Baseline groundwater sampling will be performed by a Qualified Environmental Professional (QEP) prior to the start of construction at representative locations where excavations are anticipated to extend below the groundwater table to identify potential groundwater contamination that may require testing, treatment, or disposal . A minimum of two (2) discrete (grab) samples will be collected from the proposed dewatering areas in accordance with 40 CFR Part 136. Location, depth, and date of collection will be provided for each sample.

Groundwater samples will be tested for each parameter listed in the table below using the EPA methods identified below.

Parameter	Type	EPA Method	Detection Limit
pH	Grab	150.1	
Temperature (°F)	Instantaneous	After pumping	
Oil & Grease	Grab	1664A or 1664B	
Total Suspended Solids	Grab	160.2	
Volatile Organic Compounds (VOCs)	Grab	624	EPA MDL
Semi-VOCs / Base Neutral Compounds	Grab	625	EPA MDL
Nitrate/Nitrite	Grab	300 or 353.3	EPA MDL
Metals – Total and Dissolved (13 Priority Pollutant non-Hg metals)	Grab	200.7 Rev. 4.4 200.2, 200.8	EPA MDL
Mercury – Total and Dissolved	Grab	1669 -Sampling 1631 - Analytical	EPA MDL
PCBs	Grab	608	EPA MDL

Note: The Method Detection Limit (MDL) is the level at which the analytical procedure referenced is capable of determining with a 99% probability that the substance is present. This value is determined in distilled water with no interfering substances present.

Additional parameters may be required by the disposal facility which may include the following:

Parameter	Type	EPA Method	Acceptance Limit
Flash Point	Instantaneous		>100 °F
Halogens	Grab		< 1,000 ppm
RCRA 8 Metals	Grab	6000 /7010	< RCRA Regulatory level
Herbicides and Pesticides	Grab	8081	< RCRA Regulatory level

Laboratory analyses will be performed by an Environmental Laboratory Approval Program (ELAP) laboratory certified by the NYS Department of Health.

Groundwater sampling results including complete sampling data, test results, lab records (i.e., data sheets and chain of custodies), and sampling summary report will be provided to NYSDPS and NYSDEC a minimum of two weeks prior to conducting dewatering activities. Groundwater sampling results will be compared to: New York State Ambient Water Quality Standards and Guidance Values. This data will be used to determine disposal facility acceptance. The NYSDEC and NYSDPS will be notified of disposal facilities once the project has been accepted. The following is a possible disposal facility for water, dependent on groundwater quality.

- Clean Water of New York, Inc.
  3249 Richmond Terrace
  Staten Island, NY 10303
  Phone – (718) 981-4600

Uncontaminated groundwater discharge is not anticipated at this time. Discharge of uncontaminated groundwater will not proceed without prior approval of a SPDES Permit from the NYSDEC for the project. Discharge of water generated during construction to surface waters (i.e., a stream or river) is prohibited without a NYSDEC SPDES permit. If discharges are required, the Certificate Holder will notify NYSDEC and NYSDPS prior to dewatering and a discharge plan will be provided which will include, at a minimum, the following:

- Dewatering system information including pump specifications, and estimates of pumping rate, and duration of dewatering;
- a map showing proposed discharge location points;
- if discharging to a storm drain or recharge basin, verify these systems are designed to handle the proposed rate for the duration of the discharge and the substantive requirements for all State, county, and town approvals are being met for such discharges;
- if discharging to a storm drain, identify the ultimate surface water outfall location;
- if discharging to an existing recharge basin or creating a new recharge basin, evaluate mounding effects to ensure that mounding does not adversely affect any surrounding properties and underground structures; and
- best management practices to prevent erosion and sedimentation from dewatering operations.

3.3.2.4 Dewatering Method

Since the discharge of groundwater is anticipated to be impacted by previous site uses, and offsite disposal of dewatering discharges is anticipated, the Contractor will make every effort to minimize the volume of water generated during construction.

Because the proposed dewatering will be limited to the excavations that will extend below the water table, the Contractor will contain fluids that collect in open excavations in order to prevent uncontrolled migration. The Contractor will be prepared to pump fluids into appropriately sized containers and transport containerized water off-site for disposal at a disposal facility to permitted facilities.

For the excavations that extend below the water table, the Contractor will use groundwater cut-off methods (such as steel sheeting) driven into a silt organic layer to reduce groundwater withdrawal volumes and pumping rates. If additional cut-off is required, then the bottom of the sheeted excavation will be sealed by placing tremie grouted to reduce infiltration through bottom of the

excavation. If necessary, other ground improvement techniques (grouting) will be implemented by the Contractor in order to reduce the volume of groundwater withdrawals to manageable volumes. The dewatering will be performed through sumps withing the sheeted excavation. No use of deep wells or wellpoints are anticipated during dewatering at this time. The Contractor shall perform the work to minimize dewatering discharges to keep dewatering withdrawal volumes will remain lessthan 100,000 (GPD) in any thirty-day consecutive period.

A detailed Dewatering Plan has been developed and is provided in Appendix Q that identifies the dewatering locations, specific pump information, and the anticipated dewatering rate, daily pumpage, and duration for each location.

3.3.2.5 Dewatering Contingency Measures

Although not anticipated, in the event that dewatering withdrawal exceeds a volume of 64,800 gallons per day (GPD) total capacity (i.e., 45 gallons per minute [gpm]), and well points or dewatering wells are needed for the dewatering program to maintain dry, stable excavations, then the project will trigger that need to enter into the Long Island Well Program (6 NYCRR Part 602). Capacity is defined as the total withdrawal of all sources for a facility, independent of how they are plumbed or their designation. Capacity is determined by summing the maximum potential withdrawal of all the water sources, not by the typical or actual withdrawal. As mentioned above, the Contractor does not anticipate that dewatering means and methods will require a Long Island Well Permit.

Similarly, in the event that dewatering withdrawal exceeds a volume of 100,000 GPD in any thirty-day consecutive period (i.e., 3 million gallons during a 30-day period), the project will trigger the need to enter into the Water Withdrawal Program (6 NYCRR Part 601). The Certificate Holder will notify NYSDEC and NYSDPS to discuss authorization of the water withdrawal activities. The process for processing water withdrawal applications is available in the NYSDEC Technical and Operational Guidance Series 3.2.1 Processing Water Withdrawal Permit Applications.

3.3.3 Construction Site Pollutants

Construction and waste materials expected to be stored on-site consists of materials and equipment typically used for earthwork, concrete placement, and installation of transmission pole structures. Equipment generally consists of earth moving, and pile installation equipment.
The following sections, but not limited to these sections of the Department's Standard Specifications, address provisions for construction and waste materials expected to be stored on site: Sections 107-12. The project's General Soil Erosion and Sediment Control Notes address provisions for construction and waste materials expected to be stored on site and additional temporary disturbances associated with the contractor's staging and spoil areas will not result in any change to the design or function of any permanent practices described in this report.

3.3.4 Spill Prevention and Response

A Spill Prevention and Response Plan will be developed for the site by the Contractor. The plan will

detail the steps needed to be followed in the event of an accidental spill and shall identify contact names and phone numbers of people and agencies that must be notified.

The Plan shall include Safety Data Sheets (SDS) for all materials to be stored on-site. All workers on-site will be required to be trained on safe handling and spill prevention procedures for all materials used during construction. Regular safety meetings shall be held and all workers that are expected on the site during the week shall be required to attend.

All spills shall be cleaned up immediately upon discovery. Spent absorbent materials and rags shall be hauled off-site immediately after the spill is cleaned for disposal at a local landfill. All personnel working on the site shall be instructed of the proper procedures for spill prevention and control. Any spill large enough to discharge to surface water will be immediately reported to the local fire / police departments, NYCDEP, NYSDEC Spill Hotline (1-800-457-7362), the National Response Center (1-800-424-8802), the NYC DPR, and the NYSDPS.

Specific Pollution Prevention Practices

Spill Kits Readily Available	
Description	When Fueling and Maintaining Vehicles, a spill kit will be readily available
Installation	On site during mobilization. Spill kit to be stored near fueling and equipment maintenance areas
Maintenance Requirements	Spill kits will be checked regularly to ensure no damage has occurred to kit contents

3.3.5 Fueling and Maintenance of Equipment or Vehicles

Fueling of all equipment shall occur within the limits of the construction staging area. Fuel will be delivered to the site as needed under the supervision of the general contractor. Only minor vehicle equipment cleaning and maintenance which does not produce discharge of liquids of any type onto the ground will be permissible to occur within the Project site. Drip pans will be used overnight and during fueling operations. All major maintenance and repairs shall be performed off-site. Vehicles and equipment shall be inspected on each day of use. Any sources of leakage discovered shall be addressed immediately and be brought to the attention of the NYC DPR. All leaking equipment unable to be repaired shall be immediately removed from the Project site.

3.3.6 Washing of Equipment and Vehicles

General

The Contractor shall designate areas for equipment cleaning, maintenance, and repair. The areas shall be protected and monitored to ensure all fluids are contained and are not discharged outside the designated area.

3.3.6.1 Concrete Truck Washout

Concrete trucks shall be allowed to wash out within project areas provided that the contractor provides an area which collects and contains any concrete / slurry material washed from trucks for

recovery and disposal at a later time. Concrete washout areas will be located a minimum of 100 feet from all wetlands, waterbodies, and drainage structures. No concrete / slurry shall be discharged from the property at any time of construction. All wash water used to clean the concrete truck will be directed at a concrete washout structure at designated areas only. If such washing is anticipated, the contractor shall submit a plan detailing the control of concrete / slurry to the engineer for approval. Washout structures will be inspected after each use to determine if they are filled to 75% of capacity and to ensure that the plastic linings are intact and not leaking. Material in washout structures will be removed when they reach 75% capacity.

3.3.7 Storage, Handling, and Disposal of Construction Products, Materials, and Wastes

During overland construction, refueling of equipment, storage mixing, or handling of open containers of pesticides, chemicals labeled "toxic", or petroleum products within 100 feet of a stream, waterbody, or wetland is prohibited.

3.3.7.1 Building Products

General

Excavated soil stockpiles will remain on site within the project's property limits, and away from stormwater conveyance areas. Stockpiles will be surrounded by silt fence when located on grass surfaces, and strawbales when located on hardscape surfaces, to limit any possible spread or overflow into any other material. Stockpiles will be covered with tarps or temporary seeding to limit the effects of erosion.

Specific Pollution Prevention Practices

Stockpile Containment	
Description	Temporary Seeding and Tarps
Installation	Throughout the duration of the project
Maintenance Requirements	Refer to Appendix H for Specifications
Design Specifications	Project Contract Documents (Project drawings and specifications)

3.3.7.2 Pesticides, Herbicides, Insecticides, Fertilizers, and Landscape Materials

General

All pesticides, herbicides, insecticides, fertilizers, and landscape materials must be handled in compliance with manufacturer specifications and all applicable New York State and Federal laws. Store, cover, and isolate construction materials to prevent runoff of pollutants and contamination of groundwater and surface waters. Distribute or post information material regarding proper handling, spill response, spill kit location, and emergency actions to be taken to all construction personnel.

3.3.7.3 Diesel Fuel, Oil, Hydraulic Fluids, Other Petroleum Products, and Other Chemicals

General

All fuel, hydraulic fluids, petroleum products, and other chemicals shall be disposed of into designated containers and stored in accordance with the Project Health and Safety Plan (HASP). These materials will be removed from the site and disposed of in a legal manner in compliance with all applicable New York City, New York State, and Federal laws.

3.3.7.4 Hazardous or Toxic Waste

General

All hazardous or toxic waste materials shall be handled, stored, and disposed of in accordance with all applicable New York State and Federal laws, and in compliance with the Project Health and Safety Plan (HASP). No hazardous waste shall be disposed of on-site. Material safety data sheets, material inventory, and emergency contact numbers will be maintained in the office trailer. All personnel working on the site shall be instructed of the proper procedures for hazardous waste handling and disposal.

3.3.7.5 Construction and Domestic Waste

General

All construction waste materials shall be collected and removed from the site regularly by the contractor. The contractor shall supply waste barrels for proper disposal of waste materials. All personnel working on the site shall be instructed of the proper procedures for construction waste disposal. All waste disposal shall be removed from the site and disposed of in a legal manner in compliance with all applicable New York State and Federal laws.

3.3.7.6 Sanitary Waste

General

Temporary sanitary facilities (portable toilets) shall be provided on site during the entire duration of construction. The portable toilets shall be provided with containment trays to provide extra barrier of protection against wash down water and spill. The portable toilets shall be regularly maintained and inspected weekly for evidence of leaking holding tanks. When servicing the portable toilets, containment trays shall be pumped dry of any contaminates that may have been collected in the basin.

3.3.8 Washing of Applicators and Containers used for Paint, Concrete, or Other Materials

General

No applicators and containers will be washed or stored on site.

3.3.9 Other Pollution Prevention Practices

General

ALL ESC practices for the Project shall be in compliance with the contract documents, the SPDES General Permit, and all other applicable New York State and Federal laws. Should it be deemed that there are any discrepancies between this SWPPP and any other applicable rules or regulation, the more stringent measures shall apply for the Project.

SECTION 4: CONTROLS

4.1 Timing of Controls/Measures

The erosion and sediment control measures shall be constructed prior to clearing or grading of any portion of the project. Where land disturbance is necessary, temporary seeding or mulching must be used on areas which will be exposed for more than 7 days. Permanent stabilization should be performed as soon as possible after completion of grading. As project areas are stabilized, the accumulated sediment shall be removed from the stabilized area. Erosion control devices shall remain in place until disturbed areas are permanently stabilized. The soil stabilization measures selected shall be in conformance with the most current version of the technical standard, New York Standards and Specifications for Erosion and Sediment Control.

4.2 Erosion and Sediment Controls/Stabilization Practice

Applicable erosion and sediment control measures and details are included in Appendix M. Specific final stabilization methods are provided within the Construction Documents.

4.2.2 Permanent Stabilization

Disturbed portions of the project area where construction activities permanently cease shall be stabilized with permanent seed no later than 14 days after the last construction activity. Permanent seed mix shall be in accordance with the project specifications and plans. Construction and maintenance of erosion and siltation control measures are in accordance with the New York Standards and Specifications for Erosion and Sediment Control.

Where construction activity is complete over areas to be permanently vegetated, stabilize with permanent seeding. Verify seeding dates with engineer. If engineer determines that seed cannot be applied due to climate, topsoil shall not be spread and mulching shall be applied to the exposed surface to stabilize soils until the next recommended seeding period. Other project impervious areas shall be permanently stabilized with concrete, gravel or building structures.

4.3 Temporary and Winter Operations

If construction activities proceed through the winter season, access points should be enlarged and stabilized to provide for snow stockpiling. Drainage structures should be kept open and free of potential snow and ice dams. Inspection and maintenance are necessary to ensure the function of these practices during runoff events. For sites where construction activities temporarily cease, temporary and/or permanent soil stabilization measures shall be installed within seven (7) days from the date the soil disturbing activity ceased. Disturbed areas should be stabilized with seed and mulch, or other approved methods, even if the ground is covered by significant amounts of snow.

4.3.1 Temporary and Winter Shutdown

Site inspections (by the qualified inspector) may be decreased to a minimum of one (1) time every thirty (30) days for sites where soil disturbing activities have been temporarily suspended and all disturbed areas have been temporarily stabilized with an approved method. Inlet protection should be installed and/or repaired before shutdown of the site. The owner or operator shall provide written notification to the respective DEC regional office and impacted MS4 prior to reducing the frequency of any site inspections.

SECTION 5: CONSTRUCTION INSPECTION

5.1 Inspection Personnel and Procedures

All erosion and sediment control practices and pollution prevention measures being implemented within the active work area shall be inspected daily by a trained contractor to ensure that they are being maintained in effective operating condition at all times. The trained contractor must document all inspection forms, corrections, and certification of change by the contractor on site in a site log book that becomes an addendum to this plan.

The qualified inspector shall prepare an inspection report subsequent to each and every inspection. At a minimum, the inspection report shall include and/or address the following:

A. Date and time of inspection
B. Name and title of person(s) performing inspection
C. A description of the weather and soil conditions (e.g. dry, wet, saturated) at the time of the inspection
D. A description of the condition of the runoff at all points of discharge from the construction site. This shall include identification of any discharges of sediment from the construction site. Include discharges from conveyance systems (i.e. pipes, culverts, ditches, etc.) and overland flow
E. A description of the condition of all natural surface waterbodies located within, or immediately adjacent to, the property boundaries of the construction site which receive runoff from disturbed areas. This shall include identification of any discharges of sediment to the surface waterbody
F. Identification of all erosion and sediment control practices and pollution prevention measures that need repair or maintenance
G. Identification of all erosion and sediment control practices and pollution prevention measures that were not installed properly or are not functioning as designed and need to be reinstalled or replaced
H. Description and sketch of areas with active soil disturbance activity, areas that have been disturbed but are inactive at the time of the inspection, and areas that have been stabilized (temporary and/or final) since the last inspection
I. Current phase of construction of all post-construction stormwater management practices and identification of all construction that is not in conformance with the SWPPP and technical standards
J. Corrective action(s) that must be taken to install, repair, replace or maintain erosion and sediment control practices and pollution prevention measures; and to correct deficiencies identified with the construction of the postconstruction stormwater management practice(s)
K. Identification and status of all corrective actions that were required by previous inspection
L. Digital photographs, with date stamp, that clearly show the condition of all practices that have been identified as needing corrective actions. The qualified inspector shall attach paper color copies of the digital photographs to the inspection report being maintained onsite within seven (7) calendar days of the date of the inspection. The qualified inspector shall also take digital photographs, with date stamp, that clearly show the condition of the practice(s) after the corrective action has been completed. The qualified inspector shall attach paper color copies of the digital photographs to the inspection report that documents

the completion of the corrective action work within seven (7) calendar days of that inspection.

Within one business day of the completion of an inspection, the qualified inspector shall notify the owner or operator and appropriate contractor or subcontractor of this permit of any corrective actions that need to be taken. The contractor or subcontractor shall begin implementing the corrective actions within one business day of this notification and shall complete the corrective actions in a reasonable time frame. All inspection reports shall be signed by the qualified inspector. Pursuant to Part II.D.2. of the NYSDEC SPDES General Permit for Stormwater Discharge from Construction Activity (GP-0-20-001), the inspection reports shall be maintained on site with the SWPPP.

Table 5-1: Inspection frequency and Qualified Inspector(s)

Standard Frequency:
☒ Every 24 hours and within 24 hours of a 0.5-inch rainfall event
Increased Frequency (if applicable):
For areas where 5 or more acres are disturbed or for projects that discharge to a 303d listed water ☐ Twice every 7 days and within 24 hours of a 0.5-inch rainfall event, at least 2-days between inspections
Temporary Shutdown Frequency:
With DEP approval of temporary shutdown ☐ Once every 30 days and within 24 hours of a 0.5-inch rainfall event
Qualified Inspector
Company Name: Name: Address: Tel: Email:

Inspection Report Forms
Refer to Appendix C

5.2 Trained Contractor List

Table 5-2: Documentation for Completion of Training

Contractor	Name of Trained Contractor	NYS DEC Erosion and Sediment Control Training Certificate Number	Expiration Date

SECTION 6: POST CONSTRUCTION STORMWATER CONTROLS

6.1 Operation and Maintenance Plan

A long-term operation and maintenance plan addressing all permanent SMPs and BMPs is not required for this project as there are no permanent SMPs or BMPs required.

6.2 No-Net-Increase

This project is not located in an MS4 area so therefore No-Net-Increase will not be required.

6.3 Safe Drinking Water Act Underground Injection Controls Requirements

Do you plan to install any of the following controls? Check all that apply below.

☐ Infiltration trenches (if stormwater is directed to any bored, drilled, driven shaft or dug hole that is deeper than its widest surface dimension, or has a subsurface fluid distribution system)

☐ Commercially manufactured pre-cast or pre-built proprietary subsurface detention vaults, chambers, or other devices designed to capture and infiltrate stormwater flow

☐ Drywells, seepage pits, or improved sinkholes (if stormwater is directed to any bored, drilled, driven shaft or dug hole that is deeper than its widest surface dimension, or has a subsurface fluid distribution system)

SECTION 7: CERTIFICATION AND NOTIFICATION

1. A site-specific Draft Maintenance Easement shall be included as **Appendix A**. (*When applicable*)
2. The Pre-Construction Documents & Certifications provided in **Appendix B** shall be filled out as appropriately shown in the section.
3. The site-specific Construction Duration Inspection form shall be provided in **Appendix C** and is to be filled out and signed by the qualified professional that performs site inspections and oversee installation of ESCs for this project.
4. The Monthly Summary of Site Inspection Activities form provided in **Appendix D** is to be filled out and signed by the owner, or the duly authorized representative of the owner.
5. The Contractor's Certification Statement provided in **Appendix E** is to be filled out and signed by the contractor with primary responsibility for the project site.
6. The Contractor's Certification Statement provided in **Appendix E** is to be filled out and signed by all subcontractors.
7. The Certificate of Issuance provided in **Appendix E** is to be filled out and signed by the contractor with primary responsibility for the project site prior to performing any site work.
8. The Erosion and Water Quality Control Identification form provided in **Appendix E** is to be filled out by the developer/contractor.
9. Records of site work and site stabilization are to be kept on the Construction Stabilization form provided in **Appendix E** and is to be filled out by the developer/contractor as necessary.
10. The Certificate of Change by the Contractor provided in **Appendix E** is to be filled out and signed by the operator upon implementation of any requested changes to the SWPPP by the owner, preparer, or any local authority having jurisdiction over the project site. Changes to the SWPPP are only to be made when the plan or contractor's implementation proves to be ineffective in eliminating or significantly minimizing pollutants from the construction activity.
11. The Final Stabilization and Retention of Records form provided in **Appendix F** is to be filled out and signed by the qualified professional that will perform site inspections and oversee installation of erosion control measures for this project.
12. The Certificate of Return provided in **Appendix F** is to be filled out and signed by the operator and owner after final stabilization of the site has been completed.
13. The NYC DEP Notice of Termination (NOT) will be filed by the owner or its representative upon completion of the site's final stabilization using the online form.

SECTION 8: RETENTION OF RECORDS

The following are to be retained by the owner at the site and for a period of five years from the date the site is finally stabilized:

1. SWPPP
2. Contract Documents including contract drawings and technical specifications
3. Stormwater inspections and maintenance reports
4. Contractor Certification
5. SWPPP Certification Statement of Satisfactory Completion

SECTION 9: REQUIRED DRAWINGS

1. Sediment and Erosion Control Plan
2. Grading Plan

Appendix A – Draft Maintenance Easement

XREFS: NONE

PROJECT NUMBER: 10.1457

CAD DWG. FILE NAME: K:\Projects\10.1457\Survey\Queens-Astoria\Maps and Drawings\EASEMENTS\Rev1_Astoria ARC ALIGN-LEG 3A.dwg

[redacted]

Land Surveyors as last revised.

Consolidated Edison Company of New York, Inc.
CHPE, LLC

Jonathan J. Verderber P.L.S. No. 50912 Date

"ONLY COPIES OF THIS MAP SIGNED IN RED INK AND EMBOSSED WITH THE SEAL OF AN OFFICER OF C.T. MALE ASSOCIATES OR A DESIGNATED REPRESENTATIVE SHALL BE CONSIDERED TO BE A VALID TRUE COPY".

BAR SCALE
40 0 20 40 80
1 inch = 40 ft.

JONATHAN J. VERDERBER
P.L.S. NO. 50912

DATE		REVISIONS RECORD/DESCRIPTION	DRAFTER	CHECK	APPR.
	1				
	2				
	3				
	4				
	5				
	6				
	7				
	8				
	9				

APPROVED: RTL
DRAFTED : KEC
CHECKED : JJV
PROJ. NO : 10.1457
SCALE : 1"=40'
DATE : SEPT. 16, 2024

PROPOSED EASEMENTS - LEG 3A

PORTION LANDS NOW OR FORMERLY OF

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.

PREPARED FOR

CHPE, LLC

20TH AVENUE AND 31ST STREET

BOROUGH OF QUEENS, CITY OF NEW YORK QUEENS COUNTY, NEW YORK

C.T. MALE ASSOCIATES
Engineering, Surveying, Architecture, Landscape Architecture & Geology, D.P.C.
50 CENTURY HILL DRIVE, LATHAM, NY 12110 PH 518.786.7400
COBLESKILL, NY • GLENS FALLS, NY • POUGHKEEPSIE, NY
JOHNSTOWN, NY • RED HOOK, NY • SYRACUSE, NY
www.ctmale.com

SHEET 1 OF 1

DWG. NO: 24-491

Appendix B - Certifications

Contracting Firm Information:

Contracting Firm

Address

City/Town ***State*** ***Zip***

Site Location:
Champlain Hudson Power Express Astoria DC Converter Station
Astoria Annex Upgrades
Astoria, Queens, New York

Contractor's Certification

I hereby certify that I understand and agree to comply with the terms and conditions of the SWPPP and agree to implement any corrective actions identified by the qualified inspector during a site inspection. I also understand that the owner or operator must comply with the terms and conditions of the most current version of the New York State Pollutant Discharge Elimination System (SPDES) general permit for stormwater discharges from construction activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.

Signature (Contractor/Subcontractor) ***Date***

For

Responsible For

Signature (Trained Contractor) ***Date***

For

Responsible For

Signature (Trained Contractor) ***Date***

For

Responsible For

Appendix C - Construction Duration Inspections

Construction Duration Inspection Form

a. Directions:

Inspection Form will be filled out during the entire construction phase of the project.

Required Elements:

1. On a site map, indicate the extent of all disturbed site areas and drainage pathways. Indicate site areas that are expected to undergo initial disturbance or significant site work with the next 14-day period.

2. Indicate on site map all areas of the site that have undergone temporary or permanent stabilization.

3. Indicate all disturbed site areas that have not undergone active site work during the previous 14-day period.

4. Inspect all sediment control practices and record the approximate degree of sediment accumulation as a percentage of sediment storage volume (for example, 10 percent, 20 percent, 50 percent).

5. Inspect all erosion and sediment control practices and record all maintenance requirements such as verifying the integrity of barrier or diversion systems (earther berms or silt fencing) and containment systems (sediment basins and sediment traps). Identify any evidence of rill or gully erosion occurring on slopes and any loss of stabilizing vegetation or seeding/mulching. Document any excessive deposition of sediment or ponding water along barrier or diversion systems. Record the depth of sediment within containment structures, any erosion near outlet and overflow structures, and verify the ability of rock filters around perforated riser pipes to pass water; and

6. Immediately report to the Operator any deficiencies that are identified with the implementation of SWPPP.

SITE PLAN/SKETCH

Inspector (print name) _____ Date of Inspection _____

Qualified Inspector (print name) _____ Qualified Inspector Signature _____

The above signed acknowledges that, to the best of his/her knowledge, all information provided on the forms is accurate and complete.

Weather _____ Soil Description _____

Reason for Inspection:
[ ] Daily Inspection [ ] Twice every 7 days inspection
[ ] 30-day inspection (Temporary Shutdown) [ ] Inspection after Rainfall
[ ] other _____

Stage of Construction:_____%

Maintaining Water Quality

Yes No N/A

☐ ☐ ☐ Is there an increase in turbidity causing or reasonably likely to cause a substantial visible contrast to natural conditions?

☐ ☐ ☐ Is there residue from oil and floating substances, visible oil film, or globules or grease?

☐ ☐ ☐ All disturbance is within the limits of the approved plans.

☐ ☐ ☐ Have receiving lake/bay, stream, and/or wetland been impacted by silt from the project?

Housekeeping

1. General Site Conditions

Yes No N/A

☐ ☐ ☐ Is construction site litter and debris appropriately managed?

☐ ☐ ☐ Are facilities and equipment necessary for implementation or erosion and sediment control in working order and/or properly maintained?

☐ ☐ ☐ Is construction impacting the adjacent property?

☐ ☐ ☐ Is dust adequately controlled?

2. Stabilized Construction Entrance

Yes No N/A

☐ ☐ ☐ Stone is clean enough to effectively remove mud from vehicles.

☐ ☐ ☐ Installed per standards and specifications?

☐ ☐ ☐ Does all traffic use the stabilized entrance to enter and leave site?

☐ ☐ ☐ Is adequate drainage provided to prevent ponding at entrance?

Runoff Control Practices

1. Excavation Dewatering

Yes No N/A

☐ ☐ ☐ Upstream and downstream berms (sandbags, inflatable dams, etc.) are installed per plan.

☐ ☐ ☐ Clean water from upstream pool is being pumped to the downstream pool.

☐ ☐ ☐ Sediment laden water from work area is being discharged to a silt trapping device.

☐ ☐ ☐ Constructed upstream berm with one-foot minimum freeboard.

2. Temporary Sediment Trap

Yes No N/A

☐ ☐ ☐ Trap and outlet structure constructed per the approved plan.

☐ ☐ ☐ Trap side slopes are stabilized with seed/mulch.

☐ ☐ ☐ Drainage structure flushed and trap surface restored upon removal of sediment trap facility.

☐ ☐ ☐ Sediment trap dewatering pool is dewatering at appropriate rate. Sediment accumulation is____% of design capacity.

3. Geotextile Filter Bag

Yes No N/A

☐ ☐ ☐ Bags are being replaced when full (considered full when remaining bag flow area has been reduced by 75%)

☐ ☐ ☐ Bags are placed at least 50 feet from all wetlands and other surface waters .

☐ ☐ ☐ Bags are placed in a location that is vegetated, relatively level, and provides for ease of access.

☐ ☐ ☐ Torn or damaged bags have been replaced.

Soil Stabilization

1. Topsoil and Spoil Stockpiles

Yes No N/A

☐ ☐ ☐ Stockpiles are stabilized with vegetation and/or mulch.

☐ ☐ ☐ Sediment control is installed at the toe of the slope.

2. Revegetation

Yes No N/A

☐ ☐ ☐ Temporary seeding and mulch have been applied to idle areas.

☐ ☐ ☐ 6 inches minimum of topsoil has been applied under permanent seeding.

Sediment Control Practices

1. Silt Fence

Yes No N/A

☐ ☐ ☐ Installed on Contour, 10 feet from toe of slope (not across conveyance channels).

☐ ☐ ☐ Joints constructed by wrapping the two ends together for continuous support.

☐ ☐ ☐ Fabric buried 6 inches minimum.

☐ ☐ ☐ Post are stable, fabric is tight and without rips or frayed areas. Sediment accumulation is___% of design capacity.

2. Storm Drain Inlet Protection

(Use for Stone & Block, Filter Fabric, Curb, or Excavated practices)

Yes No N/A

☐ ☐ ☐ Installed concrete blocks lengthwise so open ends face outward, not upward.

☐ ☐ ☐ Placed wire screen between No. 3 crushed stone and concrete blocks.

☐ ☐ ☐ Drainage area is 1 acre or less.

☐ ☐ ☐ Excavated area is 900 cubic feet.

☐ ☐ ☐ Excavated side slopes should be 2:1.

☐ ☐ ☐ 2" x 5" frame is constructed and structurally sound.

☐ ☐ ☐ Posts 3-foot maximum spacing between posts.

☐ ☐ ☐ Fabric is embedded 1 to 1.5 feet below ground and secured to frame/posts with staples at max 8-inch spacing.

☐ ☐ ☐ Posts are stable, fabric is tight and without rips or frayed areas. Sediments accumulation___% of design capacity.

3. Temporary Check Dam

Yes	No	N/A	
☐	☐	☐	Is channel stable? (flow is not eroding soil underneath or around the structure).
☐	☐	☐	Check is in good condition (rocks in place and no permanent pools behind the structure).
☐	☐	☐	Has accumulated sediment been removed?

4. Concrete Washout Area

Yes	No	N/A	
☐	☐	☐	Washout Facility is free of damage and leaks.
☐	☐	☐	Excess rainwater is not present within concrete washout facility.
☐	☐	☐	Accumulated hardened material is below 75% of storage capacity.
☐	☐	☐	Plastic liner replaced at last cleaning of washout facility.
☐	☐	☐	All concrete discharges on site are deposited within designated concrete washout.

*(**Note:** Not all erosion and sediment control practices are included in this listing. Add additional pages to this list as required by site specific design. Construction inspection checklists for post-development stormwater Management practices can be found in Appendix F of the New York State Stormwater Management Design Manual.)*

CONSTRUCTION DURATION INSPECTIONS

b. Modifications to the SWPPP (To be completed as described below)

The Developer shall amend the SWPPP whenever:

1. There is a significant change in design, construction, operation, or maintenance which may have a significant effect on the potential for the discharge of pollutants to the waters of the State and which has not otherwise been addressed in the SWPPP; or
2. The SWPPP proves to be ineffective in;
    - **a.** Eliminating or significantly minimizing pollutants from sources identified in the SWPPP and as required by this permit; or
    - **b.** Achieving the general objectives of controlling pollutants in stormwater discharges from permitted construction activity; and
3. Additionally, the SWPPP shall be amended to identify any new contractor or subcontractor that will implement any measure of the SWPPP.

Modification & Reason:

Detailed Description of Consistent Issues in the Construction and Technical Standards of SMPs:

Comments from the Previous Inspection on_____and Remarks:

Other Comments:

Post- Construction Stormwater Management Practices (SMPs)

Post-Construction SMP	Current Phase of Construction	Notes
Infiltration Basin		
Underground Arch Infiltration System		

a. Directions:

Inspection Form will be filled out during the entire construction phase of the project.

Required Elements:

1. On a site map, indicate the extent of all disturbed site areas and drainage pathways. Indicate site areas that are expected to undergo initial disturbance or significant site work with the next 14-day period.

2. Indicate on site map all areas of the site that have undergone temporary or permanent stabilization.

3. Indicate all disturbed site areas that have not undergone active site work during the previous 14-day period.

4. Inspect all sediment control practices and record the approximate degree of sediment accumulation as a percentage of sediment storage volume (for example, 10 percent, 20 percent, 50 percent).

5. Inspect all erosion and sediment control practices and record all maintenance requirements such as verifying the integrity of barrier or diversion systems (earther berms or silt fencing) and containment systems (sediment basins and sediment traps). Identify any evidence of rill or gully erosion occurring on slopes and any loss of stabilizing vegetation or seeding/mulching. Document any excessive deposition of sediment or ponding water along barrier or diversion systems. Record the depth of sediment within containment structures, any erosion near outlet and overflow structures, and verify the ability of rock filters around perforated riser pipes to pass water; and

6. Immediately report to the Operator any deficiencies that are identified with the implementation of SWPPP.

SITE PLAN/SKETCH

Inspector (print name) _____ Date of Inspection _____

Trained Contractor (print name) _____ Trained Contractor Signature _____

The above signed acknowledges that, to the best of his/her knowledge, all information provided on the forms is accurate and complete.

Weather _____ Soil Description _____

Reason for Inspection:
[ ] Daily Inspection
[ ] other _____

Stage of Construction:_____**%**

Maintaining Water Quality

Yes No N/A

☐ ☐ ☐ Is there an increase in turbidity causing or reasonably likely to cause a substantial visible contrast to natural conditions?

☐ ☐ ☐ Is there residue from oil and floating substances, visible oil film, or globules or grease?

☐ ☐ ☐ All disturbance is within the limits of the approved plans.

☐ ☐ ☐ Have receiving lake/bay, stream, and/or wetland been impacted by silt from the project?

Housekeeping

1. General Site Conditions

Yes No N/A

☐ ☐ ☐ Is construction site litter and debris appropriately managed?

☐ ☐ ☐ Are facilities and equipment necessary for implementation or erosion and sediment control in working order and/or properly maintained?

☐ ☐ ☐ Is construction impacting the adjacent property?

☐ ☐ ☐ Is dust adequately controlled?

2. Stabilized Construction Entrance

Yes No N/A

☐ ☐ ☐ Stone is clean enough to effectively remove mud from vehicles.

☐ ☐ ☐ Installed per standards and specifications?

☐ ☐ ☐ Does all traffic use the stabilized entrance to enter and leave site?

☐ ☐ ☐ Is adequate drainage provided to prevent ponding at entrance?

Runoff Control Practices

1. Excavation Dewatering

Yes No N/A

☐ ☐ ☐ Upstream and downstream berms (sandbags, inflatable dams, etc.) are installed per plan.

☐ ☐ ☐ Clean water from upstream pool is being pumped to the downstream pool.

☐ ☐ ☐ Sediment laden water from work area is being discharged to a silt trapping device.

☐ ☐ ☐ Constructed upstream berm with one-foot minimum freeboard.

2. Temporary Sediment Trap

Yes No N/A

☐ ☐ ☐ Trap and outlet structure constructed per the approved plan.

☐ ☐ ☐ Trap side slopes are stabilized with seed/mulch.

☐ ☐ ☐ Drainage structure flushed and trap surface restored upon removal of sediment trap facility.

☐ ☐ ☐ Sediment trap dewatering pool is dewatering at appropriate rate. Sediment accumulation is____% of design capacity.

3. Geotextile Filter Bag

Yes No N/A

☐ ☐ ☐ Bags are being replaced when full (considered full when remaining bag flow area has been reduced by 75%)

☐ ☐ ☐ Bags are placed at least 50 feet from all wetlands and other surface waters .

☐ ☐ ☐ Bags are placed in a location that is vegetated, relatively level, and provides for ease of access.

☐ ☐ ☐ Torn or damaged bags have been replaced.

Soil Stabilization

1. Topsoil and Spoil Stockpiles

Yes No N/A

☐ ☐ ☐ Stockpiles are stabilized with vegetation and/or mulch.

☐ ☐ ☐ Sediment control is installed at the toe of the slope.

2. Revegetation

Yes No N/A

☐ ☐ ☐ Temporary seeding and mulch have been applied to idle areas.

☐ ☐ ☐ 6 inches minimum of topsoil has been applied under permanent seeding.

Sediment Control Practices

1. Silt Fence

Yes No N/A

☐ ☐ ☐ Installed on Contour, 10 feet from toe of slope (not across conveyance channels).

☐ ☐ ☐ Joints constructed by wrapping the two ends together for continuous support.

☐ ☐ ☐ Fabric buried 6 inches minimum.

☐ ☐ ☐ Post are stable, fabric is tight and without rips or frayed areas. Sediment accumulation is___% of design capacity.

2. Storm Drain Inlet Protection

(Use for Stone & Block, Filter Fabric, Curb, or Excavated practices)

Yes No N/A

☐ ☐ ☐ Installed concrete blocks lengthwise so open ends face outward, not upward.

☐ ☐ ☐ Placed wire screen between No. 3 crushed stone and concrete blocks.

☐ ☐ ☐ Drainage area is 1 acre or less.

☐ ☐ ☐ Excavated area is 900 cubic feet.

☐ ☐ ☐ Excavated side slopes should be 2:1.

☐ ☐ ☐ 2" x 5" frame is constructed and structurally sound.

☐ ☐ ☐ Posts 3-foot maximum spacing between posts.

☐ ☐ ☐ Fabric is embedded 1 to 1.5 feet below ground and secured to frame/posts with staples at max 8-inch spacing.

☐ ☐ ☐ Posts are stable, fabric is tight and without rips or frayed areas. Sediments accumulation___% of design capacity.

3. Temporary Check Dam

Yes	No	N/A	
☐	☐	☐	Is channel stable? (flow is not eroding soil underneath or around the structure).
☐	☐	☐	Check is in good condition (rocks in place and no permanent pools behind the structure).
☐	☐	☐	Has accumulated sediment been removed?

4. Concrete Washout Area

Yes	No	N/A	
☐	☐	☐	Washout Facility is free of damage and leaks.
☐	☐	☐	Excess rainwater is not present within concrete washout facility.
☐	☐	☐	Accumulated hardened material is below 75% of storage capacity.
☐	☐	☐	Plastic liner replaced at last cleaning of washout facility.
☐	☐	☐	All concrete discharges on site are deposited within designated concrete washout.

*(**Note:** Not all erosion and sediment control practices are included in this listing. Add additional pages to this list as required by site specific design. Construction inspection checklists for post-development stormwater Management practices can be found in Appendix F of the New York State Stormwater Management Design Manual.)*

CONSTRUCTION DURATION INSPECTIONS

b. Modifications to the SWPPP (To be completed as described below)

The Developer shall amend the SWPPP whenever:

1. There is a significant change in design, construction, operation, or maintenance which may have a significant effect on the potential for the discharge of pollutants to the waters of the State and which has not otherwise been addressed in the SWPPP; or
2. The SWPPP proves to be ineffective in;
    a. Eliminating or significantly minimizing pollutants from sources identified in the SWPPP and as required by this permit; or
    b. Achieving the general objectives of controlling pollutants in stormwater discharges from permitted construction activity; and
3. Additionally, the SWPPP shall be amended to identify any new contractor or subcontractor that will implement any measure of the SWPPP.

Modification & Reason:

Detailed Description of Consistent Issues in the Construction and Technical Standards of SMPs:

Comments from the Previous Inspection on_____and Remarks:

Other Comments:

Appendix D - Monthly Summary Reports

Monthly Summary of Qualified Professional Site Inspection Activities

Name of Facility: Champlain Hudson Power Express Astoria DC Converter Station – Astoria Annex Upgrades	**Today's Date:**	**Reporting Month:**
Location: Astoria		
Name of Site Inspector:	**Telephone # of Site Inspector:**	

Date of Inspection	Regular/Rainfall Based Inspection	Name of Inspector	Items of Concern

Qualified Inspector's Certification:
"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I understand that certifying false, incorrect or inaccurate information is a violation of the laws of the City of New York and could subject me to criminal or civil penalties and/or administrative proceedings.

_____ _____

Qualified Professional (print name) Qualified Professional Signature

Monthly Summary of Daily Trained Contractor Site Inspection Activities

Name of Facility: Champlain Hudson Power Express Astoria DC Converter Station – Astoria Annex Upgrades	**Today's Date:**	**Reporting Month:**
Location: Astoria		
Name of Site Inspector:	**Telephone # of Site Inspector:**	

Date of Inspection	Regular/Rainfall Based Inspection	Name of Inspector	Items of Concern

Trained Contractor's Certification:
"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I understand that certifying false, incorrect or inaccurate information is a violation of the laws of the City of New York and could subject me to criminal or civil penalties and/or administrative proceedings.

_____ _____

Trained Contractor (print name) Trained Contractor Signature

Appendix E - Contractor's Certifications & Forms

CONTRACTOR'S CERTIFICATION STATEMENT

I. SITE INFORMATION

Construction Site Name: Champlain Hudson Power Express Astoria DC Converter Station – Astoria Annex Upgrades

Site Location: Located on the East River adjacent to Con Edison's Astoria Facilities

II. CONTRACTORS INFORMATION

Contracting Firm Name:
Contracting Firm Address:
Telephone Number(s):
Contact(s): 1)
2)

III. CERTIFICATION

"I hereby certify under penalty of law that I understand and agree to comply with the terms and conditions of the SWPPP and agree to implement any corrective actions identified by the qualified inspector during a site inspection. I also understand that the developer must comply with the terms and conditions of the NYC Stormwater Construction Permit, the most current version of the New York State Pollutant Discharge Elimination System (SPDES") general permit for stormwater discharges from construction activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards. Furthermore, I am aware that there are significant penalties for submitting false information that I do not believe to be true, including the possibility of fine and imprisonment for knowing violations."

_____ _____
Contractor (print name) Contractor Signature

_____ _____
Title Date

SUBCONTRACTOR'S CERTIFICATION STATEMENT

I. SITE INFORMATION

Construction Site Name: Champlain Hudson Power Express Astoria DC Converter Station – Astoria Annex Upgrades

Site Location: Located on the East River adjacent to Con Edison's Astoria Facilities

II. CONTRACTORS INFORMATION

Contracting Firm Name:
Contracting Firm Address:
Telephone Number(s):
Contact(s): 1)
2)

III. CERTIFICATION

"I hereby certify under penalty of law that I understand and agree to comply with the terms and conditions of the SWPPP and agree to implement any corrective actions identified by the qualified inspector during a site inspection. I also understand that the developer must comply with the terms and conditions of the NYC Stormwater Construction Permit, the most current version of the New York State Pollutant Discharge Elimination System (SPDES") general permit for stormwater discharges from construction activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards. Furthermore, I am aware that there are significant penalties for submitting false information that I do not believe to be true, including the possibility of fine and imprisonment for knowing violations."

_____	_____
Subcontractor (print name)	Subcontractor Signature
_____	_____
Title	Date

CERTIFICATE OF ISSUANCE

As directed by the developer, a copy of the SWPPP will be retained at the site, along with all signed statements, reports and schedules contained herein for completion by the contractor. Upon completion, the SWPPP and all records shall be returned to the developer.

Date of issuance:
Name:
Title:
Firm:

Signature: _____

Received from:
Name:
Title:
Address:
Tel. Number(s):

Signature: _____

*(**Note:** Inquiries in regard to copies of SWPPP by either the State Director or any local agency having jurisdiction to be directed to owner's project representative.)*

EROSION AND WATER QUALITY CONTROL IDENTIFICATION

The contractor and/or subcontractors that will implement each erosion control measure must be identified:

IDENTIFICATION

Name of Contractor and/or Subcontractor	Measure to be Implemented

*(**Note:** Each contractor and subcontractor identified must sign a copy of the certification statement. Those copies must be filed with the SWPPP, kept on-site, and kept up to date.*

This identification does not reassign or remove responsibility for all measures as agreed to the contract documents. The contractor is responsible for all subcontractors.)

CONSTRUCTION STABILIZATION

The contractor shall initiate stabilization measures as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, but in no case more than 14 days after the construction activity in that portion of the site has temporarily or permanently ceased. When construction activity is precluded by snow cover, stabilization measures shall be initiated as soon as practicable. When construction activity will resume within 21 days from when activity ceased, then stabilization measures do not have to be initiated on that portion of the site by the 14th day after construction activity temporarily ceased.

Major Work Activity	Portion of the Site	Date Commenced	Date Ceased (Permanently/Temporarily)	Date Stabilization Measures Initiated

***THESE MUST BE KEPT UP TO DATE AND ON-SITE FOR INSPECTION AT ANYTIME.**

CERTIFICATE OF CHANGE BY THE CONTRACTOR

To:

Project:

Site Address:

Enclosed, please find your written notification of the following provision(s) of the SWPPP not being met:

Provisions of the plan requiring modification:

Action taken to modify plan to bring project into compliance:

Date Completed:

Received By:
Name:
Title:
Contracting Firm:

Address:
Tel. Number:

Signature:
_____

Received By:
Name:
Title:
Contracting Firm:

Address:
Tel. Number:

Signature:
_____

*(**Note:** Plan amendments – major and minor need to be filed on-line. Major amendments include changes to structural components that would require design review. All others shall be filed as a minor amendment but will not require review.)*

Appendix F - End of Construction Documents

FINAL STABILIZATION AND RETENTION OF RECORDS

A. Qualified Professional Certification: A qualified professional shall perform a final site inspection.

Yes	No	N/A	
☐	☐	☐	Final site drainage will prevent erosion, concentrated flows to adjacent properties, uncontrolled overflow, and ponding.
☐	☐	☐	Conveyance systems are stabilized.

"I hereby certify that the site has undergone final stabilization. Final stabilization means that all soil disturbing activities have been completed and a uniform, perennial vegetative cover with a density of eighty (80) percent has been established or equivalent stabilization measures (such as the use of mulches or geotextiles) have been employed on all unpaved areas and areas not covered by permanent structures. Further, all temporary erosion and sediment controls (such as silt fence) not specified for permanent erosion control have been removed. I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the City and State of New York and could subject me to criminal, civil and/or administrative proceedings."

_____ _____

Qualified Professional (print name) Qualified Professional Signature

_____

Date

B. Retention of Records: The developer shall retain copies of SWPPPs, all reports, and records of all data for a period of at least five years from the date that the site is finally stabilized.

C. Maintenance of SWPPP and Reports at the Construction Site: The operator shall retain a copy of the SWPPP at the construction site from the data of initiation of construction activities to the date of final stabilization.

CERTIFICATE OF RETURN

As directed by the owner's representative, the copy of the storm water pollution prevention plan retained at the site, along with all signed statements, reports and schedules contained herein for completion by the contractor are to be returned to the owner. The owner shall retain the plan, reports and records of all data for a period of five years from the date that the site is stabilized. This period may be extended by the City director at any time upon written notification.

Date of issuance:
Name:
Title:
Firm:

Signature: _____

Received from:
Name:
Title:
Address:
Tel. Number(s):

Signature: _____

*(**Note:** Inquiries in regard to copies of pollution prevention plan by either the State Director or any local agency having jurisdiction to be directed to owner's project representative.)*

Appendix G – Not Used

Appendix H – Not Used

Appendix I – Soil Testing Data

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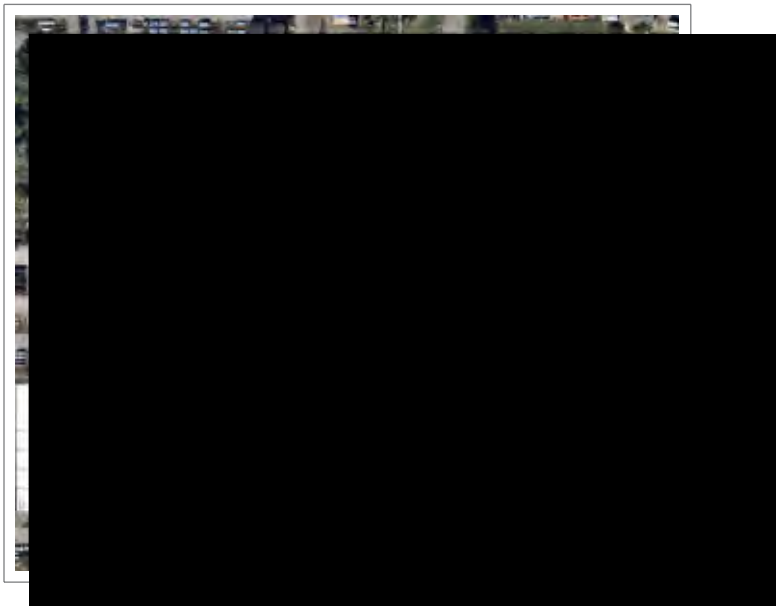
Champlain Hudson Power Express
Leg 2 - Astoria Annex Upgrade and Overhead Lines
Geotechnical Engineering Report

Astoria Generating Complex Site
30-01 20th Avenue
Astoria, New York

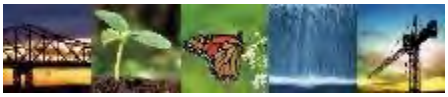
June 25, 2024
File No. 41.0163233.00



PREPARED FOR:

TDI-USA Holdings LLC/CHPE LLC

GZA GeoEnvironmental of New York
104 West 29th Street, 10th Floor | New York, NY 10001
212-594-8140 | www.gza.com



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June 25, 2024
File No. 41.0263233.00

Mr. Roger Lemos
TDI-USA Holdings LLC/CHPE LLC
623 Fifth Avenue, 20th Floor
New York, New York 10022

Re: Geotechnical Engineering Report
Champlain Hudson Power Express
Leg 2 - Astoria Annex Upgrade and Overhead Lines
30-01 20th Avenue, Astoria, New York

Dear Mr. Lemos:

GZA GeoEnvironmental of New York (GZA) is pleased to submit this geotechnical engineering report to Transmission Developers, Inc. (TDI/Client) for the Champlin Hudson Power Express (CHPE) Astoria Annex project in Astoria, Queens, New York. This geotechnical engineering report presents the results of our subsurface exploration and testing programs and provides our foundation design and construction recommendations for the proposed project.
The services described herein were performed in accordance with our proposal number 41.P000217.24, dated February 14, 2024, executed on February 14, 2024, and are subject to the terms of our proposal and the limitations presented in **Appendix A**.

We appreciate the opportunity to work with you on this project. Please contact us if you should have any questions regarding the contents of this report.

Very truly yours,

GZA GEOENVIRONMENTAL OF NEW YORK

Dharmil S. Patel, P.E.
Senior Project Manager

Muktar H. Khatari, P.E.
Vice President

Cassandra A. Wetzel, P.E
Consultant Reviewer

1.0 INTRODUCTION

This geotechnical engineering report presents the results of GZA's subsurface exploration and laboratory testing program for the proposed CHPE Leg 2 - Astoria Annex Upgrade and Overhead Lines project, located in Astoria, Queens, New York. The findings and recommendations of this report are subject to the limitations presented in **Appendix A**.

The objectives of our services were to explore the subsurface conditions at selected locations at the Site, make engineering evaluations of the conditions observed, and provide geotechnical engineering recommendations regarding the design and construction of foundations and earthwork for the project.

To accomplish our objectives, GZA undertook the following scope of services:

- Coordinated and executed a subsurface exploration program, which included advancing test borings with rock coring at selected locations, installing one groundwater monitoring well at a selected boring location, scanning boring locations for subsurface utilities with ground penetrating radar (GPR), performing potholes to expose utilities, and containing the investigation-derived wastes (IDW) in steel drums.
- Provided field engineering and observation of the subsurface exploration program, which included borings layout, coordination with subcontractors, and logging of the borings.
- Performed soil resistivity testing at the site.
- Executed a soil laboratory testing program including thermal resistivity testing.
- Performed geotechnical engineering analyses and developed foundation design and construction recommendations based on the subsurface information obtained during the exploration and laboratory testing programs.
- Prepared this geotechnical engineering report summarizing our findings and recommendations.

Recommendations presented herein are in accordance with the *Specification for Geotechnical Investigation, No. 14926-002 – REV B, prepared by Sargent and Lundy, dated January 22, 2024,* and the 2022 New York City Building Code (NYCBC), and pursuant to our discussions. Elevations in this report are referenced to the North American Vertical Datum of 1988 (NAVD 88), unless otherwise noted.

2.0 SITE AND PROJECT DESCRIPTION

2.1 SITE LOCATION

The project site is located at 30-01 20th Avenue in Astoria, Queens, New York, located within the Consolidated Edison of New York, Inc. (ConEdison) and the New York Power Authority (NYPA) Astoria Generating Complex. The project is bounded by 31st Street to the east, 16th Avenue to the south, and the construction of the new High Voltage Direct Current (HVDC) Converter Station to the north. The East River shoreline is approximately 1,800 feet north of the Site and Luyster Creek is approximately 600 feet east of the Site. The Site is occupied by an existing Annex building to the southeast, and electrical overhead lines running from the southeast to northwest portions of the Site. A Site Location Plan has been included as **Figure 1**.

2.2 SITE DESCRIPTION AND PROPOSED DEVELOPMENT

The site is occupied by an existing Annex building, a ConEdison equipment laydown yard, gravel and paved access roads, grassy areas, paved parking areas, and the Converter Station yard. The proposed development includes the installation of

new steel monopoles that will be used to support a 345 kV overhead transmission line along the west portion of the site, a new take-off structure, new underground feeders, an eastern expansion of the existing Annex building, and a new manhole along the west side of the existing Annex building. Existing grade elevations at the proposed monopole locations and take-off structure range from approximately El. +9.8 at the northern portion of the site and increase to approximately El. +14.5 towards the south portion of the site. At the proposed building extension, elevations of existing grade range from approximately El. +14.5 to El. +15.

2.3 HISTORIC TOPOGRAPHIC MAPS AND AERIAL IMAGERY

We reviewed historic United States Geological Survey (USGS) topographic maps of the Astoria Annex site for the years 1897, 1898, 1900, 1947, 1949, 1956, 1966, 1995, 2011, 2013, and 2016. The 1897 to 1949 maps show that the area north of the existing Annex site was man made in the East River. Site ground surface elevations vary from about El. +10 to El. +15 ft in the 1956 map (Mean Sea Level datum). The 1966 topographic map and more recent maps depict topographic conditions that appear to be similar to current site conditions.

We reviewed historic aerial imagery of the Site. Images from 1954 to present day show the site as a relatively flat, gravel covered area.

2.4 REGIONAL GEOLOGY

Based on a review of published regional geology information, including *Subsurface Geology and Paleogeography of Queens County, Long Island New York,* by Soren (1978), the site is underlain by unconsolidated sediments of Late Cretaceous and Pleistocene pre-Sangamon and Sangamon ages that are underlain by Precambrian age bedrock of the Raritan Formation. The bedrock consists of complexly folded and faulted gneisses and schists. The strike of the bedrock surface in Queens County is typically about N 50° E, and the surface generally dips to the southeast at an angle of about 52 minutes.

The Upper Pleistocene deposits are generally composed of glacial-drift material such as glacial till, lacustrine deposits, and outwash sand and gravel. The coarse-grained deposits and till often contain fragments of igneous, metamorphic, and sedimentary rocks. The Upper Pleistocene deposits also contain fossil plant material, varying in stages from fairly fresh in appearance to Peat.

2.5 SEISMIC SETTING

For sites east of the Rocky Mountains, the USGS Active Faults Map (USGS, 2010) indicates seismic zones rather than identifying particular faults as active. In accordance with the USGS Active Faults Map, the Site is not located within an identified active seismic zone.

2.6 FLOOD ZONE SETTING

Based on a preliminary review of the Federal Emergency Management Administration (FEMA), the Site appears to be in preliminary flood zone AE, with a Base Flood Elevation (BFE) of 13 ft. A FEMA flood zone map has been included as **Figure 3**.

3.0 SUBSURFACE EXPLORATION AND LABORATORY TESTING PROGRAM

GZA conducted a subsurface exploration and laboratory testing program for the project separated in multiple mobilizations (April 11 through 19, 2024, April 29 through May 9, 2024, and May 13 through 16, 2024). The subsurface exploration consisted of a total of nine test borings (identified as B-01 through B-04, B-04A, B-04T, and B-05 through B-09), and geotechnical laboratory testing of selected soil samples. Boring B-04T was advanced to collect soil samples for thermal resistivity test.

Geotechnical drilling complied with the site-specific GEHSI E05.23 requirements developed by Con Edison for the management of soils, groundwater, and debris from excavations and subsurface structures. Select soil samples from the exploration program were submitted to a geotechnical laboratory for testing. All exploration locations were marked in the field using a Trimble Geo 7X CM handheld sub-meter GPS unit. As-drilled boring locations for the exploration was collected using the GPS unit and elevations were estimated based on existing site grades estimated from the "Pothole Sketch, Revision A" prepared by Sargent & Lundy, undated. The approximate boring locations are provided in **Figure 2**. The exploration methods are discussed below.

3.1 TEST BORINGS

Craig Geotechnical Drilling Co. Inc. (Craig), of Mays Landing, New Jersey was retained to advance the test borings between April and May 2024 at the project site as further described below.

Prior to beginning the test borings, Craig scanned a 10-foot radius around each boring and pothole location with Ground Penetrating Radar (GPR) to check for the presence of potential subsurface utilities and underground obstructions. The locations of utilities and/or obstructions were noted in the field. Exploration locations were cleared for utilities using a vacuum truck for the upper 6- to 8- feet.

The test borings were advanced using a truck-mounted drill rig with mud rotary drilling techniques and metal casing to stabilize the boreholes. The completed boring depths varied from about 6 to 75.1 feet below the ground surface (bgs). Standard Penetration Tests (SPT) were performed at two-foot intervals during drilling within the top 20 feet and at five-foot intervals thereafter in general accordance with ASTM D-1586. A 140-pound automatic hammer was used to drive the split-spoon sampler for each SPT. The number of hammer blows required to drive the split-spoon sampler from 6- to 18-inches is the SPT N-value, a commonly used indicator of soil density and consistency. The hammer blows, N-values, and Modified Burmister description are recorded on the boring logs for each sample as well as the NYCBC Class of Materials for each stratum. Soil samples were visually classified in the field and described in accordance with the Modified Burmister Classification System.

A pocket penetrometer was used on split-spoon samples consisting of cohesive soils. Pocket penetrometer measured strengths are reported as unconfined compressive strength in tons per square foot (tsf). The pocket penetrometer tests represent index values that provide data for classification and consistency of cohesive soil and are included on the boring logs.

Rock coring was performed at test boring locations B-01 through B-05 using a double-tube NX-sized rock core barrel. Recovered rock cores were described using the Modified International Society for Rock Mechanics (ISRM) System. The rock description, the amount of rock core sample recovery (REC), and the Rock Quality Designation (RQD) are recorded on the test boring logs, as well as the NYCBC Class of Material for each core run. The rock descriptions, REC values, and RQD values provide a qualitative understanding of the physical and engineering properties of the rock. The RQD for each

run is calculated as the summation of intact core pieces 4-inches or more in length divided by the total length of the core run.

Subsequent to the completion of drilling and sampling, an open standpipe piezometer was installed in boring B-1. Groundwater depths were measured from the observation well and open boreholes. The measured groundwater depths are recorded on the boring logs.

Investigation derived wastes (IDW), including soil cuttings and drilling fluids, were contained in 55-gallon steel drums. Our drilling subcontractor transported the drums to a designated area at the completion of the drilling program. Neither environmental testing of IDW nor disposal of IDW were included in our scope of services.

The approximate boring locations are shown on **Figure 2**. The boring logs, Boring Log Key, and photos of the rock cores are provided in **Appendix B**.

3.2 SOIL RESISTIVITY TESTING

Hager-Richter Geoscience, Inc. (HRGS) of Fords, New Jersey was retained to perform soil electrical resistivity testing at four locations (arrays) within the site, where accessible. Test spacing was limited due to access constraints. Soil electrical resistivity testing was conducted in general accordance with IEEE Standard 81 and ASTM G57 using the Wenner Four-Electrode Method and the AGI SuperSting R8 resistivity meter. Locations of arrays were surveyed using a Trimble Geo 7X CM GPS receiver with an external Zephyr-2 antenna. Measurements were generally taken at spacings of 2.5, 5, 10, 15, 20, 30, 40, 60, 80, 100, and 200 feet, permitting site access and constraints. The soil resistivity testing report is included in **Appendix C**.

4.0 GEOTECHNICAL LABORATORY TESTING PROGRAM

Selected soil and rock core samples were sent to Thielsch Engineering, of Cranston, Rhode Island, RSA Geolab of Union, New Jersey and Geotherm USA of Cypress, Texas to perform geotechnical laboratory testing to check our field classifications and provide data on the material properties of soil and bedrock. The geotechnical laboratory testing program included the following:

- 9 Water Content Tests, ASTM D2216
- 6 Liquid Limit and Plastic Limit Tests, ASTM D4318
- 15 Grain Size Analysis (sieve only) Tests, ASTM D6913
- 6 Organic Content of Soil Tests, ASTM D2974
- 4 Corrosivity Suite, including pH, Chloride Content, Sulfide Content, Resistivity, and Sulfate Content
- 2 Unconfined Compressive Strength of Rock Tests, ASTM D7012
- 3 Thermal Resistivity Tests, IEEE Standard 442 and ASTM D5334
- 1 Modified Proctor Test, ASTM D1557

The testing program provided data used in the development of our geotechnical engineering recommendations. The laboratory test results are summarized below. The test results have been included in **Appendix D**.

4.1 THERMAL RESISTIVITY TESTING

GZA collected thermal resistivity samples from one test boring location identified as B-04T. This boring was advanced to a depth of approximately 8 feet bgs. The samples were generally obtained by continuous sampling using a 3-inch diameter split spoon sampler. Brass liner samples were collected during sampling, and the ends of the samples were capped and taped to preserve the in-situ moisture. Select samples were shipped to GeoTherm USA who performed the geothermal testing in accordance with IEEE Standard 442 and ASTM D5334. The results have been included in **Appendix D.**

4.2 LABORATORY TESTING RESULTS

Index Testing

The results of the index tests have been incorporated into the subsurface conditions section of this report and are reflected in the applicable descriptions on the boring logs contained in **Appendix B**.

Liquid/Plastic Limits and Organic Content Testing

Organic content and liquid limits test results are provided in the following table.

Organic Content Testing Summary						
Boring Number	**Sample Depth (ft)**	**Stratum**	**Moisture Content (%)**	**Liquid Limit (%)**	**Plastic Limit (%)**	**Organic Content (%)**
B-02	45 – 47	Lower Clay	30.5	58	28	1.3
B-03	25 – 27	Upper Clay	63.9	82	38	3.1
B-04	20 – 22	Upper Clay	89.0	121	46	6.6
B-05	25 – 27	Upper Clay	73.8	82	37	3.6
B-05	43 – 45	Clayey Silt	33.6	61	32	2.0
B-09	20 – 22	Upper Clay	80.7	102	46	4.3

Soil Electrical Resistivity Testing

The table below summarizes the electrical resistivity testing results.

Electrical Resistivity Testing Summary			
Boring Number	**Sample Depth (ft)**	**Stratum**	**Electrical Resistivity (Ohm-cm)**
B-03	50 – 52	Lower Sand	200
B-03	55 – 57	Lower Sand	200
B-07	40 – 42	Clayey Silt	30
B-09	18 – 20	Upper Clay	20

Corrosion Potential Testing

The table below summarizes the corrosion potential testing results.

Corrosion Potential Testing Summary						
Boring Number	**Sample Depth (ft)**	**Stratum**	**Sulfate (ppm)**	**Chloride (ppm)**	**Sulfide (ppm)**	**pH**
B-03	50 – 52	Lower Sand	229	140	*ND*	6.6
B-03	55 – 57	Lower Sand	112	75	*ND*	6.7
B-07	40 – 42	Clayey Silt	211	1440	*ND*	6.6
B-09	18 – 20	Upper Clay	3820	2360	*ND*	6.6
ND = Not Detected						

5.0 SUBSURFACE CONDITIONS

5.1 GENERALIZED SOIL STRATIGRAPHY

Based on the results of the exploration program, the generalized subsurface stratigraphy at the site consists of the following strata, in order of increasing depth:

- Surface Cover Materials: Approximately 1 foot of gravel was encountered at the ground surface within test borings B-01, B-03, B-07, B-08, and B-09. Approximately 1 foot of topsoil and 11 inches of concrete was encountered at the ground surface within test borings B-02 and B-04, respectively.

- FILL (NYCBC 7): Fill material was encountered either below the surface cover materials of at the ground surface within all test borings, extending to depths ranging from 12 to 23.5 feet bgs (test borings B-04A and B-04T ended in this stratum at depths of about 6- and 8- feet, respectively). The Fill stratum generally consisted of various shades of black, gray, brown, fine to coarse sand with varying amounts of gravel, silt, and metal, wood, or brick fragments. Measured SPT N-values generally varied from about weight of rod (WOR) to 53 blows per foot (bpf), with an average of 12 bpf, indicating variable density throughout the material. The Fill soils generally classify as SM and SC, according to the USCS.

- UPPER CLAY (NYCBC 4b/4c/6): An Upper Clay stratum was encountered below the Fill material within all test borings and was approximately 4- to 15.5- feet-thick (extending to approximately El. 0 to El. -19.5). The Upper Clay generally consisted of various shades of gray, brown, or black clay, organic clay, or silty clay and contained various amounts of sand, and seashell and wood fragments. Measured SPT N-values generally varied from weight of hammer (WOH) to 12 bpf, with an average of 4 bpf, indicating soft material. The Upper Clay generally classifies as CL and CH, according to the USCS.

  Pocket penetrometer readings in the Upper Clay ranged from 0 tsf to 0.5 tsf.

- UPPER SAND (NYCBC 3a/3b/6): Test borings B-01, B-03, B-04, B-05, B-7, and B-08 encountered an Upper Sand stratum below the Upper Clay stratum. This stratum was approximately 2.5 feet to 10.5 feet thick and extended to approximately El. -4.0 to El. -29.5. The Upper Sand generally consisted of various shades of brown or gray, fine to medium sand with varying amounts of silt or clayey silt, and gravel. An approximately 12-inch-thick layer of silt was encountered within this material within boring B-05. Measured SPT N-values generally varied from 2 bpf to

21 bpf, with an average of 10 bpf, indicating loose soil material. The Upper Sand soils generally classify as SM and SP, according to the USCS.

- LOWER SAND (NYCBC 3a/3b): A Lower Sand stratum was encountered below the Upper Clay in borings B-02 and B-06, below the Upper Sand in borings B-03, B-4, and B-05, and below the Clayey Silt in borings B-07 through B-09. This stratum was approximately 2 feet to 43 feet thick and extended to approximately El. -14 to El. -51. The Lower Sand generally consisted of various shades of brown, black, or gray, fine to coarse sand with varying amounts of silt, gravel, and mica. Measured SPT N-values generally varied from 12 bpf to split spoon refusal, with an average of 53 bpf, indicating a very dense condition throughout the soil material. The Lower Sand generally classifies as SM and SP, according to the USCS.

- LOWER CLAY (NYCBC 4a/4b): A Lower Clay stratum was encountered within the Lower Sand stratum in borings B-02 and B-04, and below the Lower Sand stratum within B-06. This Lower Clay stratum was approximately 4 feet to 5 feet in thickness and extended to approximately El. -26.5 to El. +39.5. This stratum generally consisted of gray or dark gray clay, with varying amounts of sand. Measured SPT N-values generally varied from 13 bpf to 42 bpf, with an average of 26 bpf, indicating very stiff material. The Lower Clay generally classifies as CL and CH, according to the USCS.

  Pocket penetrometer readings in the Lower Clay ranged from 4.0 tsf to 4.5 tsf.

- CLAYEY SILT (NYCBC 4a/4b): A Clayey Silt stratum was encountered below the Upper Sand in borings B-03, B-07 and B-8, below the Lower Sand in borings B-02, B-05, and below the Upper Clay in boring B-09. The Clayey Silt was approximately 5 feet to 30 feet in thickness and extended to approximately El. -14.5 to El. -57.5. This stratum generally consisted of olive or various shades of blue, gray, or brown Silty Clay, Silt and Clay, or Clayey Silt containing up to 50 percent sand, and up to 10 percent gravel and mica. Measured SPT N-values generally varied from 4 bpf to split spoon refusal, with an average of 21 bpf, indicating very stiff material. The Clayey Silt generally classifies as ML according to the USCS.

  Pocket penetrometer readings in the Clayey Silt ranged from 2.5 tsf to 3.8 tsf.

- DECOMPOSED ROCK (NYCBC 1d): Decomposed Rock was defined for this project as an intermediate material with an SPT N-value between 62 blows per foot and refusal exhibiting relic rock structure, or as rock that was cored but had an RQD value less than 35 percent. Decomposed Rock was encountered at each test boring location, except for borings B-03, and B-07 through B-09, and consisted of fine to coarse sand with varying amounts of silt, gravel, and mica. Decomposed Rock generally classifies as SM.

Estimated Depth and Elevation of Decomposed Rock				
Boring Number	**Approximate Ground Surface Elevation (ft)**	**Approximate Depth to Top of Decomposed Rock (ft)**	**Approximate Elevation to Top of Decomposed Rock (ft)**	**Approximate Thickness of Decomposed Rock Stratum (ft)**
B-01	9.84	30.0	-20.2	2.0
B-02	9.00	66.5	-57.5	4.5
B-03	14.00	*N/E*[2]	*N/E*[2]	-
B-04	14.21	55.5	-41.3	4.5
B-05	14.34	50.0	-35.7	5.1
B-06	14.5	45.0	-30.5	10.0
B-07	14.00	65.0[1]	-51.0[1]	-

Estimated Depth and Elevation of Decomposed Rock				
Boring Number	**Approximate Ground Surface Elevation (ft)**	**Approximate Depth to Top of Decomposed Rock (ft)**	**Approximate Elevation to Top of Decomposed Rock (ft)**	**Approximate Thickness of Decomposed Rock Stratum (ft)**
B-08	14.00	50.3[1]	-36.3[1]	-
B-09	14.00	55.0[1]	-41.0[1]	-
Notes: *[1] Practical Refusal was encountered with the split spoon sampler or casing at boring termination depth. Reported value is assumed top of decomposed rock stratum.* *[2] Decomposed rock was not encountered above the bedrock/prior to coring.* *N/E = Not Encountered*				

- BEDROCK (NYCBC 1a/1b/1c/1d): Bedrock was generally identified by roller bit refusal and/or sampler refusal. Coring was performed at selected locations. The bedrock encountered at the site generally consisted of very soft to hard, completely to slightly weathered, Gneissic Schist. The measured recoveries were between about 63 percent and 100 percent with measured RQD values between about 0 and 95 percent. The table below summarizes the approximate depths and corresponding approximate elevations to the top of bedrock.

Estimated Depth and Elevation of Bedrock			
Boring Number	**Approximate Ground Surface Elevation (ft)**	**Approximate Depth to Top of Bedrock (ft)**	**Approximate Elevation of Top of Bedrock (ft)**
B-01	9.84	32.00	-22.16
B-02	9.00	70.00	-61.00
B-03	14.00	60.00	-46.00
B-04	14.21	60.00	-45.79
B-05	14.34	55.10	-40.76
B-06	14.5	55.00	-40.50
B-07	14.00	*N/E*	*N/E*
B-08	14.00	*N/E*	*N/E*
B-09	14.00	*N/E*	*N/E*
N/E = Not Encountered			

Unconfined compressive strength testing and bulk density testing were performed on selected samples from the rock cores. The results of these tests are summarized in the table below.

Unconfined Compressive Strength of Rock Testing Summary					
Boring Number	**Rock Type**	**Approximate Sample Depth (ft)**	**Approximate Sample Elevation (ft)**	**Unit Weight (pcf)**	**Compressive Strength (psi)**
B-02	Schist	70 – 75	-61 to -66	164	18,942
B-03	Schist	60 – 65	-46 to -51	186	5,726

5.2 GROUNDWATER

Groundwater depths were measured in open boreholes and within the groundwater observation well at depths of generally 1.4 to 8.3 feet below grade, corresponding to about El. +5.7 to El. +11.1. The average measured groundwater depth was at about 5.2 feet bgs, or El. +7.7. The measured depths were obtained after completion of drilling or up to three days after drilling, to allow for drilling mud to dissipate. The measured groundwater depths are summarized in the table below.

It should be noted that changes in groundwater elevation will occur due to variations in seasonal influences, tidal river levels, precipitation amounts, local pumping, surface runoff, utility leakage, and other factors different from those existing at the time the observations were made.

Measured Groundwater Depth and Elevation				
Boring Number	**Approximate Ground Surface Elevation (ft)**	**Groundwater Reading Date and Time**	**Approximate Depth to Groundwater (ft)**	**Approximate Groundwater Elevation (ft)**
B-01	9.84	4/19/2024 10:00 AM	1.4	8.4
B-02	9.00	5/16/2024 6:00 PM	1.9	7.1
B-03	14.00	5/16/2024 7:15 AM	6.8	7.2
B-04	14.21	5/8/2024 7:00 AM	6.8	7.4
B-05	14.34	*N/M*	*N/M*	*N/M*
B-06	14.50	5/14/2024 8:00 AM	7.0	7.5
B-07	14.00	4/16/2024 12:30 PM	6.8	7.2
B-08	14.00	4/15/2024 7:15 AM	8.3	5.7
B-09	14.00	4/16/2024 12:00 PM	2.9	11.1
N/M = Not Measured				

6.0 DESIGN SOIL PARAMETERS

The tables below provide the recommended design soil parameters for the project. The parameters were developed using the results of the subsurface exploration program and the soil laboratory testing program. Correlations between SPT and engineering properties provided in FHWA *Geotechnical Engineering Circular 5, Evaluation of Soil and Rock Properties* (FHWA 2002) were considered where applicable laboratory or in situ test results were not available. The value of the subgrade modulus (k) has been provided for lateral pile analysis considering the American Petroleum Institute (API) method for sand.

6.1 GEOTECHNICAL DESIGN PARAMETERS

Recommended Design Soil Parameters						
				Effective Stress Shear Strength Parameters		**Modulus of Subgrade Reaction, k (pci)**
Stratum	**Approximate Depth (ft)**	**Typical Measured N-Value Range**	**Moist Unit Weight, ⍰ (pcf)**	**Friction Angle, Ø' (deg)**	**Cohesion, c' (psf)**	
Fill	0 – 18	1 – 53	115	28	*N/A*	50
New/Structural Fill	*N/A*	*N/A*	120	32	*N/A*	100
Upper Clay	18 – 25	1 – 12	95	*N/A*	500	25
Upper Sand	25 – 35	2 – 21	115	30	*N/A*	50
Lower Sand	35 – 50	12 – 100	125	32	*N/A*	150
Lower Clay	43 – 48	13 – 42	125	*N/A*	3,000	150
Clayey Silt	37 – 52	7 – 92	125	*N/A*	2,500	150
Decomposed Rock	50 – 55	62 – 75	135	36	*N/A*	250
Bedrock	55+	*N/A*	175	*N/A*	*N/A*	*N/A*
N/A = Not Applicable						

6.2 DESIGN GROUNDWATER

Groundwater depth readings were collected from the groundwater observation well in B-1. Stabilized groundwater measurements in the well were at a depth of approximately 1.4 feet, corresponding to an elevation of about El. +8.4.

Design of the Astoria Annex building expansion and monopoles should use a design groundwater elevation of El. +13 ft, considering the site location in FEMA flood zone AE.

7.0 FOUNDATION RECOMMENDATIONS

7.1 KEY GEOTECHNICAL ISSUES

The project site sits adjacent to man-made backfilled land which had been part of the East River. The subsurface conditions encountered at the Site generally consist of fill over compressible clays and silts and loose to medium dense sands, underlain by decomposed rock and bedrock, with the depth to the top of rock varying from about 32 to 70 feet below existing grade and varies between El. -22.2 and El. -61.

Historic structures may have been present at the project site in the past; foundations and other below-grade portions of those structures may still be present. The location and extent of historic structures is unknown but should be anticipated. We detected fuel-like odors in some of the soil samples. Working with and disposing of environmentally contaminated soil will likely impact the schedule and project budget. For planning purposes, the Contractor should be prepared to test over-excavated soil for environmental contaminants prior to receiving approval for soil waste disposal facility acceptance.

Based on our understanding of the subsurface conditions at the Site and the anticipated loading, we recommend supporting settlement sensitive structures on deep foundations bearing in the Decomposed Rock or Bedrock strata. The lighter, ancillary structures could be supported on shallow foundations; however, to meet service limit settlement tolerance criteria and the requirements of the NYCBC, areas in which the foundation subgrade materials consist of fill may need to be over-excavated and replaced with newly compacted Granular Fill.

The table below indicates the preliminary foundation loads for the proposed monopole location provided by Sargent & Lundy which were considered for our foundation recommendations.

Preliminary Monopole Foundation Loads			
Location	**Max. Axial Force (kips)**	**Max. Shear Force (kips)**	**Max Bending Moment (ft-k)**
P1	88	78	8,571
P2	79	59	6,869
P3	88	126	14,155
P4A	29	24	2,242
P4B	42	27	2,868
P4C	71	45	6004

The following sections of the report provide our foundation design and construction recommendations, as well as recommendations associated with earthwork, pavement design, and groundwater control.

7.2 DEEP FOUNDATIONS

7.2.1 Driven Piles

We recommend supporting the monopoles, more heavily loaded, and settlement-sensitive structures on driven steel H-pile or pipe pile foundations. The steel piles should be driven to refusal in the Decomposed Rock or Rock stratum. We recommend an allowable design capacity of 80 tons for HP12x53 or 12.75-inch dia. x 0.5-inch (HSS12.75X0.5) pipe piles. The allowable axial design capacity of the pile will be governed by the requirements of the NYCBC, which specifies the maximum allowable pile load based on the type of pile and the anticipated bearing stratum. The NYCBC contains a provision which allows for the exceedance of the basic maximum allowable pile loads based on the results of a load testing program. Our design recommendations consider the NYCBC maximum pile load without considering the exceedance provision. If the pre-production test pile program is performed during design, the results of the load tests can be incorporated into our recommendations and serve as the basis for the allowable pile capacity used in design.

We anticipate difficult driving conditions through the Fill as well as in the Decomposed Rock strata. Therefore, we recommend the use of steel driving tips to reduce the potential for damage during installation.

We recommend considering a minimum pile tip embedment of 5 feet into the decomposed rock for planning purposes to estimate pile lengths. Estimated pile tip elevations are presented in the table below. The estimated tip elevations provided below should be considered as preliminary and should be used for planning purposes only. During construction, the piles may encounter refusal at embedded depths of less than 5 feet. Pile tip elevation recommendations should be established based on an evaluation of the data from the control pile and load test programs discussed in the *Construction Recommendations* section of this report.

Estimated Pile Tip Elevations

Boring Location	Associated Building or Structure	Estimated Ground Surface Elevation (ft)	Approximate Elevation of top of Decomposed Rock (ft)	Estimated Tip Elevation (ft)
B-01	Monopole	9.84	-20.2	-22.2
B-02	Monopole	9.00	-57.5	-61.0
B-03	Monopole	14.00	See Note 2	-46.0
B-04	Monopole	14.21	-41.3	-45.8
B-05	Monopole	14.34	-35.7	-40.8
B-06	Monopole	14.50	-30.5	-35.5
B-07	Annex Substation	14.00	See Note 1	-51.0
B-08	Annex Substation	14.00	See Note 1	-36.3
B-09	Annex Substation	14.00	See Note 1	-41.0

Notes:
1. Boring was not advanced to decomposed rock.
2. Decomposed Rock was not encountered in the boring and pile is anticipated to be bear on bedrock.

Settlement of steel piles driven to refusal in the Decomposed Rock layer will be approximately equal to the elastic shortening of the piles plus a very small displacement at the top of the pile. Settlement at the top of similarly loaded end-bearing piles of different lengths will be approximately proportional to their lengths. For our evaluation of the elastic shortening of the piles, we considered the anticipated design pile lengths between 35 feet and 60 feet under an applied

axial load of 80 tons. The anticipated settlement of HP 12 x 53 and 12.75-inch dia. x 0.5-inch steel piles under the allowable design loads is expected to be approximately ½ inch. Differential settlement is expected to be less than half of this value.

We recommend maintaining a minimum pile spacing of at least three pile widths to provide a group efficiency equal to at least one, with no corresponding loss in axial compressive capacity. With at least a three-pile width spacing, the capacity of the pile group should be at least equal to the individual pile capacity times the number of piles in the group. The capacity of a group with closer pile spacing will be lower and the associated reduction due to group effects should be evaluated based on the pile cap and pile dimensions. We do not recommend closer pile spacing. The project structural engineer will need to design an appropriate system for transferring the loads to the piles through the pile caps.

Piles driven to refusal in the Decomposed Rock and/or Rock strata can be subject to downdrag forces; however, the magnitude of the downdrag forces will not result in pile failure or excessive deformation.

Based on the corrosion laboratory results, the on-site soils are expected to be corrosive to steel elements. A protective coating should be applied to steel H-piles or Pipe-piles installed at the Site.

7.2.1.1 Uplift Forces

The allowable uplift capacity of the driven steel piles will vary depending on the length of the pile. The estimated allowable uplift capacity of a 35-foot long and 60-foot-long piles are summarized in table below.

Pile	Length of Pile (ft)	Allowable Uplift Capacity (Tons)
HP12x53	35	9
	60	45
HSS12.75x0.5	35	7
	60	38

These values consider a factor of safety of three. A lower factor of safety may be used to estimate the allowable uplift capacity; however, the design uplift capacity would need to be verified through a tensile/uplift load testing program.

7.2.1.2 Driven H-Pile and Pipe-Pile Lateral Pile Analysis

We performed a preliminary lateral pile analysis using the computer program LPILE (v.2022) to estimate the lateral load-displacement relationships of a 40-foot long, HP 12 x 53 steel H-pile with load applied along the strong axis and weak axis and 12.75-inch dia. x 0.5-inch steel pile. We summarized the soil data into categories according to the subsurface stratigraphy and assigned strength properties based on the Design Soil Properties presented in this report.

Per the requirements of the New York City Building Code, the maximum pile deflection under “fixed-head” conditions is about 3/8-inch. In a “free-head” condition, the maximum allowable lateral load is one-half of the nominal load that deflects the pile 1-inch. The results of the lateral analyses are presented below. We considered both conditions with maximum pile head deflections for “fixed head” condition between 1/4-inch and 1-inch under the full axial design load of 80 tons. To maintain a group efficiency equal to at least one, with no corresponding loss in lateral capacity, a minimum center-to-center spacing of eight pile widths must be maintained. It is often unreasonable to maintain an eight-width spacing for foundation layout, requiring a lateral capacity reduction of the individual piles in the group. We accounted for group effects in our analyses by modeling a single pile with different soil-resistance factors (the p-y multiplier) based on

pile spacing. We considered the lateral capacity of piles with a center-to-center spacing varying between three, five, and eight pile widths/diameters, representing a reduced lateral capacity and the full lateral capacity.

The results of the lateral analyses are summarized in the tables below. These values are nominal maximum capacity values that will need to be factored for structural loading conditions. The piles should be designed with sufficient embedment and connection detail to address the bending moment defined in the tables below.

Lateral Loading Summary for Driven H-Piles						
Pile	**Pile Center-to-Center Spacing (Pile Diameters)**	**Loading Condition**	**Deflection (inches)**	**Axial Load (Tons)**	**Maximum Shear Load (kips)**	**Maximum Moment (ft-kips) (fixed-head)**
HP12x53 (Strong Axis)	3D	Fixed-Head	0.25	80	13.0	49
			0.375	80	15.0	49
			0.5	80	16.8	49
			1.0	80	18.1	49
		Free-Head	0.25	80	3.1[(1)]	-
			1.0	80	5.1[(2)]	-
	5D	Fixed-Head	0.25	80	14.0	49
			0.375	80	16.3	49
			0.5	80	18.0	49
			1.0	80	19.2	49
		Free-Head	0.25	80	3.5[(1)]	-
			1.0	80	5.4[(2)]	-
	8D	Fixed-Head	0.25	80	14.7	49
			0.375	80	17.1	49
			0.5	80	18.7	49
			1.0	80	19.8	49
		Free-Head	0.25	80	3.7[(1)]	-
			1.0	80	5.6[(2)]	-
HP12x53 (Weak Axis)	3D	Fixed-Head	0.25	80	9.0	30
			0.375	80	10.9	36
			0.5	80	11.7	36
			1.0	80	13.5	36
		Free-Head	0.25	80	1.9[(1)]	-
			1.0	80	3.6[(2)]	-
	5D	Fixed-Head	0.25	80	10.0	32
			0.375	80	11.7	36
			0.5	80	12.6	36
			1.0	80	14.5	36
		Free-Head	0.25	80	2.1[(1)]	-
			1.0	80	4.0[(2)]	-
	8D	Fixed-Head	0.25	80	10.6	33
			0.375	80	12.3	36
			0.5	80	13.2	36
			1.0	80	15.2	36

Lateral Loading Summary for Driven H-Piles						
Pile	**Pile Center-to-Center Spacing (Pile Diameters)**	**Loading Condition**	**Deflection (inches)**	**Axial Load (Tons)**	**Maximum Shear Load (kips)**	**Maximum Moment (ft-kips) (fixed-head)**
		Free-Head	0.25	80	2.3(1)	-
			1.0	80	4.2(2)	-

Note:
1. Maximum lateral load is one-half of the nominal load that deflects the pile 0.25-inches.
2. Maximum lateral load is one-half of the nominal load that deflects the pile 1.0-inches.

Lateral Loading Summary for Driven Pipe-Piles						
Pile	**Pile Center-to-Center Spacing (Pile Diameters)**	**Loading Condition**	**Deflection (inches)**	**Axial Load (Tons)**	**Maximum Shear Load (kips)**	**Maximum Moment (ft-kips) (fixed-head)**
HSS12.75x0.5(1)	3D	Fixed-Head	0.25	80	17.4	84
			0.375	80	23.0	114
			0.5	80	27.4	135
			1.0	80	33.1	149
		Free-Head	0.25	80	3.2(2)	-
			1.0	80	7.1(3)	-
	5D	Fixed-Head	0.25	80	19.2	89
			0.375	80	25.3	120
			0.5	80	29.7	139
			1.0	80	35.2	149
		Free-Head	0.25	80	3.6(2)	-
			1.0	80	7.7(3)	-
	8D	Fixed-Head	0.25	80	20.4	93
			0.375	80	26.7	124
			0.5	80	31.1	141
			1.0	80	36.5	149
		Free-Head	0.25	80	3.8(2)	-
			1.0	80	8.0(3)	-

Notes:
1. Assuming the top 5 feet of pipe pile will be filled with concrete.
2. Maximum lateral load is one-half of the nominal load that deflects the pile 0.25-inches.
3. Maximum lateral load is one-half of the nominal load that deflects the pile 1.0-inches.

The maximum allowable lateral load of a pile per the NYCBC is 1 ton (2 kips), unless verified in the field by a lateral load test. If horizontal loads greater than 1 ton will be exerted on the piles, the lateral pile capacity should be confirmed in the field by performing a load test in accordance with ASTM D3966 and the NYCBC. A minimum of two piles shall be load tested per pile type based on the footprint of the structure. Additional recommendations for pile load testing are provided in the Construction Considerations section of this report.

7.2.1.3 Driven Pile Spring Constants

Static pile spring stiffness constants for HP 12 x 53 H-pile and 12.75-inch dia. x 0.5-inch steel pipe pile are summarized in the table below.

Driven Pile Spring Stiffness Constants		
Pile	**Length of Pile (ft)**	**Axial Compressive Static Spring Stiffness (kips/inches)**
HP12x53 (80 tons)	35	1070
	60	624
HSS12.75x0.5 (80 tons)	35	1328
	60	774

The shear pile stiffness will depend on the pile head fixity condition and the orientation of the weak/strong axis.

7.2.2 Drilled Displacement Piles

Given the potential for contaminated soil at the project Site, and to limit the spoils generated during foundation construction, and the proximity to the existing structure we recommend supporting the proposed Annex building expansion on drilled displacement piles (DDP). DDPs work by displacing soil during installation. This compaction of the surrounding material improves the strength of the soil, which increases pile capacity and stiffness. DDPs are installed using a rotary drill rig. The rig uses torque and crowd force to advance a displacement boring tool into the ground. The tool displaces the soil laterally into the surrounding soil. The displacement creates a more compact and stable column for the concrete and reinforcement. The installation method for DDPs can vary depending on the soil conditions, equipment available, and local practice.

We recommend supporting the proposed building expansion on DDPs bearing in the Lower Sand (NYCBC 3a/3b) stratum. Estimated DDP tip elevations are presented in the table below. The table below summarizes allowable loads considered for an 18-inch diameter pile.

DDP Summary Table							
Diameter (inches)	**Center Bar**	**Transverse Reinforcement Bars**	**Tie Bar and Spacing**	**Allowable Axial Compression (Tons)**	**Allowable Uplift Tension (Tons)**	**Minimum Pile Length (feet)**	**Min. Compressive Strength of Grout (psi)**
18	1 - #24	5- #6	#4 Bar along length of pile spaced every 4 inches	60	40[1]	50	4,000
Note: 1) The geotechnical capacity limits the capacity of the pile.							

Estimated DDP Tip Elevations and Pile Lengths					
Boring Location	**Associated Building or Structure**	**Estimated Ground Surface Elevation (ft)**	**DD Pile Bearing Stratum**	**Approximate DD Pile Length (ft)**	**Estimated DD Tip Elevation (ft)**
B-07	Annex Substation	14.00	Lower Sand	65	-51
B-08	Annex Substation	14.00	Lower Sand	50.3	-36.3
B-09	Annex Substation	14.00	Lower Sand	50	-36

The estimated allowable axial capacity is based on an ultimate axial capacity with a factor of safety of 2.0, assuming that DDPs will have a center-to-center spacing of at least three pile diameters. The recommended uplift capacity is considering a factor of safety of 3.0. Recommended axial and uplift capacities will need to be confirmed during the load test program as discussed in the *Construction Recommendation* section of this report. Load test values of individual piles will need to consider group effect.

There is no reduction to the axial allowable capacity of piles in a group if the center-to-center spacing of piles is at least three pile diameters. The capacity of piles in a group with closer pile spacing will be reduced and should be evaluated by GZA based once the proposed pile configuration is available.

Total settlement of foundations supported on DDPs installed as recommended is estimated to be less than about ½ inch. Differential settlement is estimated to be about half this value.

7.2.2.1 DDP Lateral Capacity

We used the LPile (v.2022) computer program to evaluate the lateral loading conditions for an approximately 50-foot-long 18-inch diameter DDP. In our analyses, we considering both "fixed head" and "free head" conditions. Our analysis considers that the pile is subject to static axial loads equal to the allowable axial capacity provided above and that the pile will have a center-to-center spacing of at least eight pile diameters.

The maximum allowable lateral load of a pile per the NYCBC is 1 ton (2 kips), unless verified in the field by a lateral load test. Per the requirements of the New York City Building Code, the maximum pile deflection under "fixed-head" conditions is 3/8-inch. In a "free-head" condition, the maximum allowable lateral load is one-half of the nominal load that deflects the pile 1-inch. The results of the lateral analyses are presented below.

Lateral Loading Summary for 18-inch Diameter DDP's					
Pile Diameter (inches)	**Loading Condition**	**Deflection (inches)**	**Axial Load (Tons)**	**Maximum Shear Load (kips)**	**Maximum Moment (ft-kips)**
18	Fixed-Head	0.375	60	22.1	90
	Free-Head	1	60	7.9	-

We recommend verifying the lateral pile capacity in the field by performing a load test (if lateral loads exceed 2 kips) in accordance with ASTM D3966 and the NYCBC. Additional recommendations for pile load testing are provided in the Construction Considerations section of this report.

7.2.2.2 DDP Spring Constants

Static pile spring stiffness constants for the 18-inch diameter drilled displacement pile is summarized in the table below.

DDP Spring Stiffness Constants		
Pile	**Length of Pile (ft)**	**Axial Compressive Static Spring Stiffness (kips/inches)**
18-inch DDP (60 tons)	50	752

7.2.3 Pile Group Uplift Capacity

The uplift capacity of a pile group is dependent on the number of piles in the group, the length of piles, cap thickness/dimensions, and soil conditions. In general, the uplift capacity is equal to the sum of the uplift capacity of the individual piles in the group.

7.3 SHALLOW FOUNDATIONS

We recommend supporting lightly loaded equipment and miscellaneous structures on shallow foundations consisting of shallow spread footings or mat foundations constructed in accordance with the NYCBC. The shallow foundations should be constructed to bear on new compacted Granular Fill placed after excavation and replacement of existing Fill soils and/or unsuitable natural soils. We recommend shallow foundations bearing on these materials be designed for a net allowable soil bearing pressure of 2,000 pounds per square foot (psf).

Mat foundations may be designed using a modulus of subgrade reaction of 100 pounds per cubic inch, referenced to a 1-foot by 1-foot plate area. The recommended modulus value is contingent on subgrade preparation work being performed as described in the *Construction Recommendations* section of this report.

The mat should be designed to resist hydrostatic uplift pressure with a factor of safety of at least 1.5. Considering the site location in FEMA Flood Map Zone AE, the recommended design groundwater elevation is El. +13 ft (NAVD 88). Resistance to uplift can be provided by thickening the base slab, by extending the mat slab beyond the limits of the structure/equipment considering both the weight of the concrete and the soil above the extended portion of the slab, and/or by using tiedown anchors.

We recommend that footings and mat bearing grades be at least 4 feet below the adjacent exterior grade for frost protection. Foundation elements for supporting ancillary structures/equipment pads may be supported on compacted free draining Granular Fill/crushed stone that bears at least 4 feet below the adjacent exterior grade. Interior footings in heated building areas may be founded at nominal depths below floor slabs.

If unsuitable Fill or soft/loose natural soils are encountered at the proposed shallow foundation bearing grades, we recommend over excavating to reach suitable subgrade soils, and replacing the over-excavated soil with new compacted Granular Fill. We recommend a maximum over-excavation and replacement depth of 3 feet. All over-excavations should extend laterally at least 12-inches beyond the footing or mat in all directions. Granular Fill should meet the gradation requirements outlined in Table 1 (included at the end of this report). If excavation sidewalls remain stable, over-excavated subgrades can be backfilled with 300 psi flowable fill or lean concrete in lieu of new Granular Fill. All excavated subgrades should be observed by the Geotechnical Engineer prior to placement of Granular Fill to evaluate whether subgrade materials are consistent with the requirements of this report.

We recommend an allowable coefficient of sliding friction of 0.4 for foundations bearing on native material or on new compacted Granular Fill.

7.3.1 Shallow Foundation Settlement

Settlement estimates indicate that shallow foundations supported on properly placed compacted Fill are not expected to exceed about 1 inch. The table below provides our estimate of total settlement of various mat foundation sizes.

Settlement Estimates	
Mat Foundation Size	**Approximate Settlement (inches)**
4 ft x 4 ft	½-inch
6 ft x 6 ft	½-inch
8 ft x 8 ft	¾-inch
10 x 10 ft	1-inch

These settlement values may be acceptable depending on the settlement tolerances of the structures/equipment being supported. Settlement magnitude estimates should be updated once the dimensions, locations, and loading have been determined. Flexible utility connections may be needed to address settlement concerns.

7.3.2 Foundations for Lighter Loads

To support lighter loads such as pipe supports, pile sleepers, and light poles (all structures which are not particularly sensitive to settlement), we recommend 30-inch diameter circular foundations. We have assumed a maximum service load at each foundation of 5 kips in axial compression and 1 kip in lateral force; uplift capacity was not required. The circular foundation should be constructed to bear on the suitable Fill soils. We recommend circular foundations bearing on these materials be designed for a net allowable soil bearing pressure of 2,000 pounds per square foot (psf). The steel reinforcement ratio of each circular foundation shall be greater than 1%.

We recommend that the bottom of each foundation should be at least 5 feet below the adjacent grade. Due to uncontrolled, erratic nature of the Fill stratum supporting the foundations, the anticipated settlement of 30-inch diameter circular foundation under the allowable design loads is expected to vary from less than about ¾-inch to several inches. Periodic maintenance may be required, including adjustments with steel wedges or similar means to accommodate foundation settlement.

The lateral capacity for each isolated foundation is up to 1 kip, which is half of the force that is estimated to deflect the top of the foundation by 1 inch.

7.4 FLOOR SLAB SUPPORT

We recommend slab-on-grade construction for any interior building floor slabs after preparation of subgrades. Slabs-on-grade should be supported on new compacted Granular Fill placed after excavation and replacement of unsuitable Fill soils and/or unsuitable natural soils are encountered at the slab elevation. Slabs-on-grade bearing on compacted Granular Fill may be designed using a modulus of subgrade reaction of 100 pounds per cubic inch, referenced to a 1-foot by 1-foot plate area.

A 4-inch-thick crushed stone base course should be placed over the slab subgrade. The crushed stone should meet the gradation requirements of Table 1 and compaction requirements of Table 2.

7.5 CORROSION CONSIDERATIONS

Corrosion potential testing was performed on soil samples collected from multiple borings at various depths as presented below. Testing included sulfates, chlorides, pH, and electrical resistivity. The purpose of these tests was to evaluate the corrosivity of the soil against steel and concrete foundations. The results are presented in **Appendix D** and discussed below.

Comparison of Corrosion Testing Results					
Parameter	**Corrosive Based on Corrosivity Criteria[1]**				**Corrosive Based on Laboratory Results Compared to Corrosivity Criteria?**
	CalTrans	**AASHTO**	**NYCBC**	**FHWA**	
Electrical Resistivity (ohm-cm)	Below 1,000 ohm-cm	Below 2,000 ohm-cm	Below 1,000 ohm-cm	Below 3,000 ohm-cm	Yes
pH	Below 5.5	Below 5.5; or Between 5.5 and 8.5 for organic soils	Below 5.5	Below 5 and above 10	No
Sulfate (ppm)	Above 2,000 ppm	Above 1,000 ppm	Above 1,000 ppm	Above 200 ppm	Yes
Chloride (ppm)	Above 500 ppm	No Criteria	No Criteria	Above 100 ppm	Yes

Based on the results of the sulfate content there are restrictions and both Type I and II cement for foundations. The chloride content is high suggesting high risk of chloride attachment to carbon steel and cast iron, although the pH range of 6.6 to 6.7 is not considered to be the dominant variable affecting corrosion rates. Steel piles should have additional corrosion protection or a protective coating. Based on the electrical resistivity measurements the soils are considered to have potential for corrosion affecting buried metal structures. We recommend Type V cement be considered for use for all foundations.

8.0 SEISMIC ASSESSMENT

8.1 SEISMIC DESIGN PARAMETERS

Based on the results of our exploration and available information and in accordance with the NYCBC, the calculated average measured SPT N-values of the top 100 feet of soils fall into the range of Seismic Site Class E which is used for calculation of seismic loading and the corresponding response spectrum as described in Section 1613 of the NYCBC. However, pursuant to Section 1813 of the NYCBC, we plotted SPT N-values normalized to an energy efficiency of 60 percent versus depth to assess whether evaluation of liquefaction was required. The data indicated that a liquefaction evaluation was required at this site. The results of the liquefaction analysis are discussed below.

8.2 LIQUEFACTION POTENTIAL

Liquefaction is a phenomenon where loose, granular soils below the water table experience a sudden reduction in shear strength in response to strong earthquake shaking over successive cycles of ground motion. Liquefaction of granular soil layers may result in excessive settlements of shallow foundations, and/or downdrag on deep foundations, and global instability of slopes.

[1] Four references used to evaluate corrosion test criteria herein included:
-CalTrans Publication entitled "Memo to Designers 3-1 July 2008." CalTrans considers a site to be corrosive if one or more of the parameters listed in the table are exceeded.
-AASHTO LRFD Bridge Design Specifications (Fifth Edition 2010). AASHTO considers site conditions to be indicative of a potential pile deterioration or corrosion situation if one or more of the parameters listed on the table are exceeded.
-FHWA Publication No. FHWA NHI-05-039 entitled "Micropile Design and Construction" December 2005. FHWA uses the criteria listed in the table to determine whether the ground is classified to have strong corrosion potential or is aggressive if any one of the conditions listed is exceeded.
-NYCBC Section 1812.2.1 Corrosion Testing Requirements

We performed a liquefaction analysis of the Site using the empirical methodology set forth by Idriss and Boulanger (2008) considering the seismic site class, SPT N-values, overburden stress, hammer energy, fines content and an anticipated design earthquake. We used an estimated design peak ground acceleration (PGA) at the ground surface of 0.36g for our liquefaction analysis, corresponding to the PGA for the maximum considered earthquake (MCE) for Site Class E. We used an estimated MCE magnitude of 5.7.

Our analysis indicated that significant portions of the soil within 50 of the ground surface feet (particularly within the loose Upper Sand and Fill stratum) have the potential to liquefy. Pile design should consider acceptable performance during/following an earthquake, which may consider increased lateral deflection and/or higher allowable stresses in the piles. Pavement, utilities, and slabs on grade should consider potential settlement following a seismic event.

Based on the liquefiable soils and in accordance with the NYCBC, we recommend Seismic Site Class F, and a site-specific ground motion analysis is required per NYCBC.

Due to the entirely SPT-based analysis and the inherent conservativism, we recommend additional testing consisting of seismic CPT soundings to obtain shear wave velocities to reevaluate the site class and reassess the potential for liquefaction. Other methods, such as multi-channel analysis of surface waves (MASW) may be considered but may not be practical due to the potential presence of underground utilities and access limitations. The seismic CPT data typically models the soil response to seismic excitation more accurately than the SPT-based analysis and is less conservative. If the analysis based on the additional testing shows the site as Site Class E/F and/or susceptible to liquefaction, site specific seismic analysis would be performed using the data to reevaluate liquefaction potential and to develop seismic parameters for design. In accordance with Section BC 1818, a geotechnical peer review will be required for structural of risk category III or IV where the site class is determined as Site Class F.

9.0 CONSTRUCTION RECOMMENDATIONS

9.1 DEMOLITION

Based on the proposed construction, we anticipate that existing structures, foundations, and slabs may be encountered and should be removed from the site to facilitate construction. Site drainage should be re-routed as needed. Any below-grade utilities designated to remain should be protected during construction activities. Any relocated or removed below-grade utilities should be over-excavated, and the excavation should be backfilled with Granular Fill meeting the gradation and compaction requirements of Table 1 and Table 2, respectively.

9.2 EARTHWORK AND GRADING RECOMMENDATIONS

9.2.1 Site Preparation

Surface cover, and utilities should be completely removed from subgrades prior to placement of Granular Fill for the building extension and/or ancillary equipment.

9.2.2 Fill Subgrade Preparation

The Fill encountered at the site generally consists of very loose to very dense sands. The Fill includes materials that were likely placed during prior expansions. While the results of this study indicate that most of these materials should be suitable for support of new compacted Granular Fill, the likelihood of areas of very loose or otherwise unsuitable soil is

typically greater with Fill than with naturally deposited soils. The Geotechnical Engineer should evaluate the suitability of the Fill subgrades prior to Fill placement at the site (if required)

Where the existing site soils are not excavated, the stripped subgrades should be proof rolled with a loaded dump truck to evaluate the subgrade suitability for support of compacted Granular Fill. Existing roadway base course and crushed stone encountered along the existing site access roads may be left in place and evaluated during proof-rolling. Any weak or soft soils identified during proof-rolling by excessive pumping, weaving, or rutting should be scarified, dried and recompacted, or excavated and replaced with compacted Granular Fill.

9.2.3 Shallow Foundation Subgrade Preparation

The exposed shallow foundation subgrades should be compacted to a stable and firm consistency with a minimum of four passes of a vibratory walk behind double drum roller, or other heavy compaction equipment. Areas of unstable ground observed during proof-rolling should be over-excavated until the exposed ground is stable and firm. The over-excavated soils should be replaced with compacted Granular Fill. Foundation subgrade soils should be compacted to at least 95 percent of their maximum dry density, as determined by the Modified Proctor Test (ASTM D1557).

Subgrades should be kept free of standing water, debris, and ice. Subgrades should be protected from frost, and fill should not be placed over frozen soil. If frozen soils are present at design subgrade levels, they should be removed and replaced with new compacted Granular Fill.

All foundation subgrades should be observed by the Special Inspector, per the NYCBC Section 1705.6, prior to placement of concrete to evaluate the condition of the subgrade materials and check for consistency with the recommendations of this report.

Shallow foundation subgrades should be protected in their as-approved condition until concrete is poured. A 2-inch-thick lean concrete mix or a ‘mud-mat’ may be poured over the approved soil subgrade to protect the subgrade from disturbance and deterioration.

9.2.4 Fill Placement and Compaction

Fill material should consist of Granular Fill and/or sand-gravel fill that meets the gradation requirements outlined in Table 1. Compacted Granular Fill placed for support of shallow foundations and pavement support should be compacted to at least 95 percent of its maximum dry density, as determined by the Modified Proctor Test (ASTM D1557). Compacted Fill placed for general site grading should be compacted to 92 percent of its maximum dry density. The recommended maximum loose lift thickness of fill and minimum number of passes of compaction equipment are presented in Table 2.

Crushed stone, where used below proposed slabs, should be compacted to a firm, stable configuration, and should be wrapped all around in non-woven filter fabric, such as Mirafi 140N. The crushed stone should be compacted in place with at least two passes of a hand-operated vibratory plate, light roller, or other suitable walk-behind vibratory compaction equipment.

Any imported Granular Fill should meet the gradation requirements outlined in Table 1, should not contain particles larger than 3-inches, and shall have a minimum resistivity of 1,000 ohm-cm (100 ohm-m) per NYCBC requirements. We recommend performing at least one gradation and one moisture-density test per each 200 cubic yards of imported fill. We also recommend performing one soil resistivity test per 2,500 cubic yards of imported material per source.

9.2.5 Reuse of Existing Material

Based on the gradation results, the on-site Fill soils are generally considered suitable for reuse as site grading fill provided they are culled of any organics, boulders and debris and they meet the gradation requirements of Table 1. We recommend performing at least one gradation and one moisture-density test per each 200 cubic yards of existing on-site soil to be reused to confirm that the on-site material meets the gradation requirements of Table 1. The on-site Fill soils should be handled in accordance with the latest General Environmental, Health and Safety Instruction (GEHSI) prepared for the management of soils, groundwater and debris from excavation and subsurface structures at the Astoria Complex.

9.2.6 Flowable Fill

Flowable fill is also considered suitable for use as backfill on this project. The required strength should be established depending on the type of loading to be supported. We recommend a minimum compressive strength of 150 psi be used, with a minimum of 300 psi within the zone of influence of footings or mats. ACI 229R-13, Controlled Low-Strength Materials (CLSM) should be used when specifying flowable fill.

9.3 PILE FOUNDATIONS

9.3.1 Driven Pile Installation

Due to the presence of construction debris and other deleterious materials encountered in the borings as well as the existing structures on site, the contractor should be prepared to drill through the upper 10 feet of soil if obstructions are encountered during pile installation. The cross-sectional area of the auger used to pre-drill should be at least 2 inches less than the pile being installed.

Any voids around the pile created during the construction due to drilling or pile driving should be backfilled with soil or grout to the satisfaction of the geotechnical engineer.

9.3.1.1 Test Pile Program – Driven Piles

Prior to the start of production pile driving, the Contractor shall perform a test pile program using dynamic pile testing (PDA) and signal matching in accordance with ASTM D4945, and static axial and lateral load tests to meet the requirements of the NYCBC. The location of test piles shall be checked by the Geotechnical Engineer after the completion of a foundation plan. The test pile program will also allow for the estimation of anticipated pile lengths across the site and demonstration of pile capacities. If the load test program is performed during design development phase, the results of the load tests can be incorporated into the pile design to value engineer the allowable pile capacity.

The Contractor should perform a wave equation (WEAP) analysis of the pile and pile hammer system to check the driving criteria prior to installing test piles. The wave equation analyses shall be provided to the Geotechnical Engineer for review. The wave equation analysis should include an estimate of the anticipated driving resistance and pile stresses during driving. The Contractor should drive all test piles and production piles using the same hammer.

Pile driving analysis (PDA) and CAPWAP analysis shall be performed by the Contractor for each of the test piles. The results of the test pile installation, PDA testing, and CAPWAP analysis shall be submitted to the Geotechnical Engineer for review and approval. The Contractor shall install the production piles based on the results of the test pile program and the pile driving criteria approved by the Geotechnical Engineer. We recommend PDA testing be performed on non-production

piles used for load test and five percent of the production piles. The Geotechnical Engineer should recommend pile tip elevations and installation criteria based on an evaluation of the data from the control pile and load test programs.

9.3.2 Drilled Displacement Pile Installation

The construction of DDPs is highly dependent upon the skills of the foundation contractor in charge of the installation and their equipment. The pile installation should be performed by a specialty contractor with at least five years of experience installing DDPs. Pile installation records should be maintained for all DDPs.

The grout pump should be equipped with a stroke counter for grout volume measurement and should be calibrated prior to use. Grout for each pile should be tested by an approved testing agency. The contractor should maintain a minimum head of grout of at least 10 feet above the auger tip and should not reverse the augers during pumping. The total volume of grout should be at least 115 percent of the theoretical volume of each pile. Grout pressures and quantities should be monitored and controlled during installation. Grout should set for at least 24 hours before installing adjacent DDPs less than four center-to-center diameters from the installed pile.

The DDPs should be observed and documented by a geotechnical engineer (approved special inspection agency) to monitor installation on a full-time basis, in accordance with the Construction Documents and in accordance with the applicable code requirements. FHWA Geotechnical Engineering Circular 8, Design and Construction of Continuous Flight Auger Piles (FHWA 2007), recommends integrity testing on a minimum of two percent of production piles. Integrity testing can consist of cross-hole sonic (CSL) testing, single-hole sonic test, the backscatter gamma test, and thermal integrity profiling (TIP). GZA recommends that the Contractor consider using TIP testing of the DDPs. The TIP testing uses the temperature of the curing grout to assess the quality of the foundation element. The DDP can be profiled in two-dimensions, showing areas of competent concrete and/or anomalies inside and outside of the reinforcing cage. TIP measurements evaluate the concrete quality along the entire length of the pile.

9.3.2.1 Test Pile Program – Drilled Displacement Piles

We recommend a load test program prior to the installation of the production piles to check anticipated pile capacities. Two compressive load tests are required to evaluate the axial compressive capacity for each typical DDP at the project site per the requirements of the NYCBC. Each test pile should be tested to the recommended ultimate axial capacity of two times the design load to evaluate the DDP response to simulated structural loads and to establish lengths for production piles. The axial static load test should be performed in accordance with ASTM D1143 and the applicable requirements of the NYCBC.

9.3.3 Pile Load Testing Program

In accordance with Section 1810.4 of the NYCBC, static axial load tests (ASTM D1143) will be required for any design loads exceeding 40 tons. The number of pile load tests are based on the footprint area of the proposed Annex building extension. A test pile cannot be used as a production pile.

The NYCBC requires lateral load testing for any piles with lateral loads greater than 2 kips (1 ton). The lateral load tests should be performed in accordance with ASTM D3966, Procedure B, with loading increments applied until a measured deflection of 1-inch is observed to evaluate pile response to simulated structural loads. One-half of the load observed at a deflection of 1-inch will establish the allowable lateral load for production piles.

We have provided uplift capacity based on a factor of safety of 3.0 which does not require an uplift load test. However, if a lower factor of safety is required to increase the capacity, then uplift load tests will be required. The tensile uplift load tests should be performed in accordance with ASTM D3689.

The installation contractor must provide a detailed design for the axial, lateral, and tensile load testing, including the load test locations, construction details for the load test frames and hold-down piles (if needed), loading and monitoring procedures, and recommended evaluation procedures. An independent, calibrated load cell must be used to measure the load on the pile head; reliance solely on a calibrated jack to measure the load is not acceptable. The detailed design must be signed and sealed by a Professional Engineer registered in New York.

9.3.4 Pile Observation

Special Inspection of pile installation must be provided by a qualified Professional Engineer in accordance with Section 1705.7 of the NYCBC. We recommend that GZA be retained to provide these services due to our familiarity with the subsurface conditions at the project site and the project design to date. In addition, GZA should review the Contractor's submittals for the proposed pile design/installation.

During installation of the test pile and the production piles, the Special Inspector must record the minimum following data:

- Pile Identification Number
- Installation Equipment
- Pile Material Properties/Lengths
- Installation Start and Finish Time
- Installation Depth
- Cutoff Elevation and tip elevation (to be provided by surveyor)

9.4 SHALLOW FOUNDATIONS

All shallow foundation subgrades should be observed by the Geotechnical Engineer prior to concrete placement to evaluate whether the subgrades have been prepared as recommended in this report. All foundation subgrades should be kept clean of loose or soft soils. Over-excavated foundation subgrades can be concreted at the elevation of the undercut or backfilled with new compacted Granular Fill to the original design elevation.

Shallow foundation concrete should be placed as soon as possible after excavation and cleaning of subgrades to limit the potential for moisture infiltration. Concrete mud mats should be used to protect foundation subgrades from weather and construction traffic during reinforcing steel placement. Final Site grades should incorporate positive drainage away from the power block so that water does not accumulate around the foundations.

9.5 TEMPORARY EXCAVATIONS

The Owner and the Contractor should make themselves aware of and become familiar with applicable local, state, and federal safety regulations, including the current Occupational Safety and Health Administration (OSHA) Excavation and Trench Safety Standards. Construction site safety generally is the sole responsibility of the Contractor, who shall also be solely responsible for the means, methods, and sequencing of construction operations. We are providing this information solely as a service to our Client. Under no circumstances should the information provided below be interpreted to mean

that GZA is assuming responsibility for construction site safety or the Contractor's activities; such responsibility is not being implied and shall not be inferred.

Based on the granular nature of the existing Fill, it is anticipated that the soil exposed in excavations would generally be classified as Type C soil in accordance with OSHA regulations. For Type C soils, OSHA recommends a maximum slope inclination of 1.5H:1V. Excavation slopes should be checked regularly for signs of instability and should be shored or flattened as required. Temporary slopes should be protected from surface run-off erosion to promote stability of the slope, by means of berms and swales located along the top of the slope, a flattened slope inclination and/or plastic sheeting placed over the slope.

As an alternative to temporary slopes, vertical excavations can be temporarily shored. The Contractor or the Contractor's specialty subcontractor would be responsible for the design of the temporary shoring in accordance with applicable regulatory requirements, but the recommendations of this report will serve as a minimum requirement.

9.6 TEMPORARY GROUNDWATER CONTROL

Groundwater will need to be lowered a minimum of two feet below the excavation subgrade in the areas of the manhole structures. The construction dewatering system should be designed by a qualified Professional Engineer licensed in the State of New York and experienced in this work. The temporary dewatering design must consider equipment access when selecting the appropriate system.

Additionally, the Contractor should be prepared to excavate accumulated rainwater and runoff from local excavations during construction. Pumping from submersible pumps (sumps) will likely be effective in controlling groundwater or surface water infiltration. Sumps should be able to lower the groundwater to at least 2 ft below the base of the excavation. Dewatering methods should be the responsibility of the Contractor. Groundwater must be discharged in accordance with state and local regulations. Groundwater should be handled in accordance with the GEHSI prepared for the management of soils, groundwater and debris from excavation and subsurface structures at the Astoria Complex.

9.7 ASSESSMENT AND MONITORING OF ADJACENT STRUCTURES

The NYCBC requires the documentation of the conditions of adjacent structures prior to excavation or foundation construction and requires monitoring of structures if either excavation depths exceed five feet or if the excavation depths exceed the depths of the footings of adjacent buildings. A Professional Engineer registered in the State of New York must develop a monitoring plan to comply with the requirements of NYCBC Section 3309.16.

The pre-construction condition of adjacent buildings/structures should be documented prior to the start of any work at the project Site. This includes photographing and measuring all existing conditions and defects to provide a quantifiable baseline record prior to construction. Crack gauges, vibration monitors and/or survey points should be installed at applicable locations, and baseline values should be recorded. Crack readings, vibration measurements, and deflections should be measured throughout excavation and construction. This work must be performed on behalf of the Client, not the Contractor.

9.8 SPECIAL INSPECTION REQUIREMENTS

We anticipate that the following NYCBC Special Inspections will be required for work discussed in this report:

- Subgrade Inspection [BC 1705.6.4]
- Subsurface Conditions – Fill Placement & In-Place Density [BC 1705.6]
- Deep Foundation Elements [BC 1705.7]
- Excavations – Sheeting, Shoring and Bracing [BC 1705.25.3]

The required "Subsurface Investigation (Borings)" special inspection has been completed as a part of our subsurface exploration program. Special Inspections must be performed by a Special Inspection Agency retained by the Owner. Due to our project familiarity, we believe that our services will reduce unexpected circumstances during the bidding and construction process and should expedite resolution if unanticipated conditions are encountered.

All quality assurance and testing during construction should be performed in accordance with the applicable building codes.

10.0 REFERENCES

American Concrete Institute (2019). "Building Code Requirements for Structural Concrete (ACI 318-19) and Commentary," ACI Committee 318, Farmington Hill, MI.

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TABLES

Table 1: Recommended Use and Gradation Criteria For Fill Materials

USE OF FILL MATERIAL

Granular Fill: Below footings and slab base course, and 3 feet laterally behind walls provided that amount passing Sieve No. 200 is less than 8 percent.
Sand-Gravel: Slab base course and 3 feet laterally behind walls.
Crushed Stone: Drain line backfill and foundation protective layer. Crushed stone should be wrapped in non-woven filter fabric.

GRADATION REQUIREMENTS

Sieve Size	Percent Finer by Weight
Granular Fill	Shall be free from ice and snow, roots, sod, rubbish and other deleterious or organic matter. Granular Fill shall conform to the following gradation requirements:
2/3 of the loose lift thickness	100
No. 10	30 – 95
No. 40	10 – 70
No. 200	*0 – 15 *0 – 8 where used behind walls
Sand-Gravel	Shall consist of durable sand and gravel and shall be free from ice and snow, roots, sod, rubbish and other deleterious or organic matter. Sand-Gravel shall conform to the following gradation requirements:
3 inch	100
½ inch	50 – 85
No. 4	40 – 75
No. 40	10 – 35
No. 200	0 – 8
Crushed Stone	Shall consist of durable crushed rock or durable crushed gravel stone and shall be free from ice and snow, roots, sod, rubbish and other deleterious or organic matter or material. Crushed Stone shall conform to the following gradation requirements:
1 inch	100
¾ inch	90 – 100
½ inch	10 – 50
3/8 inch	0 – 20
No. 4	0 – 5
No. 200	0 – 1

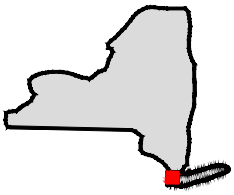
Table 2: Compaction Methods

Compaction Method	Max. Stone Size*	Maximum Loose Lift Thickness		Minimum Number of Passes	
		Below Structures and Pavement	Less Critical Area	Below Structures and Pavement	Less Critical Area
GRANULAR FILL, SAND-GRAVEL FILL, CRUSHED STONE					
Hand-operated vibratory plate or light roller in confined areas	4”	6”	8”	4	4
Hand-operated vibratory drum rollers weighing at least 1,000# in confined areas	6”	10”	12”	4	4
Light vibratory drum roller Min. weight at drum 3000# Min dynamic force 10,000#	8”	12”	18”	4	4
Medium vibratory drum roller Min. weight at drum 10,000# Min dynamic force 20,000#	8”	18”	24”	6	6

* Indicates not to exceed more than 2/3 the lift thickness

FIGURES

NEW YORK



QUADRANGLE LOCATION

SOURCE:

USGS TOPOGRAPHIC MAPS: CENTRAL PARK, NY, NJ (2023). CONTOUR INTERVAL 10FT., NAVD-1988, ORIGINAL SCALE 1:24,000 (1IN.=2,000FT.).

N W E S

CHAMPLAIN HUDSON POWER EXPRESS
345kV ASTORIA HVAC UNDERGROUND TRANSMISSION SUBSTATION TO OVERHEAD TIE-IN

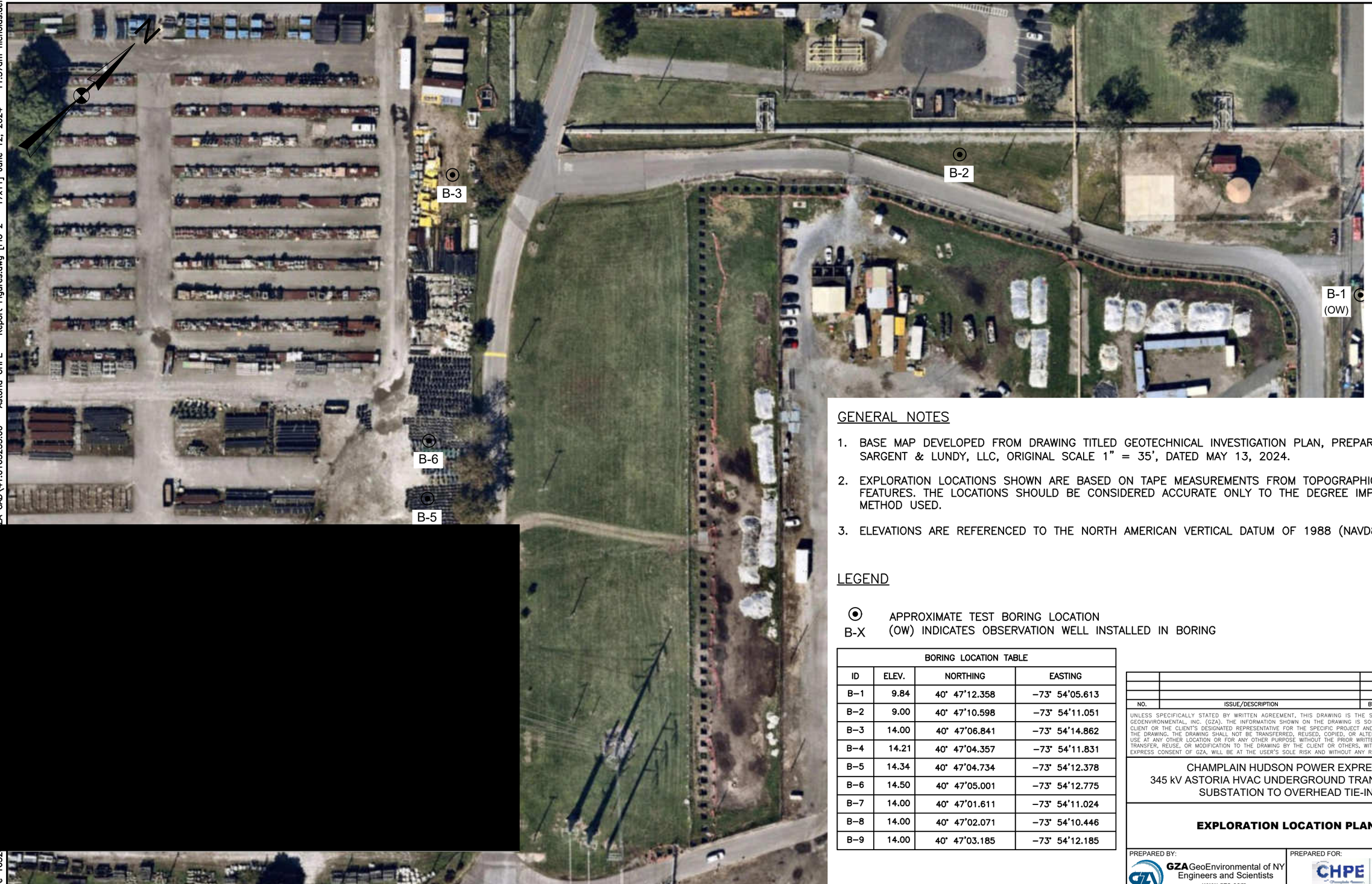
PREPARED BY:
GZA GeoEnvironmental of NY
Engineers and Scientists
www.gza.com

PREPARED FOR:
CHPE Transmission

SITE LOCATION MAP

PROJ MGR: DSP	REVIEWED BY: DSP	CHECKED BY: MK	FIGURE 1
DESIGNED BY: NW	DRAWN BY: NW	SCALE: 1"=2000'	
DATE: JUNE, 2024	PROJECT NO. 41.0163233.00	REVISION NO. -	SHEET NO. 1 OF 3

GZA–J:\Active 163200 to 163299\163233.00 – CHPE Annex Upgrades – Geotech\Drawings\GZA CAD\41.0163233.00 – Astoria CHPE – Report Figures.dwg [FIG 1 8.5x11] June 12, 2024 – 11:38am nicholas.deflorio



GENERAL NOTES

1. BASE MAP DEVELOPED FROM DRAWING TITLED GEOTECHNICAL INVESTIGATION PLAN, PREPARED BY SARGENT & LUNDY, LLC, ORIGINAL SCALE 1" = 35', DATED MAY 13, 2024.
2. EXPLORATION LOCATIONS SHOWN ARE BASED ON TAPE MEASUREMENTS FROM TOPOGRAPHICAL FEATURES. THE LOCATIONS SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.
3. ELEVATIONS ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)

LEGEND

⊙ APPROXIMATE TEST BORING LOCATION
B-X (OW) INDICATES OBSERVATION WELL INSTALLED IN BORING

BORING LOCATION TABLE

ID	ELEV.	NORTHING	EASTING
B-1	9.84	40° 47'12.358	-73° 54'05.613
B-2	9.00	40° 47'10.598	-73° 54'11.051
B-3	14.00	40° 47'06.841	-73° 54'14.862
B-4	14.21	40° 47'04.357	-73° 54'11.831
B-5	14.34	40° 47'04.734	-73° 54'12.378
B-6	14.50	40° 47'05.001	-73° 54'12.775
B-7	14.00	40° 47'01.611	-73° 54'11.024
B-8	14.00	40° 47'02.071	-73° 54'10.446
B-9	14.00	40° 47'03.185	-73° 54'12.185

0 45 90 40
SCALE IN FEET

NO.	ISSUE/DESCRIPTION	BY	DATE

CHAMPLAIN HUDSON POWER EXPRESS
345 kV ASTORIA HVAC UNDERGROUND TRANSMISSION SUBSTATION TO OVERHEAD TIE-IN

EXPLORATION LOCATION PLAN

PREPARED BY: GZA GeoEnvironmental of NY Engineers and Scientists www.gza.com
PREPARED FOR: CHPE Champlain Hudson Power Express / Transmission

PROJ MGR: DSP	REVIEWED BY: DSP	CHECKED BY: MK	FIG 2
DESIGNED BY: NAW	DRAWN BY: NAW	SCALE: 1" = 90'	
DATE: JUNE, 2024	PROJECT NO. 41.0163233.00	REVISION NO. 0	SHEET NO. 2 OF 3

FEMA FIRM LEGEND

LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X — Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D — Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

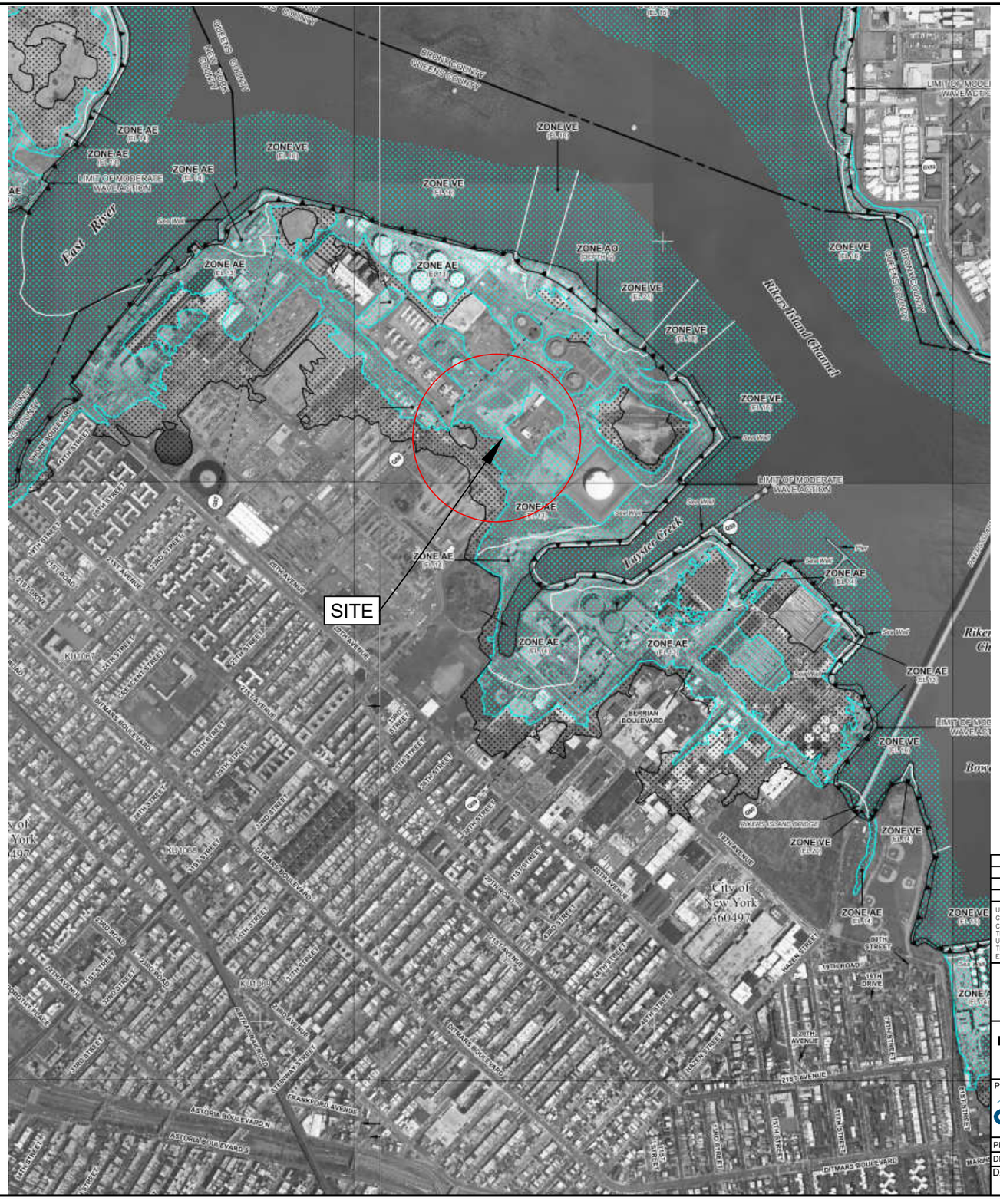
OTHERWISE PROTECTED AREAS (OPAs)

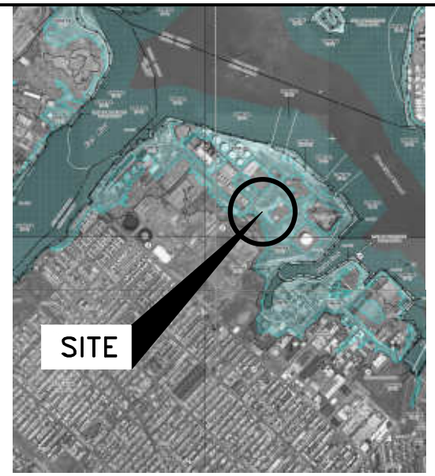
CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- Limit of Moderate Wave Action
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

- A — A — Cross section line
- 23 — 23 — Transect line
- Culvert, Flume, Penstock or Aqueduct
- Road or Railroad Bridge
- Footbridge
- 87°07'45", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
- $^{24}76^{000m}$N — 1000-meter Universal Transverse Mercator grid values, zone 18
- 600000 FT — 5000-foot grid values: New York State Plane coordinate system, Long Island zone (FIPSZONE 3104), Lambert Conformal Conic projection
- DX5510 × — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- ● M1.5 — River Mile





KEY PLAN (N.T.S)

GENERAL NOTES

1. BASE MAP DEVELOPED FROM DRAWING TITLED "FLOOD INSURANCE RATE MAP (FIRM), MAP NUMBER 3604970039G", PREPARED BY "FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA)", ORIGINAL SCALE 1" = 500", DATED "PRELIMINARY" DECEMBER 15, 2013.

LEGEND

APPROXIMATE SITE BOUNDARY

N W E S

0 250 500 1000

SCALE IN FEET

NO.	ISSUE/DESCRIPTION	BY	DATE

CHAMPLAIN HUDSON POWER EXPRESS
345 kV ASTORIA HVAC UNDERGROUND TRANSMISSION SUBSTATION TO OVERHEAD TIE-IN

FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) FLOOD INSURANCE RATE MAP (MAP)

PREPARED BY: GZA GeoEnvironmental of NY Engineers and Scientists www.gza.com		PREPARED FOR: CHPE Transmission	
PROJ MGR: DSP	REVIEWED BY: DSP	CHECKED BY: MK	FIG 3
DESIGNED BY: NAW	DRAWN BY: NAW	SCALE: 1" = 500'	
DATE: JUNE, 2024	PROJECT NO. 41.0163233.00	REVISION NO. 0	SHEET NO. 3 OF 3

APPENDIX A – GEOTECHNICAL LIMITATIONS

USE OF REPORT

1. GZA GeoEnvironmental, Inc. (GZA) prepared this report on behalf of, and for the exclusive use of our Client for the stated purpose(s) and location(s) identified in the Proposal for Services and/or Report. Use of this report, in whole or in part, at other locations, or for other purposes, may lead to inappropriate conclusions; and we do not accept any responsibility for the consequences of such use(s). Further, reliance by any party not expressly identified in the contract documents, for any use, without our prior written permission, shall be at that party's sole risk, and without any liability to GZA.

STANDARD OF CARE

2. GZA's findings and conclusions are based on the work conducted as part of the Scope of Services set forth in Proposal for Services and/or Report, and reflect our professional judgment. These findings and conclusions must be considered not as scientific or engineering certainties, but rather as our professional opinions concerning the limited data gathered during the course of our work. If conditions other than those described in this report are found at the subject location(s), or the design has been altered in any way, GZA shall be so notified and afforded the opportunity to revise the report,as appropriate, to reflect the unanticipated changed conditions .

3. GZA's services were performed using the degree of skill and care ordinarily exercised by qualified professionals performing the same type of services, at the same time, under similar conditions, at the same or a similar property. No warranty, expressed or implied, is made.

4. In conducting our work, GZA relied upon certain information made available by public agencies, Client and/or others. GZA did not attempt to independently verify the accuracy or completeness of that information. Inconsistencies in this information which we have noted, if any, are discussed in the Report.

SUBSURFACE CONDITIONS

5. The generalized soil profile(s) provided in our Report are based on widely-spaced subsurface explorations and are intended only to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized, and were based on our assessment of subsurface conditions. The composition of strata, and the transitions between strata, may be more variable and more complex than indicated. For more specific information on soil conditions at a specific location refer to the exploration logs. The nature and extent of variations between these explorations may not become evident until further exploration or construction. If variations or other latent conditions then become evident, it will be necessary to reevaluate the conclusions and recommendations of this report.

6. In preparing this report, GZA relied on certain information provided by the Client, state and local officials, and other parties referenced therein which were made available to GZA at the time of our evaluation. GZA did not attempt to independently verify the accuracy or completeness of all information reviewed or received during the course of this evaluation.

7. Water level readings have been made in test holes (as described in this Report) and monitoring wells at the specified times and under the stated conditions. These data have been reviewed and interpretations have been made in this Report. Fluctuations in the level of the groundwater however occur due to temporal or spatial variations in areal recharge rates, soil heterogeneities, the presence of subsurface utilities, and/or natural or artificially induced perturbations. The water table encountered in the course of the work may differ from that indicated in the Report.

8. GZA's services did not include an assessment of the presence of oil or hazardous materials at the property. Consequently, we did not consider the potential impacts (if any) that contaminants in soil or groundwater may have on construction activities, or the use of structures on the property.

9. Recommendations for foundation drainage, waterproofing, and moisture control address the conventional geotechnical engineering aspects of seepage control. These recommendations may not preclude an environment that allows the infestation of mold or other biological pollutants.

COMPLIANCE WITH CODES AND REGULATIONS

10. We used reasonable care in identifying and interpreting applicable codes and regulations. These codes and regulations are subject to various, and possibly contradictory, interpretations. Compliance with codes and regulations by other parties is beyond our control.

COST ESTIMATES

11. Unless otherwise stated, our cost estimates are only for comparative and general planning purposes. These estimates may involve approximate quantity evaluations. Note that these quantity estimates are not intended to be sufficiently accurate to develop construction bids, or to predict the actual cost of work addressed in this Report. Further, since we have no control over either when the work will take place or the labor and material costs required to plan and execute the anticipated work, our cost estimates were made by relying on our experience, the experience of others, and other sources of readily available information. Actual costs may vary over time and could be significantly more, or less, than stated in the Report.

SCREENING AND ANALYTICAL TESTING

12. Our interpretation of field screening and laboratory data is presented in the Report. Unless otherwise noted, we relied upon the laboratory's QA/QC program to validate these data.

13. Variations in the types and concentrations of contaminants observed at a given location or time may occur due to release mechanisms, disposal practices, changes in flow paths, and/or the influence of various physical, chemical, biological or radiological processes. Subsequently observed concentrations may be other than indicated in the Report.

ADDITIONAL SERVICES

14. GZA recommends that we be retained to provide services during any future: site observations, design, implementation activities, construction and/or property development/redevelopment. This will allow us the opportunity to: i) observe conditions and compliance with our design concepts and opinions; ii) allow for changes in the event that conditions are other than anticipated; iii) provide modifications to our design; and iv) assess the consequences of changes in technologies and/or regulations.

APPENDIX B –BORING LOG KEY, BORING LOGS, AND ROCK CORE PHOTO LOGS

LOG KEY

GZA
Geo Environmental, Inc.
Engineers and Scientists

BURMISTER SOIL CLASSIFICATION (INORGANIC)

COMPONENT	NAME	PROPORTIONAL TERM	PERCENT BY WEIGHT
MAJOR	GRAVEL, SAND, FINES*		>50
Minor	Gravel, Sand, Fines*	and	35 - 50
		some	20-35
		little	10-20
		trace	0-10

*See identification of fines table.

IDENTIFICATION OF FINES

Material	PI	Atterberg Thread Dia.
SILT	0	Cannot Roll
Clayey SILT	1-5	1/4"
SILT & CLAY	5-10	1/8"
CLAY & SILT	10-20	1/16"
Silty CLAY	20-40	1/32"
CLAY	>40	1/64"

GRADATION DESIGNATION	PROPORTION OF COMPONENT
Fine to coarse	All fractions > 10%
Medium to coarse	<10% fine
Fine to medium	<10% coarse
Coarse	<10% fine and medium
Medium	<10% coarse and fine
Fine	<10% coarse and medium

PLASTIC SOILS

Consistency	Blows/Ft. SPT N-Value
Very Soft	< 2
Soft	2 - 4
Medium Stiff	4 - 8
Stiff	8 - 15
Very Stiff	15 - 30
Hard	>30

GRAVEL & SAND

Density	Blows/Ft. SPT N-Value
Very Loose	< 4
Loose	4 - 10
Medium Dense	10 - 30
Dense	30 - 50
Very Dense	> 50

BURMISTER SOIL CLASSIFICATION (ORGANIC)

Fibrous PEAT (Pt) - Lightweight, spongy, mostly visible organic matter, water squeezes readily from sample. Typically near top of deposit.
Fine Grained PEAT (Pt) - Lightweight, spongy, little visible organic matter, water squeezes reqdily from sample. Typically below fibrous peat.
Organic Silt (OL) - Typically gray to dark gray, often has strong H2S odor. Typically contains shells or shell fragments. Lightweight. Usually found near coastal regions. May contain wide range of sand fractions.
Organic Clay (OH) - Typically gray to dark gray, high plasticity. Usually found near coastal regions. May contain wide range of sand fractions. Need organic content test for final identification.

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS) (ASTM D 2487)

MAJOR DIVISIONS			Group Symbols
Coarse Grained Soils More than 50% of material larger than No. 200 sieve.	Gravel More than 50% larger than No. 4 sieve.	Clean Gravels (Little or no fines)	GW GP
		Gravels with Fines (Appreciable amount of fines)	GM GC
	Sand More than 50% smaller than No. 4 sieve.	Clean Sands (Little or no fines)	SW SP
		Sands with Fines (Appreciable amount of fines)	SM SC
Fine Grained Soils More than 50% of material smaller than No. 200 sieve.		Silts and Clays Liquid Limit <50	ML CL
		Silts and Clays Liquid Limit >50	OL MH CH OH
		Highly Organic Soils	Pt

ABBREVIATIONS

MR = Mud Rotary
HSA = Hollow Stem Auger
SSA = Solid Stem Auger
SS = Split Spoon Sampler
U = Undisturbed Sample (Shelby Tube)
MC = Modified California Sampler
V = Vibracore
M = Macrocore

USCS = Unified Soil Classification System (ASTM D2487)
NYCBC = New York City Building Code
WOR = Weight of Rods
WOH= Weight of Hammer
SPT = Standard Penetration Test (ASTM D1586)
N-Value = Cumulative number of uncorrected blows for the middle two six-inch intervals (blows/foot).

Tv = Field Vane Shear Test (Torvane)
PP = Pocket Penetrometer
PI = Plasticity Index
MC = Moisture Content
CO = Consolidation
UC = Unconfined Compression Test
SI = Sieve Analysis
DS = Direct Shear
PID = Photoionization Detector
ppm = Parts Per Million
REC = Recovery
RQD = Rock Quality Designation
▼ = Measured Water Level

TEST BORING LOG

GZA GeoEnvironmental of New York
Engineers and Scientists

Transmission Developers Inc. (TDI/CHPE)
Leg 2- Astoria Annex
Upgrade & Overhead Lines
31-01 20th Avenue, Astoria, NY

EXPLORATION NO.: B-01
SHEET: 1 of 2
PROJECT NO: 41.0163233.00
REVIEWED BY: D. Patel

Logged By: N. Wilcox
Drilling Co.: Craig Geotechnical Testing, Inc.
Foreman: M. Gorsky
Date Start: 4/18/2024 **Finish:** 4/18/2024

Type of Rig: Truck
Rig Model: CME-75
Drilling Method: Wash Rotary

Boring Location: See Plan
Stationing (ft.): **Offset (ft.):**
Ground Surface Elevation (ft.): 9.84
Final Boring Depth (ft.): 42

H. Datum: NAD 83
V. Datum: NAVD88
Northing: 4481084.78
Easting: 623718.83

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.5"/4"

Sampler Type: SS
Sampler O.D. (in.): 2.0
Sampler Length (in.): 24
Rock Core Size: NX

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time
4/18/2024	1:00pm	1.4	20 min
4/19/2024	10:00am	1.4	20 hours

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen. (in)	Sample Rec. (in)	Sample Blows (per 6 in.)	Sample SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
								12" Gravel	1		1	GRAVEL	8.8
								1'-6': Black, fine to coarse SAND, some Gravel, trace Silt.					
5		S-1	6.0-8.0	24	9	2 3 3 2	6	S-1: Loose, black, fine to coarse SAND, some Gravel, trace Silt.				FILL (7)	
		S-2	8.0-10.0	24	8	2 3 3 2	6	S-2: Medium dense, black, fine to coarse SAND, some Gravel, trace Silt, trace brick fragments.					
10		S-3	10.0-12.0	24	4	2 1 WOH	1	S-3: Very loose, black, fine to coarse SAND, some Gravel, little Silt, trace brick fragments.					
				24	0	WOH WOH WOH WOH	0	No recovery.			12		-2.2
		S-4	14.0-16.0	24	12	WOH WOH WOH	0	S-4: Very soft, dark gray, Silty CLAY, trace wood fragments.					
15		S-5	16.0-18.0	24	19	WOH WOH WOH	0	S-5: Very soft, dark gray, Silty CLAY, trace wood fragments.				UPPER CLAY (6)	
		S-6	18.0-20.0	24	16	WOH WOH WOH	0	S-6: Very soft, dark gray, Silty CLAY, trace Sand, trace wood fragments.					
20		S-7	20.0-22.0	24	11	WOH WOH WOH WOH WOH WOH	2	S-7: Very loose, dark brown, fine to coarse SAND, some Gravel, little Silt, micaceous.			20		-10.2
25		S-8	25.0-27.0	24	10	1 1 1 1 3 3 5 24	8	S-8: Loose, brown, fine to medium SAND, some Clayey Silt, trace Gravel, micaceous.				UPPER SAND (6)	
30											30		-20.2

REMARKS

1 - Upper 6 feet was cleared using a Vac-tron. Soil descriptions for the upper 6 feet were based on observations of material removed during clearing.
2 - Increased drilling resistance when advancing roller bit.

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.: B-01

GZA TEMPLATE TEST BORING - GZA 2016_01_26.GDT - 6/25/24 15:19 - J:\GINT PROJECT DATABASES\41.0163200\41.0163233.00.GPJ

TEST BORING LOG

GZA GeoEnvironmental of New York
Engineers and Scientists

Transmission Developers Inc. (TDI/CHPE)
Leg 2- Astoria Annex
Upgrade & Overhead Lines
31-01 20th Avenue, Astoria, NY

EXPLORATION NO.: B-01
SHEET: 2 of 2
PROJECT NO: 41.0163233.00
REVIEWED BY: D. Patel

Logged By: N. Wilcox
Drilling Co.: Craig Geotechnical Testing, Inc.
Foreman: M. Gorsky
Date Start: 4/18/2024 **Finish:** 4/18/2024

Type of Rig: Truck
Rig Model: CME-75
Drilling Method: Wash Rotary

Boring Location: See Plan
Stationing (ft.): **Offset (ft.):**
Ground Surface Elevation (ft.): 9.84
Final Boring Depth (ft.): 42

H. Datum: NAD 83
V. Datum: NAVD88
Northing: 4481084.78
Easting: 623718.83

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.5"/4"

Sampler Type: SS
Sampler O.D. (in.): 2.0
Sampler Length (in.): 24
Rock Core Size: NX

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time
4/18/2024	1:00pm	1.4	20 min
4/19/2024	10:00am	1.4	20 hours

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen. (in)	Sample Rec. (in)	Sample Blows (per 6 in.)	Sample SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
		S-9	30.0-30.0	0	0	100/0"	R	S-9: No recovery.	2			DECOMPOSED ROCK (1d)	
											32		-22.2
	4:00	C-1	32.0-37.0	60	56	REC=93% RQD=83%		C-1: Moderately hard, moderately weathered, gray-white, medium grained GNEISSIC SCHIST, with very close to closely spaced, horizontally to moderately dipping fractures.	3				
	3:00												
	2:30												
35	3:00												
	3:00												
	3:00	C-2	37.0-42.0	60	58	REC=97% RQD=83%		C-2: Moderately hard, moderately weathered, gray-white, fine to medium grained GNEISSIC SCHIST, with very closely to closely spaced, horizontally to subvertically dipping fractures.				BEDROCK (1b)	
	3:00												
	2:00												
40	2:45												
	5:00										42		-32.2
								End of exploration at 42 feet.	4				
45													
50													
55													
60													

REMARKS

3 - Roller bit refusal at approximately 32 feet.
4 - Groundwater observation well installed at approximately 15 feet. Well construction consisted of PVC riser from approximately 0 feet to 5 feet, and slotted screen section from approximately 5 feet to 15 feet.

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.: B-01

TEST BORING LOG

GZA GeoEnvironmental of New York
Engineers and Scientists

Transmission Developers Inc. (TDI/CHPE)
Leg 2- Astoria Annex
Upgrade & Overhead Lines
31-01 20th Avenue, Astoria, NY

EXPLORATION NO.: B-02
SHEET: 1 of 3
PROJECT NO: 41.0163233.00
REVIEWED BY: D. Patel

Logged By: N. Wilcox
Drilling Co.: Craig Geotechnical Testing, Inc.
Foreman: M. Tarter
Date Start: 5/16/2024 **Finish:** 5/16/2024

Type of Rig: Truck
Rig Model: CME-75
Drilling Method: Wash Rotary

Boring Location: See Plan
Stationing (ft.): **Offset (ft.):**
Ground Surface Elevation (ft.): 9
Final Boring Depth (ft.): 75

H. Datum: NAD 83
V. Datum: NAVD88
Northing: 4480620.44
Easting: 593008.04

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.5"/4"

Sampler Type: SS
Sampler O.D. (in.): 2.0
Sampler Length (in.): 24
Rock Core Size: NX

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time
5/16/2024	6:00pm	1.9	10 min

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen. (in)	Sample Rec. (in)	Sample Blows (per 6 in.)	Sample SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
								12" Topsoil	1		1	TOPSOIL	8.0
								1'-6': Brown-black, fine to coarse SAND, little Gravel, trace Silt.					
5		S-1	6.0-8.0	24	7	3 11 4 5	15	S-1: Medium dense, gray, fine to coarse SAND, little Gravel, trace Silt.					
		S-2	8.0-10.0	24	5	6 12 17 17	29	S-2: Medium dense, gray, fine to coarse SAND, little Gravel, trace Silt.				FILL (7)	
10		S-3	10.0-12.0	24	5	4 5 7 4	12	S-3: Medium dense, gray, fine to coarse SAND, little Gravel, trace Silt.					
		S-4	12.0-14.0	24	10	3 5 19 8	24	S-4: Medium dense, gray, fine to coarse SAND and GRAVEL, trace Silt.					
15		S-5	14.0-16.0	24	8	6 5 3 5	8	S-5: Loose, gray, fine to coarse SAND, little Gravel, trace Silt.					
											16		-7.0
		S-6	16.0-18.0	24	15	4 4 1 2	5	S-6: Medium stiff, dark gray, CLAY, trace Sand, trace wood fragments.					
		S-7	18.0-20.0	24	17	1 1 1 3	2	S-7: Soft, dark gray, CLAY, trace wood fragments. (PP = 0.5 tsf).	2				
20		S-8	20.0-22.0	24	24	WOH 2 5 7	7	S-8: Medium stiff, dark gray, CLAY, trace Sand, trace wood fragments.				UPPER CLAY (4c/6)	
											23.5		-14.5
25		S-9	25.0-27.0	24	7	10 11 13 15	24	S-9: Medium dense, light brown, fine to coarse SAND, little Silt, little Gravel.				LOWER SAND (3a/3b)	
30													

REMARKS

1 - Upper 6 feet was cleared using a Vac-tron. Soil descriptions for the upper 6 feet were based on observations of material removed during clearing.
2 - Pocket Penetrometer (PP) reading in tons per square foot (tsf).

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.: B-02

GZA TEMPLATE TEST BORING - GZA 2016_01_26.GDT - 6/25/24 15:19 - J:\GINT PROJECT DATABASES\41.0163200\41.0163233.00.GPJ

TEST BORING LOG

GZA GeoEnvironmental of New York
Engineers and Scientists

Transmission Developers Inc. (TDI/CHPE)
Leg 2- Astoria Annex
Upgrade & Overhead Lines
31-01 20th Avenue, Astoria, NY

EXPLORATION NO.: B-02
SHEET: 2 of 3
PROJECT NO: 41.0163233.00
REVIEWED BY: D. Patel

Logged By: N. Wilcox
Drilling Co.: Craig Geotechnical Testing, Inc.
Foreman: M. Tarter
Date Start: 5/16/2024 **Finish:** 5/16/2024

Type of Rig: Truck
Rig Model: CME-75
Drilling Method: Wash Rotary

Boring Location: See Plan
Stationing (ft.): **Offset (ft.):**
Ground Surface Elevation (ft.): 9
Final Boring Depth (ft.): 75

H. Datum: NAD 83
V. Datum: NAVD88
Northing: 4480620.44
Easting: 593008.04

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.5"/4"

Sampler Type: SS
Sampler O.D. (in.): 2.0
Sampler Length (in.): 24
Rock Core Size: NX

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time
5/16/2024	6:00pm	1.9	10 min

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
		S-10	30.0-32.0	24	15	16 37 30 30	67	S-10: Very dense, light brown, fine to coarse SAND, some Gravel, trace Silt.					
35		S-11	35.0-37.0	24	14	16 22 26 24	48	S-11: Dense, brown, fine to medium SAND, some Silt, little Gravel, micaceous.				LOWER SAND (3a/3b)	
40		S-12	40.0-42.0	24	11	24 63 23 17	86	S-12: Very dense, light brown, fine to coarse SAND, some Silt, little Gravel, micaceous.			43.5		-34.5
45		S-13	45.0-47.0	24	11	7 8 14 22	22	S-13: Very stiff, dark brown, Silty CLAY. (PP = 4.5 tsf)				LOWER CLAY (4a)	
											48.5		-39.5
50		S-14	50.0-51.5	19	9	22 22 20 55/1"	42	S-14: Very dense, brown, fine to coarse SAND, little Gravel, trace Silt.				LOWER SAND (3b)	
55		S-15	55.0-57.0	24	17	28 43 54 58	97	S-15: Very dense, dark gray, fine to coarse SAND, little Gravel, trace Silt.					
60											58.5		-49.5
												CLAYEY SILT (5a/5b)	

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.: B-02

TEST BORING LOG

GZA GeoEnvironmental of New York
Engineers and Scientists

Transmission Developers Inc. (TDI/CHPE)
Leg 2- Astoria Annex
Upgrade & Overhead Lines
31-01 20th Avenue, Astoria, NY

EXPLORATION NO.: B-02
SHEET: 3 of 3
PROJECT NO: 41.0163233.00
REVIEWED BY: D. Patel

Logged By: N. Wilcox
Drilling Co.: Craig Geotechnical Testing, Inc.
Foreman: M. Tarter
Date Start: 5/16/2024 **Finish:** 5/16/2024

Type of Rig: Truck
Rig Model: CME-75
Drilling Method: Wash Rotary

Boring Location: See Plan
Stationing (ft.): **Offset (ft.):**
Ground Surface Elevation (ft.): 9
Final Boring Depth (ft.): 75

H. Datum: NAD 83
V. Datum: NAVD88
Northing: 4480620.44
Easting: 593008.04

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.5"/4"

Sampler Type: SS
Sampler O.D. (in.): 2.0
Sampler Length (in.): 24
Rock Core Size: NX

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time
5/16/2024	6:00pm	1.9	10 min

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen. (in)	Sample Rec. (in)	Sample Blows (per 6 in.)	Sample SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
		S-16	60.0-62.0	24	16	6 9 13 18	22	S-16: Very stiff, gray, Clayey SILT, trace Sand, micaceous.				CLAYEY SILT (5a/5b)	
65		S-17	65.0-66.5	18	18	25 44 48 50/0"	92	S-17: Very dense, gray, Clayey SILT, trace Sand, micaceous.	3		66.5		-57.5
												DECOMPOSED ROCK (1d)	
70	4:30	C-1	70.0-75.0	60	51	REC=85% RQD=80%		C-1: Hard, moderately weathered,gray-white, fine to medium grained GNEISSIC SCHIST, with closely to moderately closely spaced, horizontally to subhorizontally dipping fractures.			70		-61.0
	9:00											BEDROCK (1b)	
	7:45												
	9:00												
75	6:00										75		-66.0
								End of exploration at 75 feet.	4				
80													
85													
90													

REMARKS

3 - Split spoon refusal encountered at approximately 66.5 feet. Difficulty advancing roller bit to 70 feet.
4 - Upon completion, borehole was backfilled with soil cuttings and supplemented with filter sand.

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.: B-02

TEST BORING LOG

GZA GeoEnvironmental of New York
Engineers and Scientists

Transmission Developers Inc. (TDI/CHPE)
Leg 2- Astoria Annex
Upgrade & Overhead Lines
31-01 20th Avenue, Astoria, NY

EXPLORATION NO.: B-03
SHEET: 1 of 3
PROJECT NO: 41.0163233.00
REVIEWED BY: D. Patel

Logged By: N. Wilcox
Drilling Co.: Craig Geotechnical Testing, Inc.
Foreman: M. Tarter
Date Start: 5/14/2024 **Finish:** 5/16/2024

Type of Rig: Truck
Rig Model: CME-75
Drilling Method: Wash Rotary

Boring Location: See Plan
Stationing (ft.): **Offset (ft.):**
Ground Surface Elevation (ft.): 14
Final Boring Depth (ft.): 70

H. Datum: NAD 83
V. Datum: NAVD88
Northing: 4515514.76
Easting: 592455.67

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.5"/4"

Sampler Type: SS
Sampler O.D. (in.): 2.0
Sampler Length (in.): 24
Rock Core Size: NX

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time
5/14/2024	12:30pm	7.2	10 min
5/16/2024	7:15am	6.8	42 hours

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen. (in)	Sample Rec. (in)	Sample Blows (per 6 in.)	Sample SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
								12" Gravel	1		1	GRAVEL	13.0
								1'-6': Black, fine to coarse SAND, some Gravel, trace Silt.					
5													
		S-1	6.0-8.0	24	11	4 6 9 8	15	S-1: Medium dense, black, fine to coarse SAND, some Gravel, trace Silt.					
		S-2	8.0-10.0	24	8	10 7 3 2	10	S-2: Medium dense, black, fine to coarse SAND, some Gravel, trace Silt, trace brick fragments.					
10		S-3	10.0-12.0	24	3	3 4 2 2	6	S-3: Loose, black, fine to coarse SAND, little Gravel, trace Silt.				FILL (7)	
		S-4	12.0-14.0	24	2	3 2 1 1	3	S-4: Very loose, black, fine to coarse SAND, little Gravel, trace Silt.					
15		S-5	14.0-16.0	24	2	1 1 1 1	2	S-5: Very loose, black, fine to coarse SAND, little Gravel, trace Silt.					
		S-6	16.0-18.0	24	12	4 7 6 6	13	S-6: Medium dense, black, fine to coarse SAND, little Gravel, trace Silt.					
											18		-4.0
		S-7	18.0-20.0	24	4	5 4 4 2	8	S-7: Medium stiff, dark gray, CLAY, trace Sand, trace wood fragments.					
20													
												UPPER CLAY (4c/6)	
25		S-8	25.0-27.0	24	13	5 1 WOH WOH	1	S-8: Very soft, dark gray, CLAY, trace wood fragments.					
30													

REMARKS

1 - Upper 6 feet was cleared using a Vac-tron. Soil descriptions for the upper 6 feet were based on observations of material removed during clearing.
2 - Organic odor observed in sample S-9.

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.: B-03

TEST BORING LOG

GZA GeoEnvironmental of New York
Engineers and Scientists

Transmission Developers Inc. (TDI/CHPE)
Leg 2- Astoria Annex
Upgrade & Overhead Lines
31-01 20th Avenue, Astoria, NY

EXPLORATION NO.: B-03
SHEET: 2 of 3
PROJECT NO: 41.0163233.00
REVIEWED BY: D. Patel

Logged By: N. Wilcox
Drilling Co.: Craig Geotechnical Testing, Inc.
Foreman: M. Tarter
Date Start: 5/14/2024 **Finish:** 5/16/2024

Type of Rig: Truck
Rig Model: CME-75
Drilling Method: Wash Rotary

Boring Location: See Plan
Stationing (ft.): **Offset (ft.):**
Ground Surface Elevation (ft.): 14
Final Boring Depth (ft.): 70

H. Datum: NAD 83
V. Datum: NAVD88
Northing: 4515514.76
Easting: 592455.67

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.5"/4"

Sampler Type: SS
Sampler O.D. (in.): 2.0
Sampler Length (in.): 24
Rock Core Size: NX

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time
5/14/2024	12:30pm	7.2	10 min
5/16/2024	7:15am	6.8	42 hours

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen. (in)	Sample Rec. (in)	Sample Blows (per 6 in.)	Sample SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
		S-9	30.0-32.0	24	16	WOH WOH WOH WOH	0	S-9: Very soft, dark gray-brown, Silty CLAY, little wood fragments.	2			UPPER CLAY (4c/6)	
											33.5		-19.5
35		S-10	35.0-37.0	24	19	3 4 12 15	16	S-10: Medium dense, gray-brown, fine to medium SAND, little Silt.				UPPER SAND (3b/6)	
40		S-11	40.0-42.0	24	17	4 3 4 4	7	S-11: Loose, light brown, fine SAND, some Silt, micaceous.					
											43.5		-29.5
45		S-12	45.0-47.0	24	24	2 1 3 5	4	S-12: Soft, olive, Clayey SILT, trace SAND, micaceous.				CLAYEY SILT (6)	
											48.5		-34.5
50		S-13	50.0-52.0	24	17	40 39 34 22	73	S-13: Very dense, light brown, fine to medium SAND, little Silt, micaceous.					
55		S-14	55.0-57.0	24	15	7 9 23 32	32	S-14: Dense, brown-gray, fine to medium SAND, little Silt, micaceous.				LOWER SAND (3a)	
60									3		60		-46.0

REMARKS

3 - Increased drilling resistance while advancing roller bit at approximately 59 feet to 60 feet.

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.: B-03

GZA TEMPLATE TEST BORING - GZA 2016_01_26.GDT - 6/25/24 15:19 - J:\GINT PROJECT DATABASES\41.0163200\41.0163233.00.GPJ

TEST BORING LOG

GZA GeoEnvironmental of New York
Engineers and Scientists

Transmission Developers Inc. (TDI/CHPE)
Leg 2- Astoria Annex
Upgrade & Overhead Lines
31-01 20th Avenue, Astoria, NY

EXPLORATION NO.: B-03
SHEET: 3 of 3
PROJECT NO: 41.0163233.00
REVIEWED BY: D. Patel

Logged By: N. Wilcox
Drilling Co.: Craig Geotechnical Testing, Inc.
Foreman: M. Tarter
Date Start: 5/14/2024 **Finish:** 5/16/2024

Type of Rig: Truck
Rig Model: CME-75
Drilling Method: Wash Rotary

Boring Location: See Plan
Stationing (ft.): **Offset (ft.):**
Ground Surface Elevation (ft.): 14
Final Boring Depth (ft.): 70

H. Datum: NAD 83
V. Datum: NAVD88
Northing: 4515514.76
Easting: 592455.67

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.5"/4"

Sampler Type: SS
Sampler O.D. (in.): 2.0
Sampler Length (in.): 24
Rock Core Size: NX

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time
5/14/2024	12:30pm	7.2	10 min
5/16/2024	7:15am	6.8	42 hours

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen. (in)	Sample Rec. (in)	Sample Blows (per 6 in.)	Sample SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
65	3:30 3:15 3:15 3:45 4:15 3:00 3:30 3:30 5:15 3:15	C-1 C-2	60.0-65.0 65.0-70.0	60 60	57.5 40	REC=96% RQD=85% REC=67% RQD=63%		C-1: Moderately hard, moderately weathered, gray-white, fine to medium grained GNEISSIC SCHIST, with closely spaced, subhorizontally to moderately dipping fractures. C-2: Moderately hard, moderately weathered, gray-white, fine to medium grained GNEISSIC SCHIST, with closely spaced, subhorizontally to subvertically dipping fractures.			70	BEDROCK (1b/1c)	-56.0
70								End of exploration at 70 feet.	4				
75													
80													
85													
90													

REMARKS

4 - Upon completion, borehole was backfilled with soil cuttings.

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.: B-03

TEST BORING LOG

GZA GeoEnvironmental of New York
Engineers and Scientists

Transmission Developers Inc. (TDI/CHPE)
Leg 2- Astoria Annex
Upgrade & Overhead Lines
31-01 20th Avenue, Astoria, NY

EXPLORATION NO.: B-04
SHEET: 1 of 3
PROJECT NO: 41.0163233.00
REVIEWED BY: D. Patel

Logged By: N. Wilcox
Drilling Co.: Craig Geotechnical Testing, Inc.
Foreman: M. Tarter
Date Start: 5/6/2024 **Finish:** 5/8/2024

Type of Rig: Truck
Rig Model: CME-75
Drilling Method: Wash Rotary

Boring Location: See Plan
Stationing (ft.): **Offset (ft.):**
Ground Surface Elevation (ft.): 14.21
Final Boring Depth (ft.): 70

H. Datum: NAD 83
V. Datum: NAVD88
Northing: 4515414.48
Easting: 592524.61

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.5"/4"

Sampler Type: SS
Sampler O.D. (in.): 2.0
Sampler Length (in.): 24
Rock Core Size: NX

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time
5/6/2024	2:00pm	7.7	2 hrs
5/7/2024	12:00pm	7	1 hr
5/8/2024	7:00am	6.8	20 hr

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen. (in)	Sample Rec. (in)	Sample Blows (per 6 in.)	Sample SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
								11" Concrete	1		0.9	CONCRETE	13.3
								0.9'-6': Black, fine to coarse SAND, some Gravel, trace Silt.					
5		S-1	6.0-8.0	24	1	2 3 3 2	6	S-1: Loose, black, fine to coarse SAND, trace Gravel, trace Silt.					
		S-2	8.0-10.0	24	6	6 7 5 5	12	S-2: Medium dense, black, fine to coarse SAND, little Gravel, trace Silt, trace brick fragments.				FILL (7)	
10		S-3	10.0-12.0	24	7	1 1 15 11	16	S-3: Medium dense, black, fine to coarse SAND, little Gravel, trace Silt, trace brick fragments.					
		S-4	12.0-14.0	24	10	6 5 4 5	9	S-4: Loose, black, fine to coarse SAND, little Gravel, trace Silt, trace wood fragments, trace metal fragments.					
15		S-5	14.0-16.0	24	9	10 3 2 3	5	S-5: Loose, black, fine to coarse SAND, trace Gravel, trace Silt, trace wood fragments.					
		S-6	16.0-18.0	24	4	3 2 3 2	5	S-6: Loose, black, fine to coarse SAND, little Gravel, trace Silt, trace wood fragments.					
											18		-3.8
		S-7	18.0-20.0	24	24	1 1 WOH	1	S-7: Very soft, dark gray, CLAY, trace wood fragments.					
20		S-8	20.0-22.0	24	8	WOH WOH WOH WOH WOH	0	S-8: Very soft, gray, organic CLAY.				UPPER CLAY (6)	
25		S-9 S-10	25.0-27	24	24	WOH WOH WOH WOH	0	S-9, S-10: Top 12": Very soft, dark gray, CLAY, trace wood fragments. Bottom 12": Very soft, gray-brown, Silty CLAY, little Sand.					
30													

REMARKS

1 - Upper 6 feet was cleared using a Vac-tron. Soil descriptions for the upper 6 feet were based on observations of material removed during clearing.

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.: B-04

TEST BORING LOG

GZA GeoEnvironmental of New York
Engineers and Scientists

Transmission Developers Inc. (TDI/CHPE)
Leg 2- Astoria Annex
Upgrade & Overhead Lines
31-01 20th Avenue, Astoria, NY

EXPLORATION NO.: B-04
SHEET: 2 of 3
PROJECT NO: 41.0163233.00
REVIEWED BY: D. Patel

Logged By: N. Wilcox
Drilling Co.: Craig Geotechnical Testing, Inc.
Foreman: M. Tarter
Date Start: 5/6/2024 **Finish:** 5/8/2024

Type of Rig: Truck
Rig Model: CME-75
Drilling Method: Wash Rotary

Boring Location: See Plan
Stationing (ft.): **Offset (ft.):**
Ground Surface Elevation (ft.): 14.21
Final Boring Depth (ft.): 70

H. Datum: NAD 83
V. Datum: NAVD88
Northing: 4515414.48
Easting: 592524.61

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.5"/4"

Sampler Type: SS
Sampler O.D. (in.): 2.0
Sampler Length (in.): 24
Rock Core Size: NX

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time
5/6/2024	2:00pm	7.7	2 hrs
5/7/2024	12:00pm	7	1 hr
5/8/2024	7:00am	6.8	20 hr

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
		S-11	30.0-	24	24	2 3		S-11, S-12: Top 10": Soft, light brown, Silty CLAY and			30.9		-16.7
		S-12	32			2 2	5	SAND.					
								Bottom 14": Loose, brown, fine to medium SAND, little Silt, trace Gravel.				UPPER SAND (6)	
35									2		35		-20.8
40		S-13	40.0-	24	1	5 4		S-13: Medium dense, light brown, fine to medium SAND,				LOWER SAND (3a/3b)	
			42.0			8 13	12	some Silt.					
		S-14	42.0-	24	21	70 77		S-14: Very dense, brown, fine to coarse SAND, some Gravel,					
			44.0			66 87	>100	trace Silt.			44.5		-30.3
45		S-15	45.0-	24	10	90 28		S-15: Hard, dark gray, CLAY, little Sand, micaceous.	3				
			47.0			14 18	42	(PP=4.0 tsf)				LOWER CLAY (4a)	
											48.5		-34.3
50		S-16	50.0-	24	17	23 12		S-16: Medium dense, dark gray, fine to medium SAND, some					
			52.0			16 19	28	Silt, micaceous.				LOWER SAND (3a)	
55		S-17	55.0-	6	6	124 50/0"	R	S-17: Very dense, dark gray, fine to medium SAND, little Silt,	4		55.5		-41.3
			55.5					micaceous.				DECOMPOSED ROCK (1d)	
60											60		-45.8

REMARKS

2 - Presumed boulder at approximately 35 feet. Roller bit was advanced beyond this obstruction and sampling interval. SPT sampling resumed at approximately 40 feet.
3 - Pocket Penetrometer (PP) reading in tons per square foot (tsf).
4 - Increased drilling resistance during roller bit advancement from approximately 55.5 feet to 60 feet.

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.: B-04

TEST BORING LOG

GZA GeoEnvironmental of New York
Engineers and Scientists

Transmission Developers Inc. (TDI/CHPE)
Leg 2- Astoria Annex
Upgrade & Overhead Lines
31-01 20th Avenue, Astoria, NY

EXPLORATION NO.: B-04
SHEET: 3 of 3
PROJECT NO: 41.0163233.00
REVIEWED BY: D. Patel

Logged By: N. Wilcox
Drilling Co.: Craig Geotechnical Testing, Inc.
Foreman: M. Tarter
Date Start: 5/6/2024 **Finish:** 5/8/2024

Type of Rig: Truck
Rig Model: CME-75
Drilling Method: Wash Rotary

Boring Location: See Plan
Stationing (ft.): **Offset (ft.):**
Ground Surface Elevation (ft.): 14.21
Final Boring Depth (ft.): 70

H. Datum: NAD 83
V. Datum: NAVD88
Northing: 4515414.48
Easting: 592524.61

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.5"/4"

Sampler Type: SS
Sampler O.D. (in.): 2.0
Sampler Length (in.): 24
Rock Core Size: NX

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time
5/6/2024	2:00pm	7.7	2 hrs
5/7/2024	12:00pm	7	1 hr
5/8/2024	7:00am	6.8	20 hr

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen. (in)	Sample Rec. (in)	Sample Blows (per 6 in.)	Sample SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
65	5:00 7:30 6:30 5:30 5:00 4:30	C-1	60.0- 65.0	60	60	REC=100% RQD=53%		C-1: Moderately hard, moderately weathered, gray-white, fine grained GNEISSIC SCHIST, with very closely to closely spaced, horizontally to subhorizontally dipping fractures.					
70	4:30 4:30 4:00 4:30 4:30	C-2	65.0- 70.0	60	60	REC=100% RQD=95%		C-2: Moderately hard, slightly weathered, gray-white, fine grained GNEISSIC SCHIST, with closely spaced, horizontally to moderately dipping fractures.				BEDROCK (1c)	
											70		-55.8
								End of exploration at 70 feet.	5				
75													
80													
85													
90													

REMARKS

5 - Upon completion, borehole was backfilled with soil cuttings and filter sand, and surface patched with asphalt cold patch.

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.: B-04

TEST BORING LOG

GZA GeoEnvironmental of New York
Engineers and Scientists

Transmission Developers Inc. (TDI/CHPE)
Leg 2- Astoria Annex
Upgrade & Overhead Lines
31-01 20th Avenue, Astoria, NY

EXPLORATION NO.: B-04A
SHEET: 1 of 1
PROJECT NO: 41.0163233.00
REVIEWED BY: D. Patel

Logged By: N. Wilcox
Drilling Co.: Craig Geotechnical Testing, Inc.
Foreman: M. Tarter
Date Start: 5/6/2024 **Finish:** 5/6/2024

Type of Rig: Truck
Rig Model: CME-75
Drilling Method: Wash Rotary

Boring Location: See Plan
Stationing (ft.): **Offset (ft.):**
Ground Surface Elevation (ft.): 14.21
Final Boring Depth (ft.): 6

H. Datum: NAD 83
V. Datum: NAVD88
Northing:
Easting:

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.5"/4"

Sampler Type: SS
Sampler O.D. (in.): 2.0
Sampler Length (in.): 24
Rock Core Size: N/A

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time
Not	Encountered		

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen. (in)	Sample Rec. (in)	Sample Blows (per 6 in.)	Sample SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
		S-1	0.0-2.0	24	24	20 28 25 24	53	S-1: Upper 14": Concrete Bottom 10": Very dense, black-gray, fine to coarse SAND, some Gravel, trace Silt.			1.2	CONCRETE	13.0
		S-2	2.0-4.0	24	24	25 19 19 15	38	S-2: Dense, black, fine to coarse SAND, little Gravel, trace Silt, trace brick fragments.				FILL (7)	
5		S-3	4.0-6.0	24	24	11 11 8 10	19	S-3: Medium dense, black, fine to coarse SAND, trace Gravel, trace Silt, trace brick fragments.			6		8.2
								End of exploration at 6 feet.	1				
10													
15													
20													
25													
30													

REMARKS

1 - Upon completion, borehole was backfilled with soil cuttings.

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.: B-04A

TEST BORING LOG

GZA GeoEnvironmental of New York
Engineers and Scientists

Transmission Developers Inc. (TDI/CHPE)
Leg 2- Astoria Annex
Upgrade & Overhead Lines
31-01 20th Avenue, Astoria, NY

EXPLORATION NO.: B-04T
SHEET: 1 of 1
PROJECT NO: 41.0163233.00
REVIEWED BY: D. Patel

Logged By: N. Wilcox
Drilling Co.: Craig Geotechnical Testing, Inc.
Foreman: M. Tarter
Date Start: 5/13/2024 **Finish:** 5/13/2024

Type of Rig: Truck
Rig Model: CME-75
Drilling Method: Wash Rotary

Boring Location: See Plan
Stationing (ft.): **Offset (ft.):**
Ground Surface Elevation (ft.): 14.21
Final Boring Depth (ft.): 8

H. Datum: NAD 83
V. Datum: NAVD88
Northing:
Easting:

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.5"/4"

Sampler Type: U
Sampler O.D. (in.): 3
Sampler Length (in.): 24
Rock Core Size: N/A

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time
Not	Encountered		

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen. (in)	Sample Rec. (in)	Sample Blows (per 6 in.)	Sample SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
		S-1	0.0-2.0	24		36 109 77 75	>100	S-1: Top 18": Concrete Bottom 6": Very dense, black, fine to coarse SAND, some Gravel, trace Silt.	1			CONCRETE	
		S-2	2.0-4.0	24		56 60 57 50	>100	S-2: Very dense, black-light brown, fine to coarse SAND, some Gravel, trace Silt, trace brick fragments.			1.5		12.7
5		S-3	4.0-6.0	24		42 38 18 12	56	S-3: Very dense, light brown, fine to coarse SAND, little Gravel, trace Silt, trace brick fragments.				FILL (7)	
		S-4	6.0-8.0	24		6 5 3 4	8	S-4: Loose, light brown, fine to coarse SAND, little Gravel, trace Silt.			8		6.2
10								End of exploration at 8 feet.	2				
15													
20													
25													
30													

REMARKS

1 - Soil samples were collected for thermal resistivity testing.
2 - Upon completion, borehole was backfilled with soil cuttings.

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.: B-04T

TEST BORING LOG

GZA GeoEnvironmental of New York
Engineers and Scientists

Transmission Developers Inc. (TDI/CHPE)
Leg 2- Astoria Annex
Upgrade & Overhead Lines
31-01 20th Avenue, Astoria, NY

EXPLORATION NO.: B-05
SHEET: 1 of 3
PROJECT NO: 41.0163233.00
REVIEWED BY: D. Patel

Logged By: A. Amador
Drilling Co.: Craig Geotechnical Testing, Inc.
Foreman: M. Tarter
Date Start: 5/8/2024 **Finish:** 5/8/2024

Type of Rig: Truck
Rig Model: CME-75
Drilling Method: Wash Rotary

Boring Location: See Plan
Stationing (ft.): **Offset (ft.):**
Ground Surface Elevation (ft.): 14.34
Final Boring Depth (ft.): 75.1

H. Datum: NAD 83
V. Datum: NAVD88
Northing: 4515435.17
Easting: 592510.08

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.5"/4"

Sampler Type: SS
Sampler O.D. (in.): 2.0
Sampler Length (in.): 24
Rock Core Size: NX

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time
Not	Measured		

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen. (in)	Sample Rec. (in)	Sample Blows (per 6 in.)	Sample SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
									1				
5		S-1	6.0-8.0	24	10	2 2 2 4	4	S-1: Loose, black, medium to coarse SAND, little Gravel.	2				
		S-2	8.0-10.0	24	14	2 3 5 7	8	S-2: Loose, black, medium to coarse SAND, little Gravel.				FILL (7)	
10		S-3	10.0-12.0	24	8	2 2 2 3	4	S-3: Loose, black, medium to coarse SAND, trace Gravel, trace wood/brick fragments.					
		S-4	12.0-14.0	24	6	2 3 7 2	10	S-4: Loose, black, medium to coarse SAND, trace Gravel, trace wood/brick fragments.					
15		S-5	14.0-16.0	24	0	WOR WOR	0	S-5: No recovery.					
		S-6	16.0-18.0	24	11	WOR 2 2 3 5 2	8	S-6: Medium stiff, gray, Silty CLAY, trace Sand, trace wood fragments. (PP = 0.3 TSF)	3		16		-1.7
		S-7	18.0-20.0	24	6	2 1 1 2	2	S-7: Soft, gray, Silty CLAY, trace wood and shell fragments. (PP = 0.3 TSF)					
20		S-8	20.0-22.0	24	9	1 1 1 1	2	S-8: Soft, gray, Silty CLAY, trace wood and shell fragments. (PP = 0.3 TSF)					
												UPPER CLAY (4c/6)	
25		S-9	25.0-27.0	24	6	1 2 1 2	3	S-9: Soft, dark gray, CLAY. (PP = 0.3 TSF)					
30													

REMARKS

1 - Upper 6 feet was cleared using a Vac-tron.
2 - Petroleum odor observed in samples S-1, S-2, S-3, and S-4.
3 - Pocket Penetrometer (PP) reading in tons per square foot (tsf).

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.: B-05

TEST BORING LOG

GZA GeoEnvironmental of New York
Engineers and Scientists

Transmission Developers Inc. (TDI/CHPE)
Leg 2- Astoria Annex
Upgrade & Overhead Lines
31-01 20th Avenue, Astoria, NY

EXPLORATION NO.: B-05
SHEET: 2 of 3
PROJECT NO: 41.0163233.00
REVIEWED BY: D. Patel

Logged By: A. Amador
Drilling Co.: Craig Geotechnical Testing, Inc.
Foreman: M. Tarter
Date Start: 5/8/2024 **Finish:** 5/8/2024

Type of Rig: Truck
Rig Model: CME-75
Drilling Method: Wash Rotary

Boring Location: See Plan
Stationing (ft.): **Offset (ft.):**
Ground Surface Elevation (ft.): 14.34
Final Boring Depth (ft.): 75.1

H. Datum: NAD 83
V. Datum: NAVD88
Northing: 4515435.17
Easting: 592510.08

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.5"/4"

Sampler Type: SS
Sampler O.D. (in.): 2.0
Sampler Length (in.): 24
Rock Core Size: NX

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time
Not	Measured		

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen. (in)	Sample Rec. (in)	Sample Blows (per 6 in.)	SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
		S-10	30.0-32.0	24	18	2 2 4 9	6	S-10: Top 12": Loose, brown, SILT & CLAY, some Sand. Bottom 6": Loose, gray-brown, fine to medium SAND, little Silt.			31	UPPER SAND (6)	-16.7
											33.5		-19.2
35		S-11	35.0-37.0	24	2	11 10 10 12	20	S-11: Medium dense, gray-brown, fine to medium SAND, little Silt.				LOWER SAND (3b)	
40		S-12	40.0-40.0	0	0	50/0"	R	S-12: No recovery.					
		S-13	43.0-45.0	24	12	13 15 15 15	30	S-13: Very stiff, dark brown, Silty CLAY. (PP = 3.8 TSF)			43		-28.7
45		S-14	45.0-47.0	24	7	2 2 10 10	12	S-14: Stiff, blue-gray, Clayey SILT, trace Gravel, trace Sand. (PP = 2.5 TSF)				CLAYEY SILT (5a/5b)	
50		S-15	50.0-52.0	21	19	26 18 49 50/3"	67	S-15: Very dense, black-gray, fine to coarse SAND, some Silt, micaceous.			50		-35.7
												DECOMPOSED ROCK (1d)	
55		S-16 C-1	55.0-55.1 55.1-60.1	1 60	1 43	50/1" REC=72% RQD=0%	R	S-16: Rock fragments. C-1: Moderately hard, moderately weathered, gray-white, medium grained GNEISSIC SCHIST, with very closely spaced, subhorizontally dipping fractures.			55.1		-40.8
60												BEDROCK (1d/1c)	

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.: B-05

TEST BORING LOG

GZA GeoEnvironmental of New York
Engineers and Scientists

Transmission Developers Inc. (TDI/CHPE)
Leg 2- Astoria Annex
Upgrade & Overhead Lines
31-01 20th Avenue, Astoria, NY

EXPLORATION NO.: B-05
SHEET: 3 of 3
PROJECT NO: 41.0163233.00
REVIEWED BY: D. Patel

Logged By: A. Amador
Drilling Co.: Craig Geotechnical Testing, Inc.
Foreman: M. Tarter
Date Start: 5/8/2024 **Finish:** 5/8/2024

Type of Rig: Truck
Rig Model: CME-75
Drilling Method: Wash Rotary

Boring Location: See Plan
Stationing (ft.): **Offset (ft.):**
Ground Surface Elevation (ft.): 14.34
Final Boring Depth (ft.): 75.1

H. Datum: NAD 83
V. Datum: NAVD88
Northing: 4515435.17
Easting: 592510.08

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.5"/4"

Sampler Type: SS
Sampler O.D. (in.): 2.0
Sampler Length (in.): 24
Rock Core Size: NX

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time
Not	Measured		

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen. (in)	Sample Rec. (in)	Sample Blows (per 6 in.)	Sample SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
65	3:30 4:30 4:15 4:00 5:00 3:00 4:30 3:15 5:00 3:45 5:30 3:30 4:00 4:00 4:00	C-2	60.1-65.1	60	55	REC=92% RQD=42%		C-2: Moderately hard, moderately weathered, gray-white, medium to fine grained GNEISSIC SCHIST, with very closely spaced, subhorizontally to horizontally dipping fractures.					
		C-3	65.1-70.1	60	58	REC=97% RQD=13%		C-3: Moderately hard, moderately weathered, gray-white, medium to fine grained GNEISSIC SCHIST, with very closely spaced, horizontally dipping fractures.				BEDROCK (1d/1c)	
70		C-4	70.1-75.1	60	59	REC=98% RQD=42%		C-4: Moderately hard, moderately weathered, gray-white, medium to fine grained GNEISSIC SCHIST, with very closely spaced, subhorizontally to horizontally dipping fractures.					
75											75.1		-60.8
								End of exploration at 75.1 feet.	4				
80													
85													
90													

REMARKS

4 - Upon completion, borehole was backfilled with soil cuttings.

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.: B-05

GZA TEMPLATE TEST BORING - GZA 2016_01_26.GDT - 6/25/24 15:19 - J:\GINT PROJECT DATABASES\41.0163200\41.0163233.00.GPJ

TEST BORING LOG

GZA GeoEnvironmental of New York
Engineers and Scientists

Transmission Developers Inc. (TDI/CHPE)
Leg 2- Astoria Annex
Upgrade & Overhead Lines
31-01 20th Avenue, Astoria, NY

EXPLORATION NO.: B-06
SHEET: 1 of 3
PROJECT NO: 41.0163233.00
REVIEWED BY: D. Patel

Logged By: A. Amador
Drilling Co.: Craig Geotechnical Testing, Inc.
Foreman: M. Tarter
Date Start: 5/9/2024 **Finish:** 5/14/2024

Type of Rig: Truck
Rig Model: CME-75
Drilling Method: Wash Rotary

Boring Location: See Plan
Stationing (ft.): **Offset (ft.):**
Ground Surface Elevation (ft.): 14.5
Final Boring Depth (ft.): 65

H. Datum: NAD 83
V. Datum: NAVD88
Northing: 4515456.14
Easting: 592491.26

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.5"/4"

Sampler Type: SS
Sampler O.D. (in.): 2.0
Sampler Length (in.): 24
Rock Core Size: NX

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time
5/13/2024	12:30pm	7.4	10 min
5/14/2024	8:00am	7.0	20 hours

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen. (in)	Sample Rec. (in)	Sample Blows (per 6 in.)	Sample SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
									1				
5		S-1	6.0-8.0	24	10	6 3 5 6	8	S-1: Loose, black, fine to coarse SAND, little Gravel, trace Silt, trace brick fragments.	2				
		S-2	8.0-10.0	24	19	14 17 22 12	39	S-2: Dense, black, fine to coarse SAND, little Gravel, trace Silt.					
10		S-3	10.0-12.0	24	7	2 2 2 2	4	S-3: Loose, black, fine to coarse SAND, trace Gravel, trace Silt, trace wood fragments.					
		S-4	12.0-14.0	24	10	6 8 9 12	17	S-4: Medium dense, black, fine to coarse SAND, trace Gravel, trace Silt, trace wood fragments.				FILL (7)	
15		S-5	14.0-16.0	24	6	9 10 8 6	18	S-5: Medium dense, black, fine to coarse SAND, trace Gravel, trace Silt, trace wood fragments.	3				
		S-6	16.0-18.0	24	9	3 6 8 6	14	S-6: Medium dense, black, fine to coarse SAND, trace Gravel, trace Silt, trace wood fragments.					
		S-7	18.0-20.0	24	10	5 11 8 4	19	S-7: Medium dense, black, fine to coarse SAND, trace Gravel, trace Silt, trace wood fragments.					
20		S-8	20.0-22.0	24	5	WOH WOH WOH WOH	0	S-8: Medium dense, black, fine to coarse SAND, trace Gravel, trace Silt, trace wood fragments.			23.5		-9.0
25		S-9	25.0-27.0	24	24	WOH WOH WOH WOH	0	S-9: Very soft, gray, CLAY, trace Sand, trace shells. (PP = 0.0 TSF)	4			UPPER CLAY (6)	
30											28.5	LOWER SAND (3a/3b)	-14.0

REMARKS

1 - Upper 6 feet was cleared using a Vac-tron.
2 - Petroleum odor observed in samples S-1, S-2, S-3, S-4, S-5, S-6, S-7, and S-8.
3 - No recovery. 3-inch split spoon was advanced within the same interval for samples S-5 and S-6.
4 - Pocket Penetrometer (PP) reading in tons per square foot (tsf).

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.: B-06

TEST BORING LOG

GZA GeoEnvironmental of New York
Engineers and Scientists

Transmission Developers Inc. (TDI/CHPE)
Leg 2- Astoria Annex
Upgrade & Overhead Lines
31-01 20th Avenue, Astoria, NY

EXPLORATION NO.: B-06
SHEET: 2 of 3
PROJECT NO: 41.0163233.00
REVIEWED BY: D. Patel

Logged By: A. Amador
Drilling Co.: Craig Geotechnical Testing, Inc.
Foreman: M. Tarter
Date Start: 5/9/2024 **Finish:** 5/14/2024

Type of Rig: Truck
Rig Model: CME-75
Drilling Method: Wash Rotary

Boring Location: See Plan
Stationing (ft.): **Offset (ft.):**
Ground Surface Elevation (ft.): 14.5
Final Boring Depth (ft.): 65

H. Datum: NAD 83
V. Datum: NAVD88
Northing: 4515456.14
Easting: 592491.26

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.5"/4"

Sampler Type: SS
Sampler O.D. (in.): 2.0
Sampler Length (in.): 24
Rock Core Size: NX

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time
5/13/2024	12:30pm	7.4	10 min
5/14/2024	8:00am	7.0	20 hours

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
		S-10	30.0-32.0	24	16	19 22 9 8	31	S-10: Dense, black-gray, fine to coarse SAND and SILT, trace Gravel.					
35		S-11	35.0-37.0	24	20	6 9 14 15	23	S-11: Medium dense, gray-brown, fine to medium SAND, some Silt, micaceous.				LOWER SAND (3a/3b)	
40		S-12	40.0-42.0	24	24	6 6 7 9	13	S-12: Top 12": Medium dense, gray-brown, fine to medium SAND, some Silt, micaceous. Bottom 12": Stiff, gray, CLAY, trace Sand.			41		-26.5
												LOWER CLAY (4b)	
45		S-13	45.0-47.0	24	16	5 15 47 31	62	S-13: Very dense, gray-brown, fine to coarse SAND, little Silt, trace Gravel, micaceous.			45		-30.5
50		S-14	50.0-52.0	22	16	18 26 49 50/4"	75	S-14: Very dense, gray, fine to medium SAND, some Silt, micaceous.				DECOMPOSED ROCK (1d)	
55	3:00 3:00 4:15 3:30 3:00	C-1	55.0-60.0	60	38	REC=63% RQD=35%		C-1: Very soft, severely weathered, gray-white, medium to fine grained GNEISSIC SCHIST, with closely to very closely spaced, horizontally to moderately dipping fractures.			55		-40.5
												BEDROCK (1c)	
60													

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.: B-06

TEST BORING LOG

GZA GeoEnvironmental of New York
Engineers and Scientists

Transmission Developers Inc. (TDI/CHPE)
Leg 2- Astoria Annex
Upgrade & Overhead Lines
31-01 20th Avenue, Astoria, NY

EXPLORATION NO.: B-06
SHEET: 3 of 3
PROJECT NO: 41.0163233.00
REVIEWED BY: D. Patel

Logged By: A. Amador
Drilling Co.: Craig Geotechnical Testing, Inc.
Foreman: M. Tarter
Date Start: 5/9/2024 **Finish:** 5/14/2024

Type of Rig: Truck
Rig Model: CME-75
Drilling Method: Wash Rotary

Boring Location: See Plan
Stationing (ft.): **Offset (ft.):**
Ground Surface Elevation (ft.): 14.5
Final Boring Depth (ft.): 65

H. Datum: NAD 83
V. Datum: NAVD88
Northing: 4515456.14
Easting: 592491.26

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.5"/4"

Sampler Type: SS
Sampler O.D. (in.): 2.0
Sampler Length (in.): 24
Rock Core Size: NX

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time
5/13/2024	12:30pm	7.4	10 min
5/14/2024	8:00am	7.0	20 hours

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen. (in)	Sample Rec. (in)	Sample Blows (per 6 in.)	Sample SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
65	1:45 1:45 3:30 5:00 6:45	C-2	60.0-65.0	60	43.5	REC=73% RQD=38%		C-2: Very soft to moderately hard, completely to moderately severely weathered, gray-white, medium to fine grained GNEISSIC SCHIST, with closely to very closely spaced, horizontally to subhorizontally dipping fractures.			65	BEDROCK (1c)	-50.5
								End of exploration at 65 feet.	5				
70													
75													
80													
85													
90													

REMARKS

5 - Upon completion, borehole was backfilled with soil cuttings and filter sand, and surface patched with asphalt cold patch.

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.: B-06

GZA TEMPLATE TEST BORING - GZA 2016_01_26.GDT - 6/25/24 15:19 - J:\GINT PROJECT DATABASES\41.0163200\41.0163233.00.GPJ

TEST BORING LOG

GZA GeoEnvironmental of New York
Engineers and Scientists

Transmission Developers Inc. (TDI/CHPE)
Leg 2- Astoria Annex
Upgrade & Overhead Lines
31-01 20th Avenue, Astoria, NY

EXPLORATION NO.: B-07
SHEET: 1 of 3
PROJECT NO: 41.0163233.00
REVIEWED BY: D. Patel

Logged By: N. Wilcox
Drilling Co.: Craig Geotechnical Testing, Inc.
Foreman: M. Gorsky
Date Start: 4/15/2024 **Finish:** 4/16/2024

Type of Rig: Truck
Rig Model: CME-75
Drilling Method: Wash Rotary

Boring Location: See Plan
Stationing (ft.): **Offset (ft.):**
Ground Surface Elevation (ft.): 14
Final Boring Depth (ft.): 65

H. Datum: NAD 83
V. Datum: NAVD88
Northing: 4515330.46
Easting: 592553.5

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.5"/4"

Sampler Type: SS
Sampler O.D. (in.): 2.0
Sampler Length (in.): 24
Rock Core Size: N/A

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time
4/15/2024	1:00pm	11.6	15 min
4/16/2024	12:30pm	6.8	24 hours

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen. (in)	Sample Rec. (in)	Sample Blows (per 6 in.)	Sample SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
								12" Gravel	1		1	GRAVEL	13.0
								1'-4': Light brown, fine to coarse SAND, trace Silt.					
5								4'-6': Black, fine to coarse SAND, little Gravel, trace Silt.					
		S-1	6.0-8.0	24	12	6 4 3 3	7	S-1: Loose, dark gray, fine to medium SAND, some Silt, trace Gravel.				FILL (7)	
		S-2	8.0-10.0	24	1	4 4 6 3	10	S-2: Loose, black, fine to coarse SAND, little Gravel, trace Silt.					
10		S-3	10.0-12.0	24	3	2 2 2 1	4	S-3: Very loose, black, fine to coarse SAND, little Gravel, trace Silt.					
		S-4	12.0-14.0	24	6	1 1 1 3	2	S-4: Very loose, black, fine to coarse SAND, little Gravel, trace Silt, trace wood fragments.					
15		S-5	14.0-16.0	24	6	3 2 2 1	4	S-5: Very loose, black, fine to coarse SAND, some Silt, trace wood fragments.			15		-1.0
		S-6	16.0-18.0	24	16	1 0 1 1	1	S-6: Very soft, brown-black, Silty CLAY, trace Sand, trace wood fragments.					
		S-7	18.0-20.0	24	24	0 0 1 1	1	S-7: Very soft, brown-black, Silty CLAY, little Sand, trace wood fragments.				UPPER CLAY (4b/6)	
20		S-8	20.0-22.0	24	14	6 9 3 3	12	S-8: Stiff, brown-gray, Silty CLAY, some Sand, trace Gravel.					
											23.5		-9.5
25		S-9	25.0-27.0	24	12	4 2 7 6	9	S-9: Loose, orange-brown, fine to medium SAND, some Silt, trace Gravel, micaceous.				UPPER SAND (6)	
											28.5		-14.5
30												CLAYEY SILT (5a/5b/6)	

REMARKS

1 - Upper 6 feet was cleared using a Vac-tron. Soil descriptions for the upper 6 feet were based on observations of material removed during clearing.

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.: B-07

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TEST BORING LOG

GZA GeoEnvironmental of New York
Engineers and Scientists

Transmission Developers Inc. (TDI/CHPE)
Leg 2- Astoria Annex
Upgrade & Overhead Lines
31-01 20th Avenue, Astoria, NY

EXPLORATION NO.: B-07
SHEET: 2 of 3
PROJECT NO: 41.0163233.00
REVIEWED BY: D. Patel

Logged By: N. Wilcox
Drilling Co.: Craig Geotechnical Testing, Inc.
Foreman: M. Gorsky
Date Start: 4/15/2024 **Finish:** 4/16/2024

Type of Rig: Truck
Rig Model: CME-75
Drilling Method: Wash Rotary

Boring Location: See Plan
Stationing (ft.): **Offset (ft.):**
Ground Surface Elevation (ft.): 14
Final Boring Depth (ft.): 65

H. Datum: NAD 83
V. Datum: NAVD88
Northing: 4515330.46
Easting: 592553.5

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.5"/4"

Sampler Type: SS
Sampler O.D. (in.): 2.0
Sampler Length (in.): 24
Rock Core Size: N/A

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time
4/15/2024	1:00pm	11.6	15 min
4/16/2024	12:30pm	6.8	24 hours

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen. (in)	Sample Rec. (in)	Sample Blows (per 6 in.)	Sample SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
		S-10	30.0-32.0	24	12	4 4 3 6	7	S-10: Medium stiff, blue-gray, Clayey SILT, little Sand, micaceous.					
35		S-11	35.0-37.0	24	24	5 7 9 9	16	S-11: Very stiff, blue-gray, Clayey SILT, little Sand, micaceous.					
40		S-12	40.0-42.0	24	24	3 5 6 9	11	S-12: Stiff, gray, Clayey SILT and SAND, micaceous.					
45		S-13	45.0-47.0	24	22	6 6 10 11	16	S-13: Very stiff, blue-gray, Clayey SILT, little Sand, micaceous.				CLAYEY SILT (5a/5b/6)	
50		S-14	50.0-52.0	24	24	5 5 5 9	10	S-14: Stiff, blue-gray, Clayey SILT, little Sand, micaceous.					
55		S-15	55.0-57.0	24	24	8 11 16 18	27	S-15: Very stiff, blue-gray, Clayey SILT, little Sand, micaceous.					
60											58.5	LOWER SAND (3b)	-44.5

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.: B-07

TEST BORING LOG

GZA GeoEnvironmental of New York
Engineers and Scientists

Transmission Developers Inc. (TDI/CHPE)
Leg 2- Astoria Annex
Upgrade & Overhead Lines
31-01 20th Avenue, Astoria, NY

EXPLORATION NO.: B-07
SHEET: 3 of 3
PROJECT NO: 41.0163233.00
REVIEWED BY: D. Patel

Logged By: N. Wilcox
Drilling Co.: Craig Geotechnical Testing, Inc.
Foreman: M. Gorsky
Date Start: 4/15/2024 **Finish:** 4/16/2024

Type of Rig: Truck
Rig Model: CME-75
Drilling Method: Wash Rotary

Boring Location: See Plan
Stationing (ft.): **Offset (ft.):**
Ground Surface Elevation (ft.): 14
Final Boring Depth (ft.): 65

H. Datum: NAD 83
V. Datum: NAVD88
Northing: 4515330.46
Easting: 592553.5

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.5"/4"

Sampler Type: SS
Sampler O.D. (in.): 2.0
Sampler Length (in.): 24
Rock Core Size: N/A

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time
4/15/2024	1:00pm	11.6	15 min
4/16/2024	12:30pm	6.8	24 hours

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen. (in)	Sample Rec. (in)	Sample Blows (per 6 in.)	Sample SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
65		S-16	60.0-62.0	24	24	7 11 15 25	26	S-16: Medium dense, gray, fine to medium SAND and SILT, micaceous.	2		65	LOWER SAND (3b)	-51.0
		S-17	65.0-65	0	0	50/0"	R	S-17: No recovery. End of exploration at 65 feet.	3				
70													
75													
80													
85													
90													

REMARKS

2 - Roller bit resistance increased at approximately 63.5 feet.
3 - Upon completion, borehole was backfilled with soil cuttings and filter sand.

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.: B-07

TEST BORING LOG

GZA GeoEnvironmental of New York
Engineers and Scientists

Transmission Developers Inc. (TDI/CHPE)
Leg 2- Astoria Annex
Upgrade & Overhead Lines
31-01 20th Avenue, Astoria, NY

EXPLORATION NO.: B-08
SHEET: 1 of 2
PROJECT NO: 41.0163233.00
REVIEWED BY: D. Patel

Logged By: N. Wilcox
Drilling Co.: Craig Geotechnical Testing, Inc.
Foreman: M. Gorsky
Date Start: 4/12/2024 **Finish:** 4/16/2024

Type of Rig: Truck
Rig Model: CME-75
Drilling Method: Wash Rotary

Boring Location: See Plan
Stationing (ft.): **Offset (ft.):**
Ground Surface Elevation (ft.): 14
Final Boring Depth (ft.): 50.3

H. Datum: NAD 83
V. Datum: NAVD88
Northing: 4515347.28
Easting: 592566.8

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.5"/4"

Sampler Type: SS
Sampler O.D. (in.): 2.0
Sampler Length (in.): 24
Rock Core Size: N/A

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time
4/12/2024	1:30pm	7.5	15 min
4/15/2024	7:15am	8.3	66 hours

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen. (in)	Sample Rec. (in)	Sample Blows (per 6 in.)	Sample SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
								12" Gravel	1		1	GRAVEL	13.0
								1'-4': Light brown, fine to coarse SAND, little Gravel, trace Silt.					
5								4'-6': Black, fine to coarse SAND, some Gravel, trace Silt.					
		S-1	6.0-8.0	24	12	11 8 / 8 7	16	S-1: Medium dense, black, fine to coarse SAND, little Gravel, trace Silt.				FILL (7)	
		S-2	8.0-10.0	24	12	5 3 / 2 2	5	S-2: Loose, black, fine to coarse SAND, little Gravel, trace Silt.					
10		S-3	10.0-12.0	24	3	5 3 / 2 1	5	S-3: Loose, black, fine to coarse SAND, little Gravel, trace Silt.					
		S-4	12.0-14.0	24	24	3 7 / 5 3	12	S-4: Medium dense, black, fine to coarse SAND, little Gravel, trace Silt, trace wood fragments.			14		0.0
15		S-5	14.0-16.0	24	15	2 1 / 1 0	2	S-5: Soft, light brown-gray, Silty CLAY, some Sand, trace wood fragments.				UPPER CLAY (6)	
		S-6	16.0-18.0	24	5	1 2 / 1 1	3	S-6: Soft, light brown, Silty CLAY, some Sand, trace wood fragments.			18		-4.0
		S-7	18.0-20.0	24	9	2 4 / 9 2	13	S-7: Medium dense, light brown, fine to medium SAND, some Silt.					
20		S-8	20.0-22.0	24	21	2 2 / 3 2	5	S-8: Loose, brown, fine to medium SAND, little Silt, little Gravel.				UPPER SAND (3b/6)	
25		S-9	25.0-27.0	24	12	11 10 / 11 9	21	S-9: Medium dense, orange-brown, fine to medium SAND, some Silt.					
30											28.5	CLAYEY SILT (5a/5b)	-14.5

REMARKS

1 - Upper 6 feet was cleared using a Vac-tron. Soil descriptions for the upper 6 feet were based on observations of material removed during clearing.
2 - Casing advanced to a depth of approximately 30 feet.

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.: B-08

TEST BORING LOG

GZA GeoEnvironmental of New York
Engineers and Scientists

Transmission Developers Inc. (TDI/CHPE)
Leg 2- Astoria Annex
Upgrade & Overhead Lines
31-01 20th Avenue, Astoria, NY

EXPLORATION NO.: B-08
SHEET: 2 of 2
PROJECT NO: 41.0163233.00
REVIEWED BY: D. Patel

Logged By: N. Wilcox
Drilling Co.: Craig Geotechnical Testing, Inc.
Foreman: M. Gorsky
Date Start: 4/12/2024 **Finish:** 4/16/2024

Type of Rig: Truck
Rig Model: CME-75
Drilling Method: Wash Rotary

Boring Location: See Plan
Stationing (ft.): **Offset (ft.):**
Ground Surface Elevation (ft.): 14
Final Boring Depth (ft.): 50.3

H. Datum: NAD 83
V. Datum: NAVD88
Northing: 4515347.28
Easting: 592566.8

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.5"/4"

Sampler Type: SS
Sampler O.D. (in.): 2.0
Sampler Length (in.): 24
Rock Core Size: N/A

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time
4/12/2024	1:30pm	7.5	15 min
4/15/2024	7:15am	8.3	66 hours

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen. (in)	Sample Rec. (in)	Sample Blows (per 6 in.)	Sample SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
		S-10	30.0-32.0	24	19	10 6 11 11	17	S-10: Very stiff, blue-gray, Clayey SILT, little Sand.	2				
35		S-11	35.0-37.0	24	22	5 10 10 11	20	S-11: Very stiff, blue-gray, Clayey SILT, little Sand, micaceous.					
40		S-12	40.0-42.0	24	22	5 7 10 13	17	S-12: Very stiff, blue-gray, Clayey SILT, little Sand, micaceous.				CLAYEY SILT (5a/5b)	
45		S-13	45.0-47.0	24	24	12 13 19 16	32	S-13: Hard, blue-gray, Clayey SILT, some Sand, micaceous.			48.5		-34.5
50		S-14	50.0-50.3	4	4	100/4"	R	S-14: Very dense, blue-gray, fine to coarse SAND, little Gravel, trace Silt, micaceous.	3			LOWER SAND (3a)	
								End of exploration at 50.3 feet.			50.3		-36.3
55													
60													

REMARKS

3 - Upon completion, borehole was backfilled with soil cuttings and filter sand.

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.: B-08

TEST BORING LOG

GZA GeoEnvironmental of New York
Engineers and Scientists

Transmission Developers Inc. (TDI/CHPE)
Leg 2- Astoria Annex
Upgrade & Overhead Lines
31-01 20th Avenue, Astoria, NY

EXPLORATION NO.: B-09
SHEET: 1 of 2
PROJECT NO: 41.0163233.00
REVIEWED BY: D. Patel

Logged By: N. Wilcox
Drilling Co.: Craig Geotechnical Testing, Inc.
Foreman: M. Gorsky
Date Start: 4/16/2024 **Finish:** 4/16/2024

Type of Rig: Truck
Rig Model: CME-75
Drilling Method: Wash Rotary

Boring Location: See Plan
Stationing (ft.): **Offset (ft.):**
Ground Surface Elevation (ft.): 14
Final Boring Depth (ft.): 55

H. Datum: NAD 83
V. Datum: NAVD88
Northing: 4515377.92
Easting: 592530.97

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.5"/4"

Sampler Type: SS
Sampler O.D. (in.): 2.0
Sampler Length (in.): 24
Rock Core Size: N/A

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time
4/16/2024	12:00pm	2.9	20 min

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen. (in)	Sample Rec. (in)	Sample Blows (per 6 in.)	Sample SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
								12" Gravel	1			GRAVEL (7)	
								1'-4': Light brown, fine to coarse SAND, trace Gravel, trace Silt.			1		13.0
5								4'-6': Black, fine to coarse SAND, little Gravel, trace Silt.					
		S-1	6.0-8.0	24	8	5 3 3 3	6	S-1: Loose, black, fine to coarse SAND, some Gravel, trace Silt.					
		S-2	8.0-10.0	24	4	1 5 5 4	10	S-2: Loose, black, fine to coarse SAND, some Gravel, trace Silt.				FILL (7)	
10		S-3	10.0-12.0	24	3	2 3 1 0	4	S-3: Loose, black, fine to coarse SAND, some Gravel, trace Silt.					
		S-4	12.0-14.0	24	12	2 1 3 8	4	S-4: Loose, black, fine to coarse SAND, some Gravel, trace Silt, trace wood fragments.					
15		S-5	14.0-16.0	24	9	6 7 5 2	12	S-5: Medium dense, black, fine to coarse SAND, some Gravel, trace Silt, trace wood fragments.					
		S-6	16.0-18.0	24	10	4 6 3 3	9	S-6: Loose, black, fine to coarse SAND, some Gravel, trace Silt, trace brick and wood fragments.			18		-4.0
		S-7	18.0-20.0	24	16	4 1 1 1	2	S-7: Soft, dark gray, CLAY, trace Sand, trace wood fragments.					
20		S-8	20.0-22.0	24	18	2 1 1 1	2	S-8: Soft, dark brown, organic CLAY.				UPPER CLAY (6)	
25		S-9	25.0-27.0	24	17	1 1 1 0	2	S-9: Soft, dark gray, CLAY, trace Silt, trace wood fragments.					
30											28.5		-14.5
												CLAYEY SILT (5b)	

REMARKS

1 - Upper 6 feet was cleared using a Vac-tron. Soil descriptions for the upper 6 feet were based on observations of material removed during clearing.

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.: B-09

TEST BORING LOG

GZA GeoEnvironmental of New York
Engineers and Scientists

Transmission Developers Inc. (TDI/CHPE)
Leg 2- Astoria Annex
Upgrade & Overhead Lines
31-01 20th Avenue, Astoria, NY

EXPLORATION NO.: B-09
SHEET: 2 of 2
PROJECT NO: 41.0163233.00
REVIEWED BY: D. Patel

Logged By: N. Wilcox
Drilling Co.: Craig Geotechnical Testing, Inc.
Foreman: M. Gorsky
Date Start: 4/16/2024 **Finish:** 4/16/2024

Type of Rig: Truck
Rig Model: CME-75
Drilling Method: Wash Rotary

Boring Location: See Plan
Stationing (ft.): **Offset (ft.):**
Ground Surface Elevation (ft.): 14
Final Boring Depth (ft.): 55

H. Datum: NAD 83
V. Datum: NAVD88
Northing: 4515377.92
Easting: 592530.97

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.5"/4"

Sampler Type: SS
Sampler O.D. (in.): 2.0
Sampler Length (in.): 24
Rock Core Size: N/A

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time
4/16/2024	12:00pm	2.9	20 min

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen. (in)	Sample Rec. (in)	Sample Blows (per 6 in.)	Sample SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
		S-10	30.0-32.0	24	6	10 12 6 3	18	S-10: Very stiff, light brown, Clayey SILT, little Sand, micaceous.					
35		S-11	35.0-37.0	24	17	9 5 6 11	11	S-11: Stiff, brown, SILT & CLAY, little Sand, micaceous.				CLAYEY SILT (5b)	
40		S-12	40.0-42.0	24	11	20 11 8 10	19	S-12: Very stiff, light brown, Clayey SILT, some Sand, micaceous.			43.5		-29.5
45		S-13	45.0-47.0	24	22	12 16 43 46	59	S-13: Very dense, dark brown, fine to medium SAND, some Silt, micaceous.				LOWER SAND (3a)	
50		S-14	50.0-52.0	24	24	23 30 63 51	93	S-14: Very dense, dark gray-black, fine SAND, little Silt, micaceous.	2				
55		S-15	55.0-55.0	0	0	50/0"	R	S-15: No recovery. End of exploration at 55 feet.	3		55		-41.0
60													

REMARKS

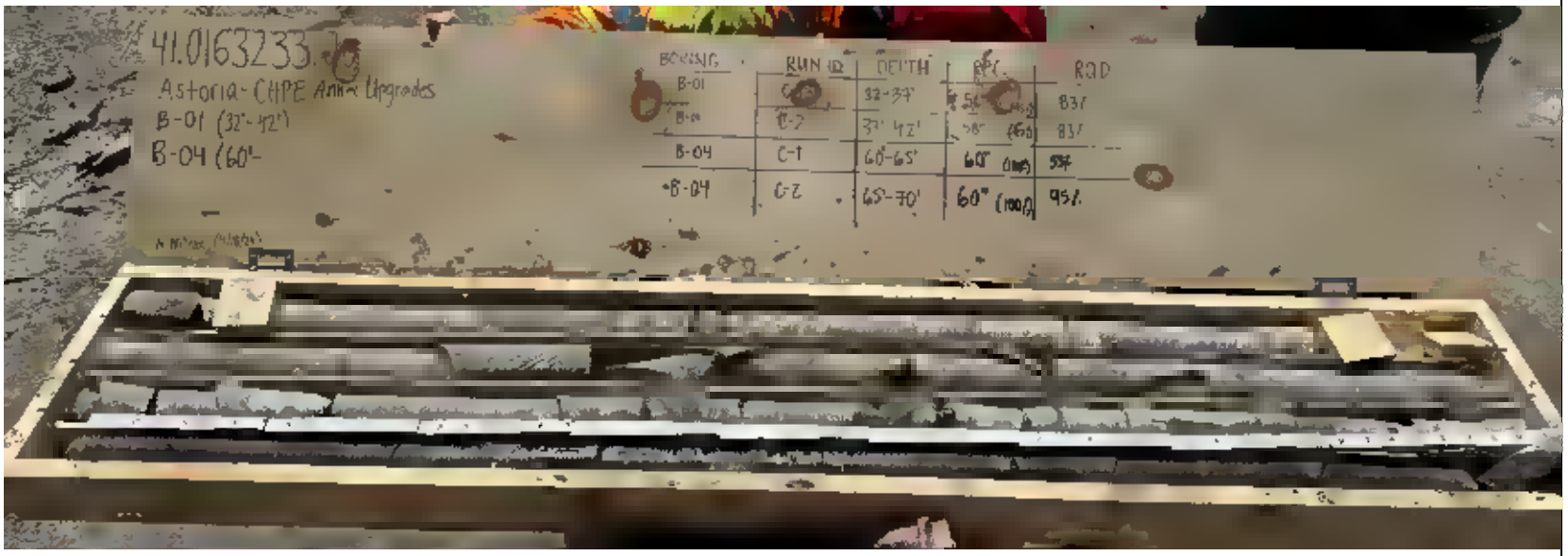
2 - Roller bit resistance increased at approximately 52.5 feet.
3 - Upon completion, borehole was backfilled with soil cuttings and filter sand.

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.: B-09

Rock Core Photo Log

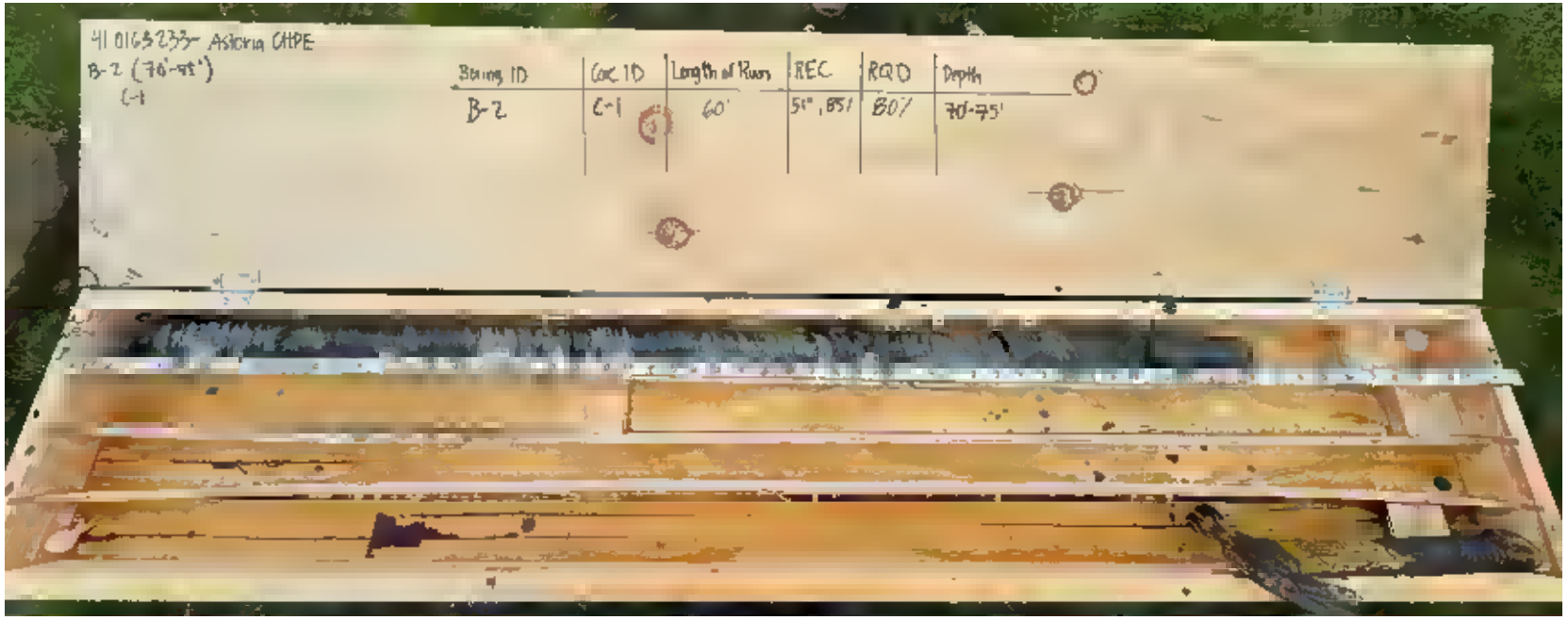
Client:	Leg 2 - Astoria Annex Upgrade and Overhead Lines 18-01 20th Avenue, Astoria, NY	Project No.
Transmission Developers, Inc.		41.0163233.00



Boring	Depth	Run Summary	Recovery	RQD
B-01	32-37 feet	C-1 – 60 inches	56 inches (93%)	49 inches (83%)
B-01	37-42 feet	C-2 – 60 inches	58 inches (97%)	49 inches (83%)
B-04	60-65 feet	C-1 – 60 inches	60 inches (100%)	32 inches (53%)
B-04	65-70 feet	C-2 – 60 inches	60 inches (100%)	57 inches (95%)

Rock Core Photo Log

Client:	Leg 2 - Astoria Annex Upgrade and Overhead Lines 18-01 20th Avenue, Astoria, NY	Project No.
Transmission Developers, Inc.		41.0163233.00



Boring	Depth	Run Summary	Recovery	RQD
B-02	70-75 feet	C-1 – 60 inches	51 inches (85%)	40 inches (80%)

Rock Core Photo Log

Client:	Leg 2 - Astoria Annex Upgrade and Overhead Lines 18-01 20th Avenue, Astoria, NY	Project No.
Transmission Developers, Inc.		41.0163233.00

Boring	Depth	Run Summary	Recovery	RQD
B-05	55.1-60.1 feet	C-1 – 60 inches	43 inches (72%)	0 inches (0%)
B-05	60.1-65.1 feet	C-2 – 60 inches	55 inches (92%)	25 inches (42%)
B-05	65.1-70.1 feet	C-3 – 60 inches	58 inches (97%)	8 inches (13%)
B-05	70.1-75.1 feet	C-4 – 60 inches	59 inches (98%)	25 inches (42%)

Rock Core Photo Log

Client:	Leg 2 - Astoria Annex Upgrade and Overhead Lines 18-01 20th Avenue, Astoria, NY	Project No.
Transmission Developers, Inc.		41.0163233.00

Boring	Depth	Run Summary	Recovery	RQD
B-03	60-65 feet	C-1 – 60 inches	58 inches (96%)	51 inches (85%)
B-03	65-70 feet	C-2 – 60 inches	40 inches (67%)	38 inches (63%)
B-06	55-60 feet	C-1 – 60 inches	38 inches (63%)	21 inches (35%)
B-06	60-65 feet	C-2 – 60 inches	44 inches (73%)	23 inches (38%)

APPENDIX C – SOIL RESISTIVITY TESTING REPORT

HRGS

GEOPHYSICAL SURVEY
CHPE ASTORIA ANNEX SUBSTATION
ASTORIA, NEW YORK

Prepared for:

GZA
104 West 29th Street, 10th Floor
New York, New York 10001

Prepared by:

Hager-Richter Geoscience, Inc.
dba HR Geological Services in NY
846 Main Street
Fords, New Jersey 08863

File 23JCC79
March 2024

HRGS
HAGER-RICHTER GEOSCIENCE

GEOPHYSICS FOR THE ENGINEERING & ENVIRONMENTAL COMMUNITIES

2 Industrial Way S/2, Atkinson, NH / 603.893.9944
846 Main Street, Fords, NJ / 732.661.0555

www.hager-richter.com

March 06, 2024
File 23JCC79

Dharmil S. Patel, P.E.
Project Manager
GZA
104 West 29th Street, 10th Floor
New York, New York 10001

Tel: 732.725.1284
Cell: 646.951.8908
Email: Dharmil.Patel@gza.com

RE: Geophysical Services
Astoria Annex Substation
Astoria, Queens, New York

Dear Mr. Patel:

In this report, we summarize the results of a geophysical survey conducted in February 2024 by Hager-Richter Geoscience, Inc., dba HR Geological Services in NY, (HRGS) at the above referenced site for GZA. The scope of the project and area of interest were specified by GZA.

INTRODUCTION

In support of work related to a proposed new facility, referred to as CHPE Astoria Annex Substation, located along 31st Street, in Astoria, New York, GZA required soil electrical resistivity testing at four locations. Figure 1 shows the general location of the tests. The test locations were in gravel and grassy areas. Figure 2 shows the locations of the testing arrays.

Soil electrical resistivity testing was conducted in substantial accordance with IEEE Std 81-1983 and ASTM G57 using the Wenner Four-Electrode Method.

OBJECTIVE

The objective of the geophysical survey was to determine the soil electrical resistivity of the subsurface at four locations specified by GZA.

THE SURVEY

Alexis Martinez, Robert A. Collier and Astrid Carter, of HRGS, conducted the field operations on February 20, 2024. The project was coordinated with Mr. Patel. Soil resistivity data were acquired along orthogonal arrays in the four proposed locations. The proposed electrode spacings for the survey were 2.5, 5, 10, 15, 20, 30, 40, 60, 80, 100, 200 and 300 feet, as access permitted. We note that numerous fences and other surface metallic obstructions that affect the resistivity data were present, and the

arrays could not be completed with the proposed a-spacing. The test locations were identified as Lines R-1 A/B, R-2 A/B, R-3 A/B and R-4 A/B, with A/B the two semi orthogonal arrays at each test location.

EQUIPMENT AND PROCEDURES

As indicated above, the soil resistivity testing was conducted in substantial accordance with the IEEE standard 81-1983 and ASTM G57. Original data and field notes will be retained in the HRGS files for a minimum of three years.

The Method. The method as first described by Frank Wenner uses four equally spaced electrodes driven a short distance into the ground. Electric current (DC) is injected through the outer electrodes to produce a potential difference between the inner electrodes. Measurements of the electrode spacing, a, the current, I, and the potential difference, V, are sufficient to determine the resistivity, ρa, which is given by

$$\rho a = 2 * \pi * a * (V/I) \qquad \text{EQ 1}$$

The resistivity ρa determined in this manner is called apparent resistivity because it is the theoretical resistivity of a semi-infinite earth. To determine more precise values of resistivity, measurements are made for several values of a, and the data are then inverted using methods of mathematical physics that are beyond the scope of this project.

Equipment. The testing was conducted using an Advanced Geosciences, Inc. (AGI) SuperSting R8 resistivity meter to determine the soils resistivity. This instrumentation consists of a Power Supply, Transmitter, and Receiver.

The SuperSting R8 provides for the following:

- automatically reversing polarity of the injected current
- measuring the electrode contact resistance, and, if too high in the judgment of the operator, the measurement of resistance can be discontinued and the contact resistance reduced to an acceptable level by pouring a small amount of salty water around the electrode
- repeating individual measurement for either an operator specified number of times or until the standard error of the accumulated data is equal to or less than an operator specified percentage.

Procedure. As stated above, HRGS measured soil resistivity at the subject site in substantial accordance with IEEE 81-1983 and ASTM G57 using the AGI SuperSting R8 resistivity meter. Soil resistivity data were acquired at two locations. Figure 2 shows the locations and center points of the resistivity testing lines.

HRGS

Measurements were taken using steel electrodes at the proposed a-spacings. Due to access constraints, none of the arrays could be completed with the proposed a-spacings. Photo 1 illustrates the site conditions and the equipment utilized in the survey.

The weather was sunny with air temperatures near 45°F and no precipitation was recorded at the Site within the 24-hours preceding the testing based on the Record of Climatological Observations from the National Oceanic & Atmospheric Administration for JFK Airport, New York.

Photo 1.- AGC-2B. AGI Supersting R8 console is the yellow instrument in the center of the photo. The presence of fences, guard rails, overhead piping prevented installation of the proposed electrode a-spacings for most of the test locations.

LIMITATIONS OF THE METHOD

As with any of the electrical geophysical methods, resistivity data are subject to interference from such cultural features as buildings, fencing, underground utilities that are electrically conducting, and overhead power lines. Thus, for certain applications, the use of the resistivity method in some settings might be inappropriate.

The subsurface is three dimensional in character, and although the resistivity data are acquired along a line, the data are affected by resistivity changes off-line. Therefore, unless there are parallel survey lines that are spaced appropriately, resistivity changes off-line may be interpreted as changes below the survey line. This limitation is particularly significant for single survey lines.

RESULTS

The soil resistivity testing was conducted in substantial accordance with IEEE standard 81-1983 and ASTM G57. Specifically, the survey was conducted using the four-point Wenner method. Soil resistivity data were acquired along four test locations, identified as R-1 A/B, R-2 A/B, R-3 A/B and R-4 A/B. The locations of the test lines are shown in Figure 2. Data were acquired using the proposed a-spacings of 2.5, 5, 10, 15, 20, 30, 40, 60, 80, 100, 200 and 300 feet. A maximum a-spacing of 200 feet was possible only at R-2B location. For the rest of the arrays, maximum a-spacings between 10 and 60 feet was possible.

The apparent resistivity values, calculated from Eq. 1, are provided in the attached Soil Resistivity Field Measurement Forms reported in Appendix 1. All the data is presented in feet and ohm-ft for consistency. Resistivity data for the two orthogonal arrays at R-1 and R-2 test locations do not exhibit strong discrepancies. Readings along these two test lines exhibit similar resistivity measurements for the two orthogonal arrays, indicative of the data not being affected by the presence of subsurface metallic

HRGS

elements. Readings for both R-3 and R-4 exhibit low resistivity numbers for relatively short electrode spacings, indicative of the date being affected by the proximity of fences, utilities, guard rails, etc. Figure 3 is a graphic representation of the resistivity data for the four arrays.

LIMITATIONS ON USE OF THE REPORT

This letter report was prepared for the exclusive use of GZA and its client (collectively, Client). No other party shall be entitled to rely on this Report, or any information, documents, records, data, interpretations, advice, or opinions given to the Client by Hager-Richter Geoscience, Inc. (HRGS) in the performance of its work. The Report relates solely to the specific project for which HRGS has been retained and shall not be used or relied upon by the Client or any third party for any variation or extension of this project, any other project or any other purpose without the express written permission of HRGS. Any unpermitted use by the Client or any third party shall be at the Client's or such third party's own risk and without any liability to HRGS.

HRGS has used reasonable care, skill, competence, and judgment in the performance of its services for this project consistent with professional standards for those providing similar services at the same time, in the same locale, and under like circumstances. Unless otherwise stated, the work performed by HRGS should be understood to be exploratory and interpretational in character and any results, findings or recommendations contained in this Report or resulting from the work proposed may include decisions which are judgmental in nature and not necessarily based solely on pure science or engineering. It should be noted that our conclusions might be modified if subsurface conditions were better delineated with additional subsurface exploration including, but not limited to, test pits, soil borings with collection of soil and water samples, and laboratory testing.

Except as expressly provided in this limitations section, HRGS makes no other representation or warranty of any kind whatsoever, oral or written, expressed or implied; and all implied warranties of merchantability and fitness for a particular purpose, are hereby disclaimed.

If you have any questions or comments on this letter report, please contact us at your convenience. It has been a pleasure to work with GZA on this project. We look forward to working with you again in the future.

Sincerely yours,
HAGER-RICHTER GEOSCIENCE, INC.
dba HR Geological Services in New York

José Carlos Cambero Calzada, P.G. (NY 000899)
Senior Geophysicist

Attachments: Soil Resistivity Field Measurement Forms
Figures 1 – 3 & Appendix 1

N

APPROXIMATE SCALE (feet)

0 500 1000

LOCATION

NOTE

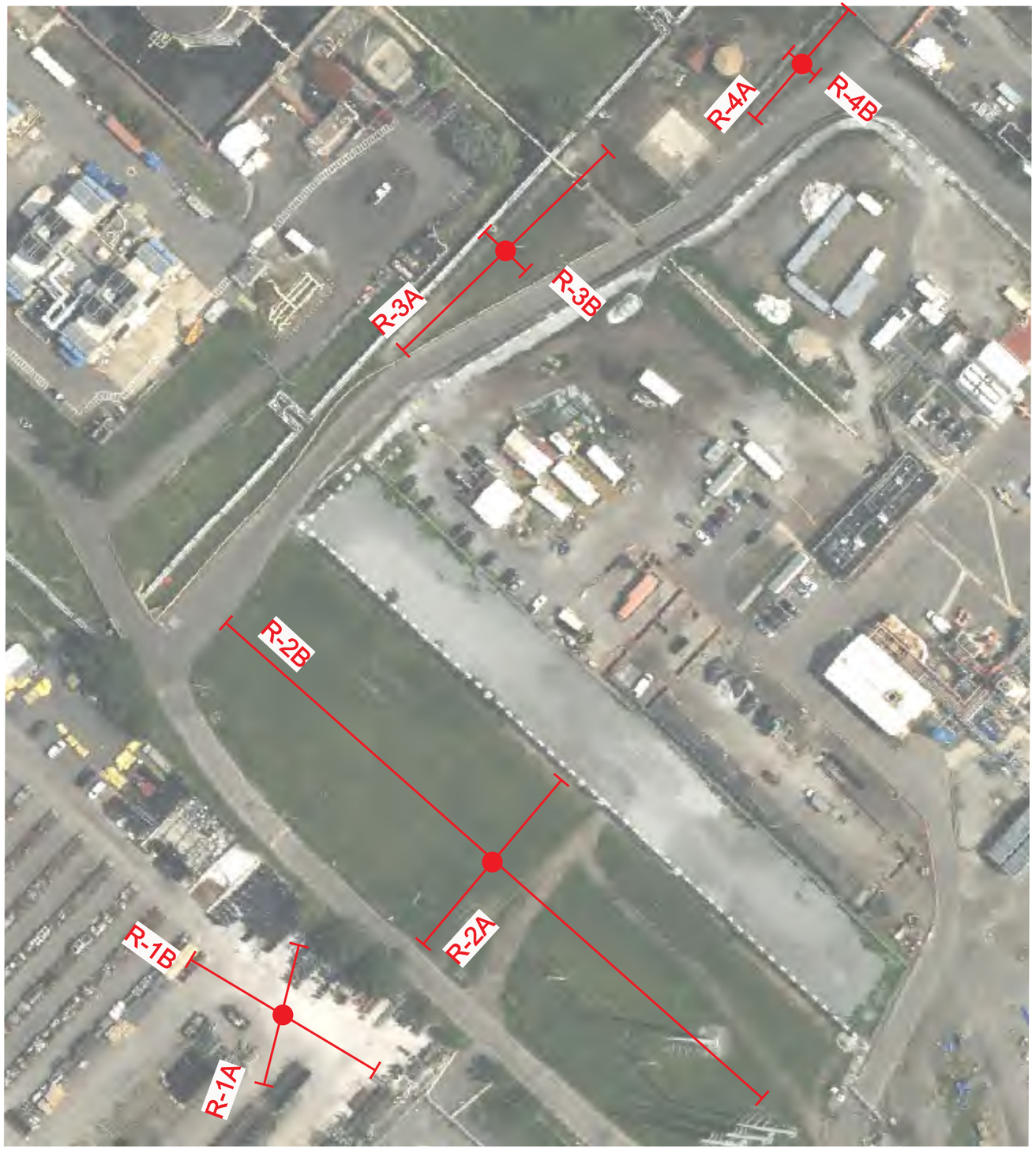
Modified from Bing aerial photograph.

* DBA HR Geological Services in New York

Figure 1
General Site Location
CHPE Astoria Annex Substation
Astoria, Queens, New York

File 23JCC79 | March 2024

HRGS* Atkinson, NH
Fords, NJ



N

H:R

LEGEND

SOIL RESISTIVITY TESTING LINE WITH DATA MIDPOINT

SCALE (feet)

0 100 200

NOTE

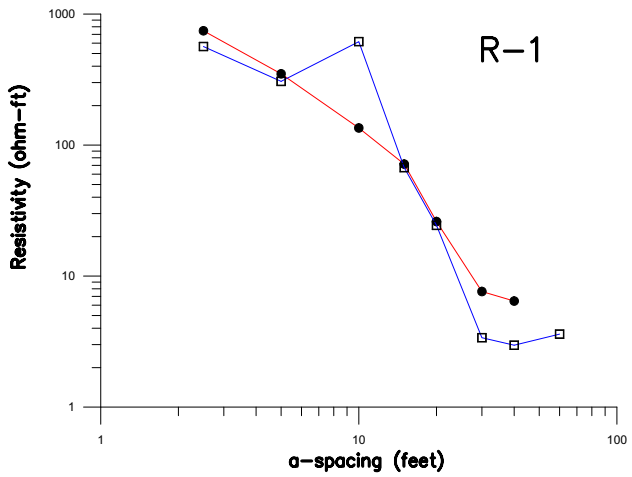
Modified from Google Earth Pro Aerial Photograph.

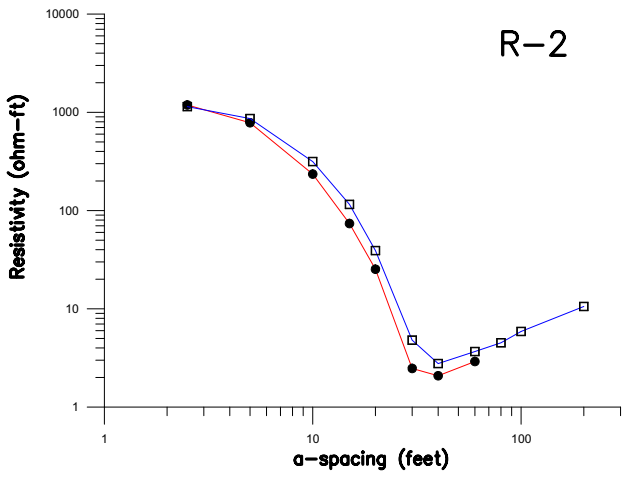
* DBA HR Geological Services in New York

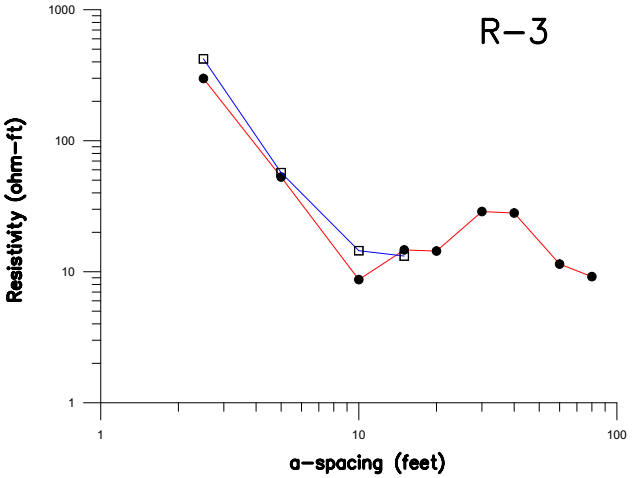
Figure 2
Test Locations
CHPE Astoria Annex Substation
Astoria, Queens, New York

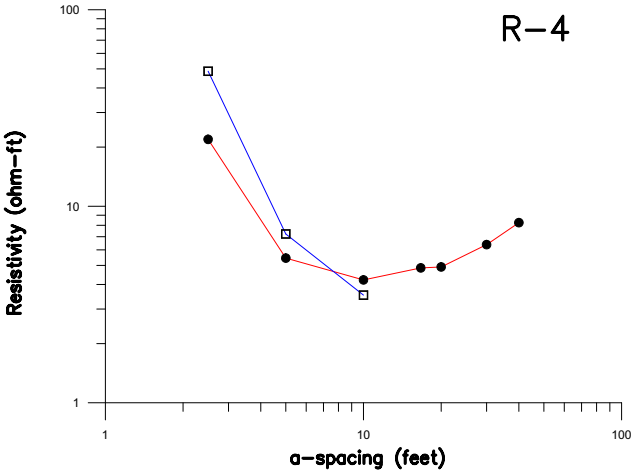
File 23JCC79 | March 2024

HRGS* Atkinson, NH
Fords, NJ









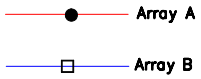


Figure 3
Soil Resistivity Testing Results
CHPE Astoria Annex Substation
Astoria, Queens, New York

File 23JCC79 | March 2024

HRGS* Atkinson, NH
Fords, NJ

* DBA HR Geological Services in New York

HRGS

APPENDIX 1

SOIL RESISTIVITY RESULTS

Soil Resistivity Field Measurement Form

Location: Line R1-A			Project Name: CHPE - Astoria Annex Substation, Astoria, NY
Lat: 40.784590°	Long: -73.903637°	Orientation: 13° True North	Air Temperature: 46°F
Soil Type:			Date of Test: 2/20/24
Soil Conditions (wet,dry): dry, 49.1°F			Weather Conditions: Overcast
Test Completed By: Alexis Martinez, Alex Collier, Astrid Carter			Test Methods: Soil Resistivity Testing (Wenner Array)
Test Instrument: AGI Sting R8 Resistivity meter. S/N: SS1504294			Calibration Date: 2/06/2023

Electrode Spacing (ft)	Current Electrode Depth (in)	Potential Electrode Depth (in)	Injected Current (mA)	Measured Potential (mV)	Measured Resistance (ohm)	Apparent Resistivity (Ohm-ft)
2.50	2	2	54.7	2593.7	47.4	745
5.00	3	3	29.0	322.9	11.1	350
10.00	4	4	22.0	47.3	2.1	135
15.00	4	4	116.3	88.3	0.8	72
20.00	6	6	60.0	12.4	0.2	26
30.00	6	6	208.0	8.4	0.0	8
40.00	7	7	64.3	1.7	0.0	6

Field Notes:

Soil Resistivity Field Measurement Form

Location: Line R1-B			Project Name: CHPE - Astoria Annex Substation, Astoria, NY
Lat: 40.784590°	Long: -73.903637°	Orientation: 121° True North	Air Temperature: 46°F
Soil Type:			Date of Test: 2/20/24
Soil Conditions (wet,dry): dry, 49.1°F			Weather Conditions: Overcast
Test Completed By: Alexis Martinez, Alex Collier, Astrid Carter			Test Methods: Soil Resistivity Testing (Wenner Array)
Test Instrument: AGI Sting R8 Resistivity meter. S/N: SS1504294			Calibration Date: 2/06/2023

Electrode Spacing (ft)	Current Electrode Depth (in)	Potential Electrode Depth (in)	Injected Current (mA)	Measured Potential (mV)	Measured Resistance (ohm)	Apparent Resistivity (Ohm-ft)
2.50	1	1	63.3	2278.9	36.0	565
5.00	2	2	48.7	474.6	9.8	306
10.00	3	3	142.7	1397.9	9.8	616
15.00	4	4	61.3	43.7	0.7	67
20.00	4	4	227.3	44.1	0.2	24
30.00	6	6	236.3	4.2	0.02	3.4
40.00	6	6	56.3	0.7	0.01	3.0
60.00	8	8	120.3	1.2	0.01	3.6

Field Notes:

Soil Resistivity Field Measurement Form

Location: Line R2-A			Project Name: CHPE - Astoria Annex Substation, Astoria, NY
Lat: 40.784938°	Long: -73.902998°	Orientation: 40° True North	Air Temperature: 41°F
Soil Type: Grass Field			Date of Test: 2/20/24
Soil Conditions (wet,dry): dry, 36F			Weather Conditions: Overcast
Test Completed By: Alexis Martinez, Alex Collier, Astrid Carter			Test Methods: Soil Resistivity Testing (Wenner Array)
Test Instrument: AGI Sting R8 Resistivity meter. S/N: SS1504294			Calibration Date: 2/06/2023

Electrode Spacing (ft)	Current Electrode Depth (in)	Potential Electrode Depth (in)	Injected Current (mA)	Measured Potential (mV)	Measured Resistance (ohm)	Apparent Resistivity (Ohm-ft)
2.50	1	1	33.0	2492.8	75.5	1187
5.00	2	2	53.0	1319.9	24.9	782
10.00	3	3	59.7	223.4	3.7	235
15.00	4	4	37.7	29.5	0.8	74
20.00	4	4	76.0	15.3	0.2	25
30.00	6	6	63.0	0.8	0.01	2.5
40.00	6	6	101.0	0.8	0.01	2.1
60.00	8	8	129.7	1.0	0.01	2.9

Field Notes:

Soil Resistivity Field Measurement Form

Location: Line R2-B			Project Name: CHPE - Astoria Annex Substation, Astoria, NY
Lat: 40.784938°	Long: -73.902998°	Orientation: 132° True North	Air Temperature: 41°F
Soil Type: Grass Field			Date of Test: 2/20/24
Soil Conditions (wet,dry): dry, 36F			Weather Conditions: Overcast
Test Completed By: Alexis Martinez, Alex Collier, Astrid Carter			Test Methods: Soil Resistivity Testing (Wenner Array)
Test Instrument: AGI Sting R8 Resistivity meter. S/N: SS1504294			Calibration Date: 2/06/2023

Electrode Spacing (ft)	Current Electrode Depth (in)	Potential Electrode Depth (in)	Injected Current (mA)	Measured Potential (mV)	Measured Resistance (ohm)	Apparent Resistivity (Ohm-ft)
2.50	1	1	30.0	2182.2	72.7	1143
5.00	2	2	53.0	1459.2	27.5	865
10.00	3	3	52.7	264.5	5.0	315
15.00	4	4	60.3	74.0	1.2	116
20.00	4	4	54.7	17.0	0.3	39
30.00	6	6	53.7	1.4	0.03	4.8
40.00	6	6	59.3	0.7	0.01	2.8
60.00	8	8	49.0	0.5	0.01	3.7
80.00	8	8	36.7	0.3	0.01	4.5
100.00	8	8	100.0	0.9	0.01	5.9
200.00	8	8	153.3	1.3	0.01	10.6

Field Notes:

Soil Resistivity Field Measurement Form

Location: Line R3-A			Project Name: CHPE - Astoria Annex Substation, Astoria, NY
Lat: 40.786338°	Long: -73.902947°	Orientation: 47° True North	Air Temperature: 35.7°F
Soil Type: grassy area			Date of Test: 2/20/24
Soil Conditions (wet,dry): dry, 33.2°F			Weather Conditions: Overcast
Test Completed By: Alexis Martinez, Alex Collier, Astrid Carter			Test Methods: Soil Resistivity Testing (Wenner Array)
Test Instrument: AGI Sting R8 Resistivity meter. S/N: SS1504294			Calibration Date: 2/06/2023

Electrode Spacing (ft)	Current Electrode Depth (in)	Potential Electrode Depth (in)	Injected Current (mA)	Measured Potential (mV)	Measured Resistance (ohm)	Apparent Resistivity (Ohm-ft)
2.50	1	1	26.0	494.1	19.0	299
5.00	2	2	164.3	276.4	1.7	53
10.00	3	3	346.3	48.0	0.1	9
15.00	4	4	221.7	34.5	0.2	15
20.00	4	4	112.7	12.9	0.1	14
30.00	6	6	203.7	31.1	0.2	29
40.00	6	6	141.7	15.8	0.1	28
60.00	8	8	268.0	8.1	0.03	11
80.00	8	8	257.3	4.7	0.02	9

Field Notes:

Soil Resistivity Field Measurement Form

Location: Line R3-B			Project Name: CHPE - Astoria Annex Substation, Astoria, NY
Lat: 40.786338°	Long: -73.902947°	Orientation: 134° True North	Air Temperature: 35.7°F
Soil Type: grassy area			Date of Test: 2/20/24
Soil Conditions (wet,dry): dry, 33.2°F			Weather Conditions: Overcast
Test Completed By: Alexis Martinez, Alex Collier, Astrid Carter			Test Methods: Soil Resistivity Testing (Wenner Array)
Test Instrument: AGI Sting R8 Resistivity meter. S/N: SS1504294			Calibration Date: 2/06/2023

Electrode Spacing (ft)	Current Electrode Depth (in)	Potential Electrode Depth (in)	Injected Current (mA)	Measured Potential (mV)	Measured Resistance (ohm)	Apparent Resistivity (Ohm-ft)
2.50	1	1	83.3	2237.5	26.8	422
5.00	2	2	51.3	93.2	1.8	57
10.00	3	3	76.0	17.5	0.2	14
15.00	4	4	113.7	15.9	0.1	13

Field Notes:

Soil Resistivity Field Measurement Form

Location: Line R4-A			Project Name: CHPE - Astoria Annex Substation, Astoria, NY
Lat: 40.786764°	Long: -73.902048°	Orientation: 41° True North	Air Temperature: 35.2°F
Soil Type: grassy/gravelly area			Date of Test: 2/20/24
Soil Conditions (wet,dry): dry, 28.2°F			Weather Conditions: Overcast
Test Completed By: Alexis Martinez, Alex Collier, Astrid Carter			Test Methods: Soil Resistivity Testing (Wenner Array)
Test Instrument: AGI Sting R8 Resistivity meter. S/N: SS1504294			Calibration Date: 2/06/2023

Electrode Spacing (ft)	Current Electrode Depth (in)	Potential Electrode Depth (in)	Injected Current (mA)	Measured Potential (mV)	Measured Resistance (ohm)	Apparent Resistivity (Ohm-ft)
2.50	1	1	28.0	39.0	1.4	22
5.00	2	2	34.7	6.0	0.2	5
10.00	3	3	119.0	8.0	0.1	4
15.00	4	4	52.3	2.5	0.05	5
20.00	4	4	187.0	7.3	0.04	5
30.00	6	6	404.7	13.7	0.03	6
40.00	6	6	138.0	4.5	0.03	8

Field Notes:

Soil Resistivity Field Measurement Form

Location: Line R4-B			Project Name: CHPE - Astoria Annex Substation, Astoria, NY
Lat: 40.786764°	Long: -73.902048°	Orientation: 130° True North	Air Temperature: 35.2°F
Soil Type: grassy/gravelly area			Date of Test: 2/20/24
Soil Conditions (wet,dry): dry, 28.2°F			Weather Conditions: Overcast
Test Completed By: Alexis Martinez, Alex Collier, Astrid Carter			Test Methods: Soil Resistivity Testing (Wenner Array)
Test Instrument: AGI Sting R8 Resistivity meter. S/N: SS1504294			Calibration Date: 2/06/2023

Electrode Spacing (ft)	Current Electrode Depth (in)	Potential Electrode Depth (in)	Injected Current (mA)	Measured Potential (mV)	Measured Resistance (ohm)	Apparent Resistivity (Ohm-ft)
2.50	1	1	35.3	109.4	3.1	49
5.00	2	2	222.7	51.2	0.2	7
10.00	3	3	310.3	17.4	0.1	4

Field Notes:

APPENDIX D – LABORATORY TEST RESULTS

Thielsch DIVISION OF THE RISE GROUP	195 Frances Avenue Cranston RI, 02910 Phone: (401)-467-6454 Fax: (401)-467-2398 cts.thielsch.com *Let's Build a Solid Foundation*	Client Information: GZA GeoEnvironmental New York, NY Project Manager: Dharmil Patel Assigned By: Natalie Wilcox Collected By: GZA	Project Information: **Astoria CHPE - Annex Upgrades** **31-01 20th Ave, Astoria NY 11105** Project Number: 41.0163233.00 Summary Page: 1 of 2 Report Date: 6/3/2024

LABORATORY TESTING DATA SHEET, Report No.: 7424-E-218

Material Source	Sample ID	Depth (ft)	Laboratory No.	Identification Tests									Proctor / CBR / Permeability Tests							Laboratory Log and Soil Description
				As Rcvd Moisture Content %	LL %	PL %	OD LL	Gravel %	Sand %	Fines %	Org. %	pH	g_d MAX (pcf) W_{opt} (%)	g_d MAX (pcf) W_{opt} (%) (Corr.)	Dry unit wt. (pcf)	Test Moisture Content %	Target Test Setup as % of Proctor	CBR @ 0.1"	CBR @ 0.2"	Permeability cm/sec	
				D2216	D4318			C136			D2974	D4792	D1557							
B-7	S-1	6-8	24-S-1993	15.1				5.1	66.2	28.7										Dark Grey f-m SAND, some Silt, trace fine Gravel
B-7	S-12	40-42	24-S-1994					0.0	43.6	56.4										Grey Clayey SILT and f-c SAND
B-7	S-16	60-62	24-S-1995					0.0	58.4	41.6										Grey f-m SAND and SILT
B-8	S-8	20-22	24-S-1996	13.6				11.7	69.2	19.1										Brown f-m SAND, little Silt, little fine Gravel
B-9	S-8	20-22	24-S-1997	80.7	102	46					4.3									Dark Brown Organic CLAY
B-9	S-11	35-37	24-S-1998	24.2				0.0	14.9	85.1										Brown SILT & CLAY, little fine Sand
B-9	S-13	45-47	24-S-1999	15.7				0.0	78.2	21.8										Dark Brown f-m SAND, some Silt
B-3	S-8	25-27	24-S-2000	63.9	82	38					3.1									Dark Grey CLAY
B-3	S-12	45-47	24-S-2001	26.4				0.0	6.6	93.4										Olive Clayey SILT, trace fine Sand
B-4	S-8	20-22	24-S-2002	89.0	121	46					6.6									Grey Organic CLAY
B-4	S-12	30-32	24-S-2003					1.1	86.1	12.8										Brown f-m SAND, little Silt, trace fine Gravel
B-4	S-14	42-44	24-S-2004					20.5	75.1	4.4										Brown f-c SAND, some f-c Gravel, trace Silt

Date Received: **5/23/2024** Reviewed By: Date Reviewed: **6/3/2024**

Thielsch
DIVISION OF THE RISE GROUP

195 Frances Avenue
Cranston RI, 02910
Phone: (401)-467-6454
Fax: (401)-467-2398
cts.thielsch.com
Let's Build a Solid Foundation

Client Information:	
GZA GeoEnvironmental	
New York, NY	
Project Manager:	Dharmil Patel
Assigned By:	Natalie Wilcox
Collected By:	GZA

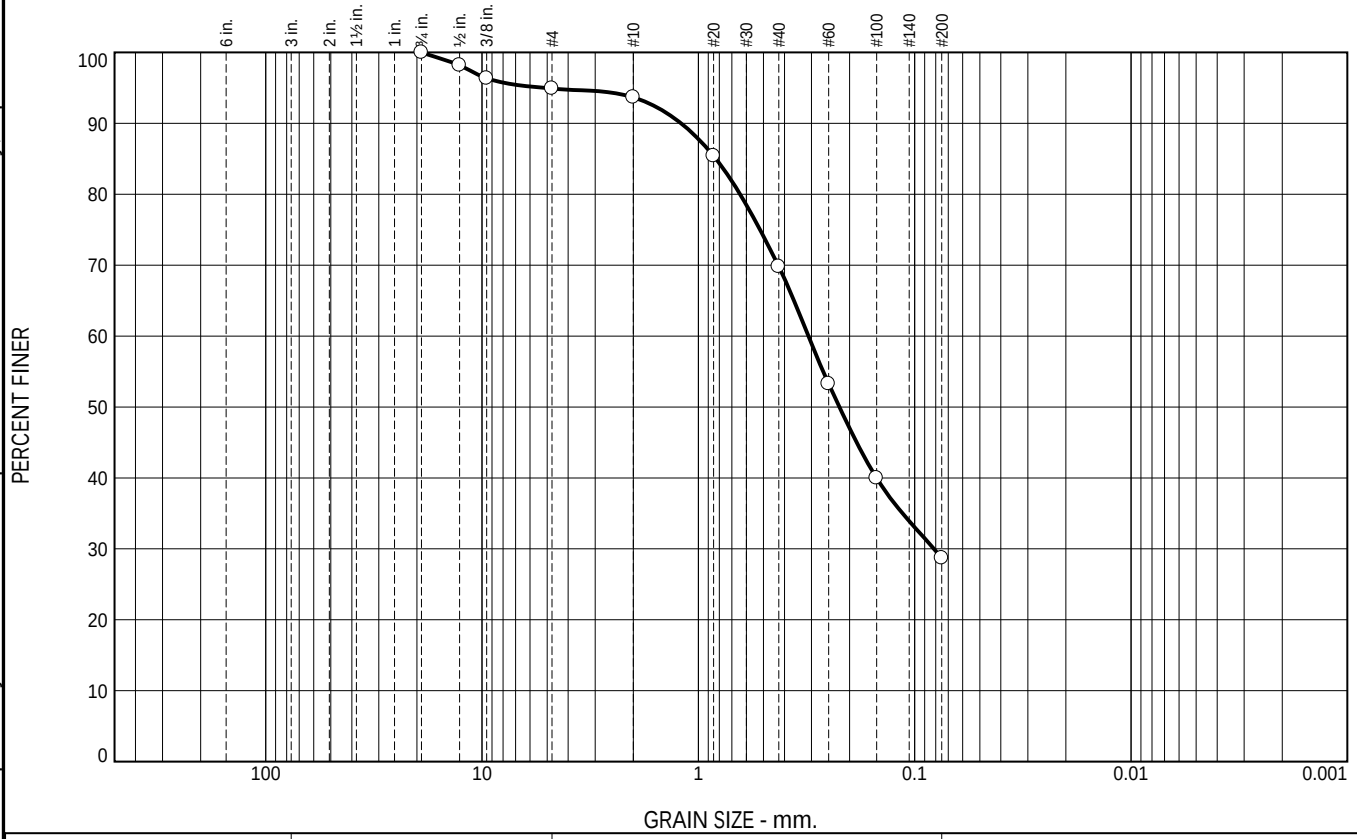
Project Information:	
Astoria CHPE - Annex Upgrades	
31-01 20th Ave, Astoria NY 11105	
Project Number:	41.0163233.00
Summary Page:	2 of 2
Report Date:	6/3/2024

LABORATORY TESTING DATA SHEET, Report No.: 7424-E-218

Material Source	Sample ID	Depth (ft)	Laboratory No.	Identification Tests								Proctor / CBR / Permeability Tests								Laboratory Log and Soil Description
				As Rcvd Moisture Content %	LL %	PL %	OD LL	Gravel %	Sand %	Fines %	Org. %	pH	g_d MAX (pcf) W_{opt} (%)	g_d MAX (pcf) W_{opt} (%) (Corr.)	Dry unit wt. (pcf)	Test Moisture Content %	Target Test Setup as % of Proctor	CBR @ 0.1"	CBR @ 0.2"	Permeability cm/sec	
				D2216	D4318			C136			D2974	D4792	D1557								
B-5	S-9	25-27	24-S-2005	73.8	82	37					3.6										Dark Grey CLAY
B-5	S-13	43-45	24-S-2006	33.6	61	32					2.0										Dark Brown Silty CLAY
B-5	S-10	30-32	24-S-2007	22.0				0.0	22.9	77.1											Brown SILT & CLAY, some f-m Sand
B-6	S-14	50-52	24-S-2008					0.0	76.1	23.9											Grey f-m SAND, some Silt
B-2	S-4	12-14	24-S-2009	8.5				46.0	45.2	8.8											Dark Brown f-c GRAVEL and f-c SAND, trace Silt
B-2	S-13	43-45	24-S-2010	30.5	58	28					1.3										Dark Brown Silty CLAY
B-2	S-11	35-37	24-S-2011	8.9				10.7	57.5	31.8											Brown f-m SAND, some Silt, little f-c Gravel
B-1	S-7	20-22	24-S-2012					20.5	68.9	10.6											Dark Brown f-c SAND, some f-c Gravel, little Silt
B-1	S-8	25-27	24-S-2013	16.4				6.3	69.0	24.7											Brown f-m SAND, some Clayey Silt, trace fine Gravel

Date Received: **5/23/2024** Reviewed By: Date Reviewed: **6/3/2024**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	5.1	1.2	23.9	41.1	28.7	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4"	100.0		
1/2"	98.2		
3/8"	96.4		
#4	94.9		
#10	93.7		
#20	85.4		
#40	69.8		
#60	53.3		
#100	40.0		
#200	28.7		

* (no specification provided)

Source of Sample: Boring Depth: 6-8'
Sample Number: B-7 / S-1

Soil Description
Dark Grey f-m SAND, some Silt, trace fine Gravel

Atterberg Limits
PL= NP LL= NV PI= NP

Coefficients
D_{90}= 1.2014 D_{85}= 0.8292 D_{60}= 0.3100
D_{50}= 0.2229 D_{30}= 0.0814 D_{15}=
D_{10}= C_u= C_c=

Classification
USCS= SM AASHTO= A-2-4(0)

Remarks

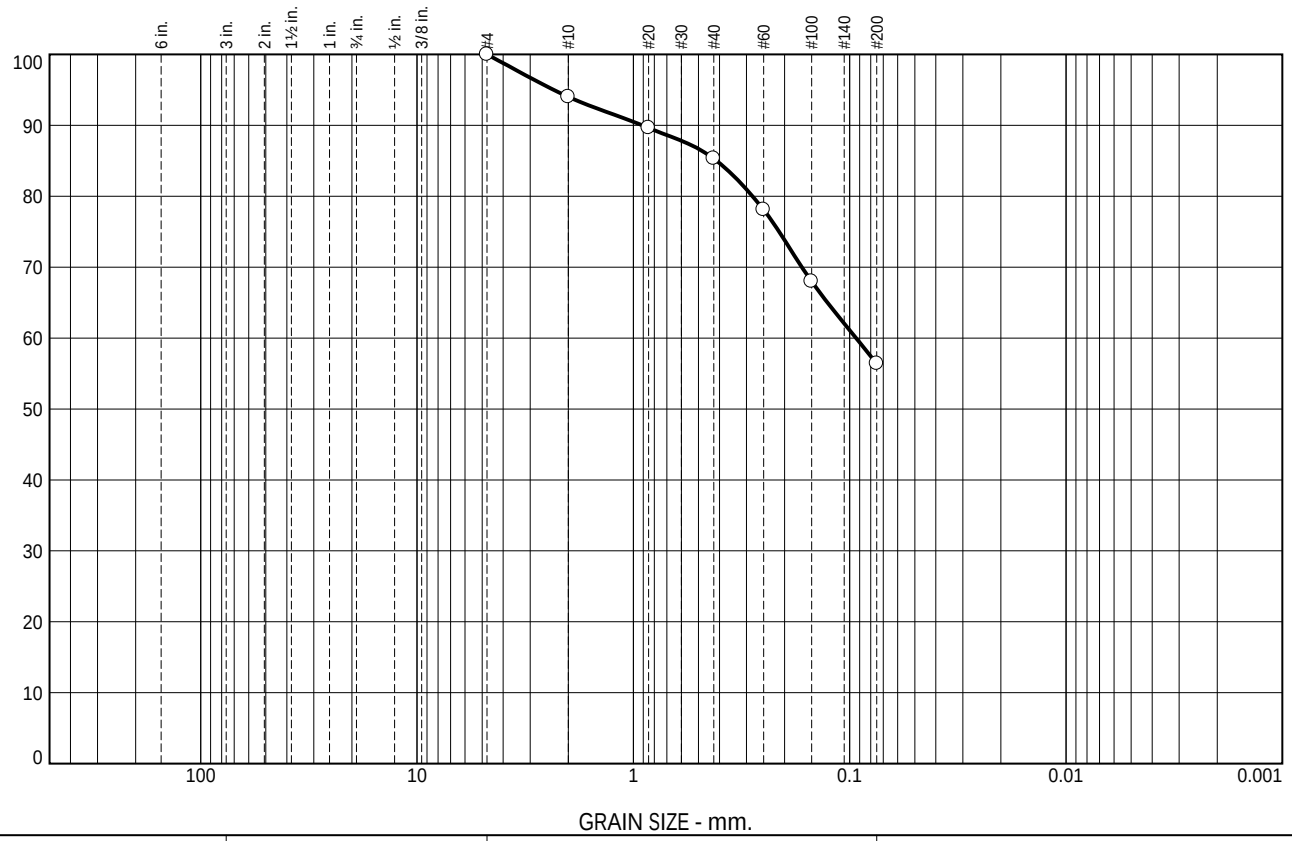
Date: 5.30.24

Thielsch Engineering Inc.
Cranston, RI

Client: GZA GeoEnvironmental
Project: Astoria CHPE - Annex Upgrades
31-01 20th Ave, Astoria NY 11105
Project No: 41.0163233.00 Fig. 24-S-1993

Tested By: MCS Checked By: Kris Roland

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	6.0	8.7	28.9	56.4	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	94.0		
#20	89.6		
#40	85.3		
#60	78.1		
#100	68.0		
#200	56.4		

* (no specification provided)

Soil Description

Grey Clayey SILT and f-c SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.9071 D_{85}= 0.4123 D_{60}= 0.0935
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= ML AASHTO= A-4(0)

Remarks

Sample visually classified as plastic. Sample rolled to 1/4"

Source of Sample: Boring Depth: 40-42'
Sample Number: B-7 / S-12

Date: 5.30.24

Thielsch Engineering Inc.

Cranston, RI

Client: GZA GeoEnvironmental
Project: Astoria CHPE - Annex Upgrades
31-01 20th Ave, Astoria NY 11105
Project No: 41.0163233.00 Fig. 24-S-1994

Tested By: MCS Checked By: Kris Roland

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.7	18.8	38.9	41.6	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.3		
#20	93.8		
#40	80.5		
#60	65.2		
#100	52.6		
#200	41.6		

* (no specification provided)

Soil Description

Grey f-m SAND and SILT

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 0.6641 D_{85}= 0.5171 D_{60}= 0.2053
D_{50}= 0.1307 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-4(0)

Remarks

Sample visually classified as non-plastic.

Source of Sample: Boring Depth: 60-62'
Sample Number: B-7 / S-16

Date: 5.30.24

Thielsch Engineering Inc.

Cranston, RI

Client: GZA GeoEnvironmental
Project: Astoria CHPE - Annex Upgrades
31-01 20th Ave, Astoria NY 11105
Project No: 41.0163233.00 Fig. 24-S-1995

Tested By: MCS Checked By: Kris Roland

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	11.7	4.9	16.6	47.7	19.1	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4"	100.0		
1/2"	92.0		
3/8"	91.2		
#4	88.3		
#10	83.4		
#20	76.6		
#40	66.8		
#60	54.9		
#100	39.1		
#200	19.1		

* (no specification provided)

Soil Description

Brown f-m SAND, little Silt, little fine Gravel

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 6.7724 D_{85}= 2.5721 D_{60}= 0.3063
D_{50}= 0.2112 D_{30}= 0.1097 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

Source of Sample: Boring Depth: 20-22'
Sample Number: B-8 / S-8

Date: 5.30.24

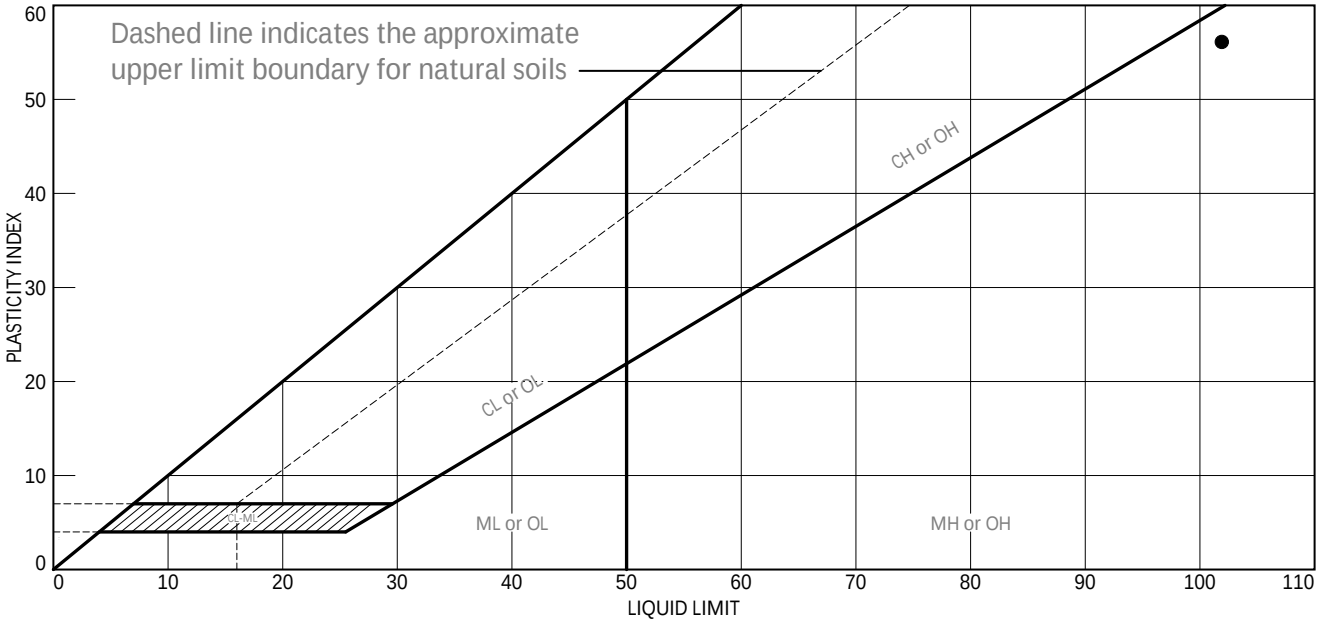
Thielsch Engineering Inc.

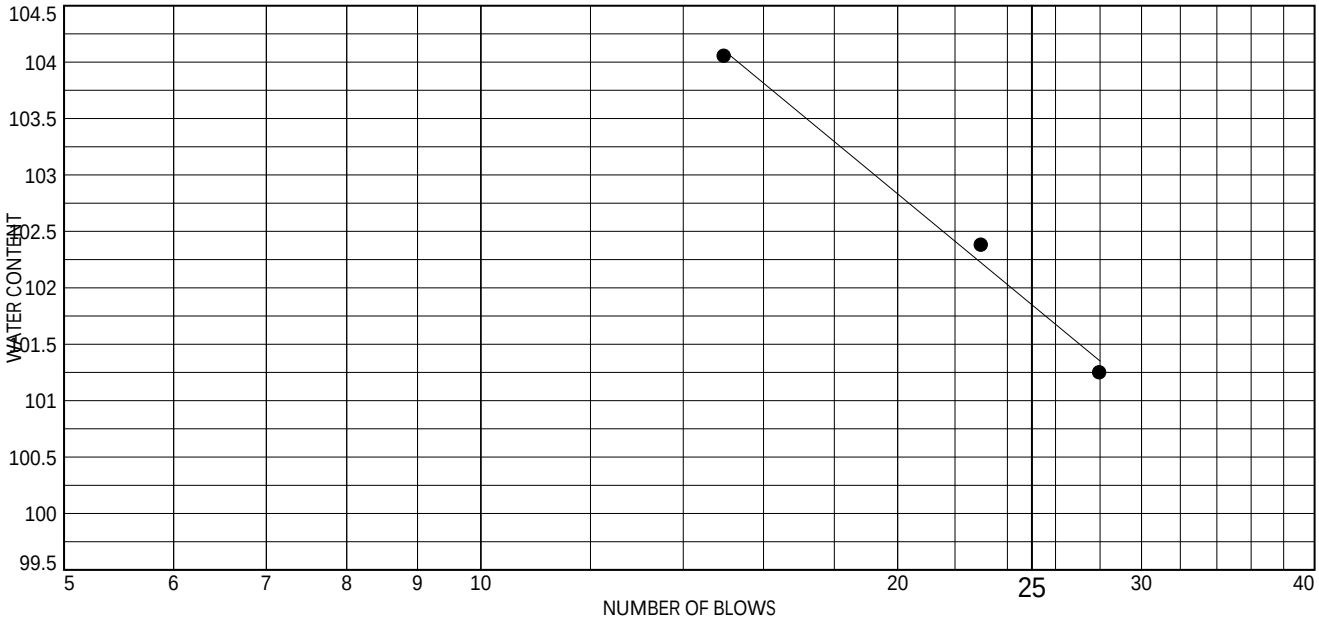
Cranston, RI

Client: GZA GeoEnvironmental
Project: Astoria CHPE - Annex Upgrades
31-01 20th Ave, Astoria NY 11105
Project No: 41.0163233.00 Fig. 24-S-1996

Tested By: MCS Checked By: Kris Roland

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Dark Brown Organic CLAY	102	46	56			

Project No. 41.0163233.00 Client: GZA GeoEnvironmental

Project: Astoria CHPE - Annex Upgrades

31-01 20th Ave, Astoria NY 11105

Source of Sample: Boring Depth: 20-22'

Sample Number: B-9 / S-8

Remarks:

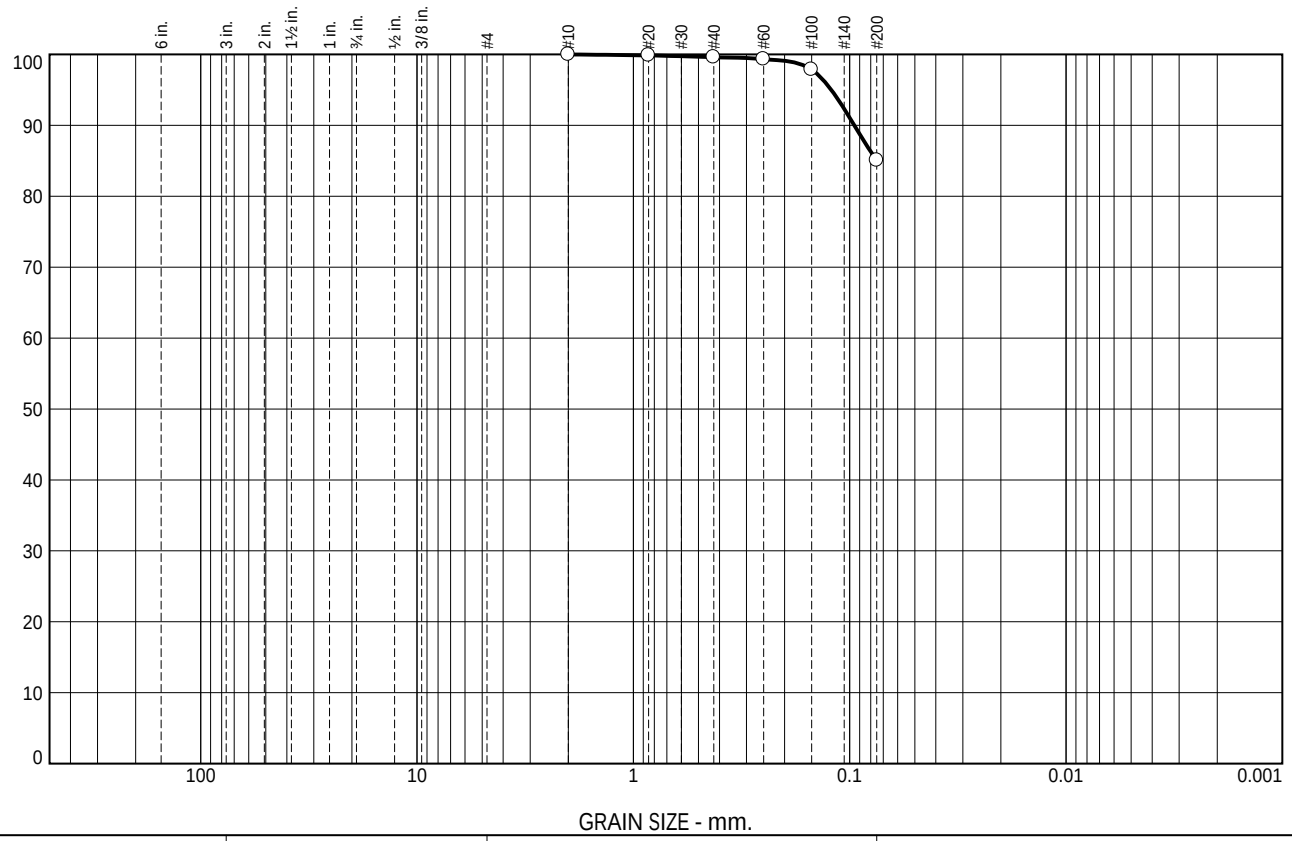
Thielsch Engineering Inc.

Cranston, RI

Fig. 24-L-1997

Tested By: SL Checked By: Kris Roland

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.4	14.5	85.1	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	99.9		
#40	99.6		
#60	99.3		
#100	97.9		
#200	85.1		

* (no specification provided)

Soil Description

Brown SILT & CLAY, little fine Sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.0952 D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= ML AASHTO= A-4(0)

Remarks

Sample visually classified as plastic. Sample rolled to 1/8".

Source of Sample: Boring Depth: 35-37'
Sample Number: B-9 / S-11

Date: 5.30.24

Thielsch Engineering Inc.

Cranston, RI

Client: GZA GeoEnvironmental
Project: Astoria CHPE - Annex Upgrades
31-01 20th Ave, Astoria NY 11105
Project No: 41.0163233.00 Fig. 24-S-1998

Tested By: MCS Checked By: Kris Roland

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.6	19.1	58.5	21.8	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.4		
#20	96.0		
#40	80.3		
#60	57.2		
#100	36.2		
#200	21.8		

* (no specification provided)

Soil Description

Dark Brown f-m SAND, some Silt

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 0.6011 D_{85}= 0.4947 D_{60}= 0.2668
D_{50}= 0.2123 D_{30}= 0.1168 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

Source of Sample: Boring Depth: 45-47'
Sample Number: B-9 / S-13

Date: 5.30.24

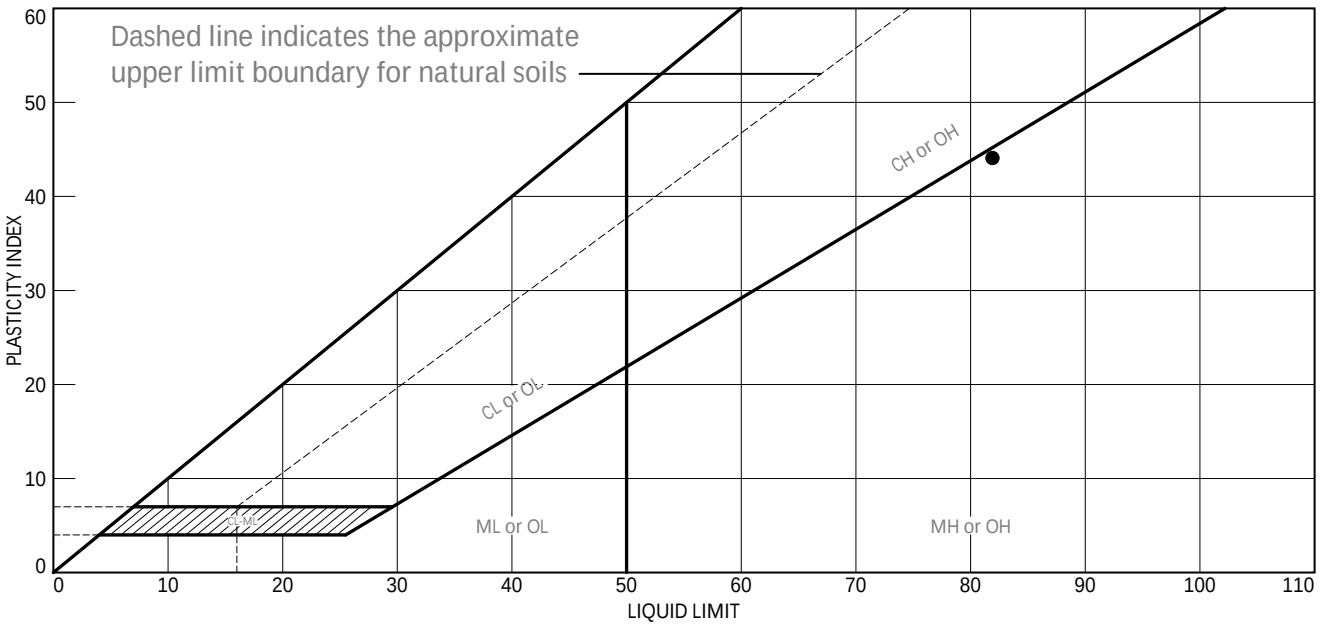
Thielsch Engineering Inc.

Cranston, RI

Client: GZA GeoEnvironmental
Project: Astoria CHPE - Annex Upgrades
31-01 20th Ave, Astoria NY 11105
Project No: 41.0163233.00 Fig. 24-S-1999

Tested By: MCS Checked By: Kris Roland

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Dark Grey CLAY	82	38	44			

Project No. 41.0163233.00 Client: GZA GeoEnvironmental

Project: Astoria CHPE - Annex Upgrades

31-01 20th Ave, Astoria NY 11105

Source of Sample: Boring Depth: 25-27'

Sample Number: B-3 / S-8

Remarks:

Thielsch Engineering Inc.

Cranston, RI

Fig. 24-L-2000

Tested By: SL Checked By: Kris Roland